



In-Depth Productivity Review of Belgium



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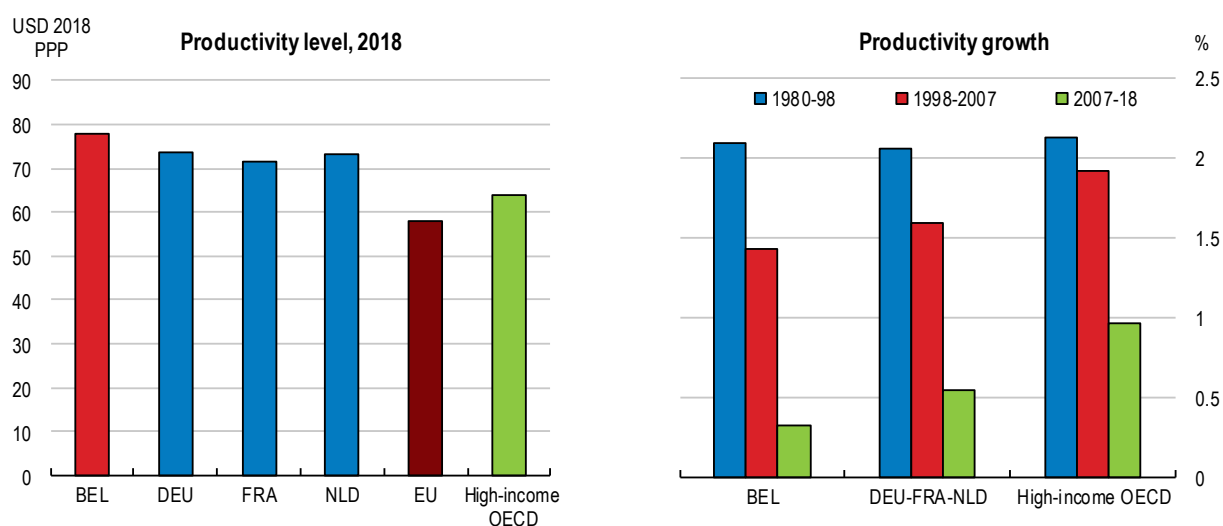
Executive summary

The Belgian economy is in an enviable position in many ways. Its citizens have strong talent and skills. Firms have a leading edge in digitalisation. Capital intensity is high. Many multinational enterprises aspire to locate in the country. These are all among the factors that make Belgium one of the most productive economies in Europe and in the world. Productivity – how much a worker produces in a given period of time – matters because, if it is high as in Belgium, it ensures high incomes, room for leisure time and good overall well-being. Higher productivity means working smarter, rather than more hours, and being rewarded for it with higher wages.

Why Belgium needs urgent reform to reignite productivity growth

However, since the late-1990s growth of productivity has declined quite strongly, and more so than in other advanced countries. From 1980 to 1998, productivity growth in Belgium averaged 2.1% per year, the same as in high-income OECD countries in aggregate and in a composite of France-Germany-the Netherlands, Belgium's main trading partners. Since then, it has averaged only 0.8% in Belgium, against 1.4% in high-income OECD countries and 1.0% in France-Germany-the Netherlands. Therefore, while Belgium's productivity growth used to be in line with that of peer countries 20-40 years ago, it is now well behind. The report estimates the total productivity shortfall over the last 20 years to be in the range of 20-25%. Most worryingly, over the past decade productivity growth in Belgium has been a mere 0.3% per year.

Belgium's productivity in international comparison: High level, low growth



Note: Productivity is measured as GDP per hour worked, and in the right panel in constant prices, USD 2010 purchasing power parities. High-income OECD is the weighted average of Australia, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, the Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, the United Kingdom and the United States.

Source: OECD estimates based on OECD Productivity Statistics Database.

Belgian citizens are already paying the price for the slowdown in productivity. With so few productivity gains, social partners have very little to bargain about, and hourly real wages have increased by a mere ½ per cent per year over the past decade. With working hours declining, annual wages have effectively stagnated. All this means that Belgium's position as a high-productivity and high-wage country is under threat. A particular concern is that productivity growth has been weakest in the firms and regions (Wallonia) that were already underperforming. Should these trends continue, they could lead to economic and political tensions.

The sometimes expressed argument, that the productivity slowdown in Belgium is the inevitable consequence of a trade-off of higher employment with lower productivity, does not find empirical support in this report. In this view of a “productivity sacrifice”, the successful policies of bringing more low-skilled people into work have mechanically pulled productivity down. But this negative compositional effect has been far outweighed by the positive effect on skills through the general improvement in educational attainment. The share of the low-educated in the workforce is lower than elsewhere and has declined more. Thus, the rise of employment is unlikely to be a significant explanation for the productivity slowdown in Belgium compared with other countries.

The good news coming out of this is that productivity growth is not destined to be low, even as employment and jobs continue to be high policy priorities. Belgium's potential is great, with a highly educated workforce, technologically advanced firms and a deep integration in global value chains. It is in the hands of policy makers to change course and lift productivity growth out of the lows of the past two decades. Belgium's government has begun to tackle the challenges of productivity by, for example, developing the National Pact for Strategic Investments, establishing a National Productivity Board and taking some measures to stimulate product market competition. But, to really make a difference, more action is necessary.

The 7-Point Action Plan

This report recommends a 7-Point Action Plan, focusing on the areas where reform is most urgent, to reinvigorate Belgium's productivity growth. The seven action points and their associated main recommendations are as follows.

Action 1: Promoting competition and easing regulatory restrictions in services

- Make product market regulation more competition-friendly, especially in sectors with tight restrictions: retail distribution and several professional services (lawyers, notaries, accountants, architects and estate agents). According to new OECD indicators, product market regulation in Belgium overall is among the most stringent in OECD countries and barriers in services sectors are the highest.
- Involve the competition authority in competition impact assessments for new laws and regulations to ensure independence of assessments, and generally support the authority in becoming a more effective enforcer of competition law.

Action 2: Improving the effectiveness of government support for R&D

Redesign the current public research and development (R&D) support policy, which is very expensive, but does not appear to translate in high economy-wide productivity growth. The return on public R&D support and the targeting of young innovative firms need to improve:

- A recent evaluation suggests that the two federal measures acting at the corporate level (tax incentives for R&D investment and “innovation income”) do not create additional R&D activity, while others are more effective. To improve their “bang for the buck”, consideration could for example be given to cap eligible sums at an upper limit, so that small and innovative firms receive a larger pie.
- Shifting support from the two corporate tax incentive measures to direct government funding, which tends to target small and young firms better, could be another reform option. But it would also be challenging, as tax credits are a federal and R&D funds a regional competence.

Action 3: Strengthening risk capital and reducing costs on risk-taking

- Strengthen the provision of venture capital to fast-growing young firms, building on the recent joint initiative with the European Investment Fund, and consider creating a mini-bond market for small firms. Complement these measures with actions to alter cultural mindsets towards greater risk-taking, reduce the tax privileges for safe assets (savings accounts and life insurance) and ensure a better social safety net for entrepreneurs.
- Continue to reform the firm insolvency regime, which is one of the least favourable to productivity in the OECD. This should build on the successful reform in 2018, which nevertheless left scope to further strengthen some design features of the regime.

Action 4: Facilitating the job mobility of workers away from ailing firms

Make it easier for companies in economic difficulty to downsize and for workers in these companies to find new work in fast-growing firms and sectors. This requires in particular increasing the flexibility of collective dismissals, which according to OECD indicators are among the most regulated in OECD countries, while continuing to help workers acquire new skills. Suitable options to enhance such flexibility are to: *i)* shorten the length of the consultation procedure with employee representatives by setting explicit criteria in the law when it ends or involving a third party, such as a social mediator; *ii)* have one notification, rather than two; and *iii)* make use of mutually-agreed collective termination agreements.

Action 5: Supporting the creation of a new culture of lifelong learning

- Raise the legal entitlement to training of employees from two working days per year to the said objective of five working days, and ensure that the entitlement applies to each employee, not all employees in the firm on average. Take-up should be monitored and firms encouraged to provide their workers with counselling on learning opportunities.
- The French Community should consider participating in PIAAC, the OECD Survey of Adult Skills, and the Brussels-Capital Region and Wallonia may consider undertaking an *OECD Skills Strategy* project, like Flanders.

Action 6: Giving firms and workers more freedom to set wages

- Allow for more decentralisation of collective bargaining, within the framework of sector-level agreements, to better align wages with productivity at the level of the individual firm. The system has done well at the macroeconomic level in preserving

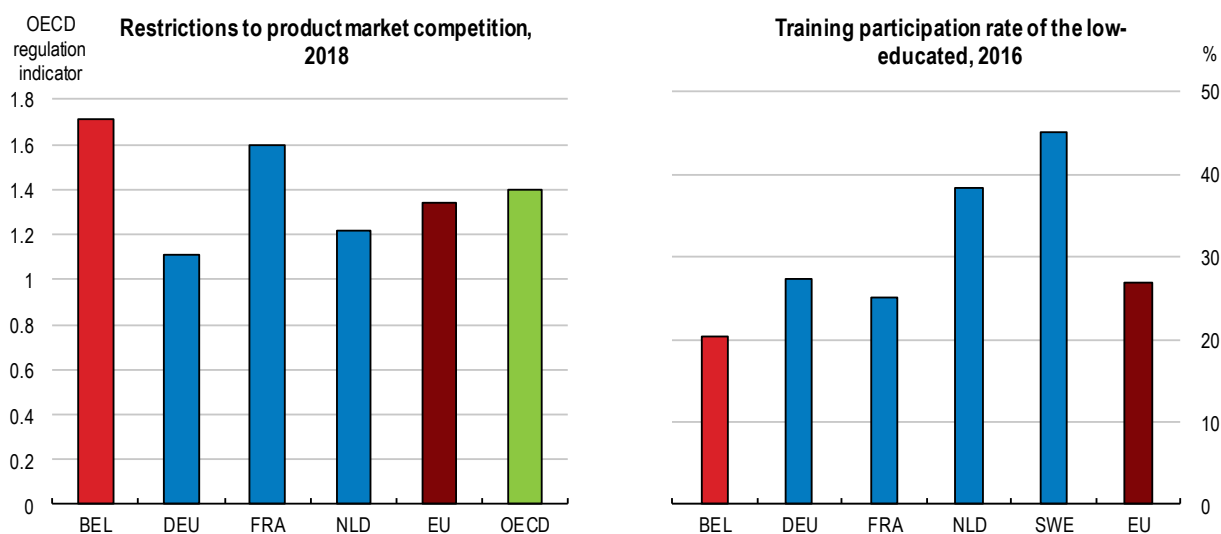
competitiveness. But the empirical analyses suggest that wages are not adaptable enough to support career opportunities of workers and productivity growth. Policy options are: *i)* wider corridor agreements at the sector level that give more room to set wages at each firm; and *ii)* more frequent exceptions to the favourability principle via opt-out clauses. These elements of collective agreements fall in the domain of the social partners and hence should in the first place be discussed by them. The government could, however, encourage their use by conditioning administrative extensions of collective agreements on them.

- Reduce the weight of seniority in total wage compensation, especially for white-collar workers, to make career progression more meritocratic and improve work incentives.

Action 7: Making the public finances more friendly to productivity growth

- In future fiscal plans, prioritise public investment in transport and digital infrastructure and university funding, which on a per student basis has markedly declined. Areas for savings could be identified with the help of a comprehensive spending review. Such a spending review should also co-function as a tool to improve efficiency, or productivity, in the public sector.
- To enhance residential and labour mobility, reduce the tax privileges for homeowners and lower the high registration duties on real estate transactions, for example by making duties in the Brussels-Capital Region and Wallonia transferable, as in Flanders.

Two of the contributors to low productivity growth: Strong restrictions to product market competition and insufficient training of the low-skilled



Note: The OECD product market regulation indicators measure distortions induced by state involvement and barriers to domestic and foreign entry; the higher is the value, the stronger are the regulatory restrictions. The training participation rate of the low-educated is the participation rate in formal and non-formal education and training over the last 12 months of persons who are aged 25-64 and whose highest education degree is below upper secondary education. EU and OECD are the unweighted average of EU and OECD countries for which data are available. Figures 9 and 14 in the overview chapter show the estimates for all countries with available data.

Source: OECD 2018 Product Market Regulation Database and Eurostat Adult Education Survey.

Content of this report

Following through with the put forward 7-Point Action Plan would ensure higher wage growth and productivity growth, as well as a broad range of other benefits, such as higher pensions, better health care and greater social cohesion. The productivity plan would not go against other important objectives, in particular good levels of employment and wage equality. No action is also a path policy makers may choose. However, the prospect then is continued wage stagnation, little progress in living standards, more erosion of Belgium's productivity advantage over peer countries and increasing risks of social discontent.

Next comes the overview chapter which presents the main takeaways and policy lessons. It is followed by three analytical chapters that lay out the evidence base: Chapter 1 on economy-wide and sector-level trends in productivity; Chapter 2 on the firm dimension of productivity, with a focus on the role of productivity dispersion and firm dynamics; and Chapter 3 on the worker dimension of productivity, with a focus on the role of wages and skills.

The policy insights in this executive summary and the overview chapter draw on the three analytical chapters, the last *OECD Economic Survey of Belgium* of 2017 and many other policy-relevant issues. While the policy insights in this report build, as is natural, to a certain extent on material in the last *Survey*, most of the conclusions and results are new. This is thanks to resource-intensive in-depth research that uses micro-data on productivity and employment in Chapters 2 and 3, type of work that would not normally be possible in the context of a *Survey*. Another particularity is that the *Review* involved multi-disciplinary teams with experts in their fields from various parts of the OECD.

Overview of main findings and policy recommendations

Promoting productivity growth is essential for increasing incomes, living standards and well-being. The key facts regarding productivity in Belgium are as follows.

Fact 1: *Productivity is very high. But its growth has declined strongly over the past two decades, despite an increasingly skilled workforce.*

Fact 2: *Productivity developments have been heterogeneous: growth has been relatively high in manufacturing, for already high-productivity firms and in Flanders. However, it has been weak in service sectors, for low-productivity firms and in Wallonia.*

Fact 3: *Inertia, rather than dynamism, describes the business landscape and work careers: few firms enter and exit, and workers stay in the same job for long.*

If these trends continue, Belgium's position as a high-productivity and high-wage country is under threat. Further divergence between frontier and lagging firms and regions may also increasingly become a source of economic and political tensions.

The 7-Point Action Plan:

Reviving Belgium's productivity growth requires action in many areas cutting across governments and ministerial competences. The first three actions relate primarily to the business environment, the next three to the labour market and the final one to the public finances.

Action 1: *Promoting competition between businesses in services: this means lowering the regulatory restrictions in services and enhancing the role of the competition authority.*

Action 2: *Improving the effectiveness of government support for R&D: the objective should be to shift support to schemes and firms that create the most additional R&D.*

Action 3: *Strengthening the provision of risk capital and reducing unnecessary costs on risk-taking, in particular by making insolvencies less burdensome.*

Action 4: *Facilitating the job mobility of workers away from firms in economic difficulty to high-growth firms and sectors.*

Action 5: *Supporting the creation of a new culture of lifelong learning to better prepare citizens for an increasingly complex world of work.*

Action 6: *Giving firms and workers more freedom to set wages, with greater scope to adapt collective agreements and compensation systems based more on merit and less on seniority.*

Action 7: *Prioritising public investment in transport and digital infrastructure and university funding, and reducing the tax penalties for moving home and jobs.*

The main policy priority of successive Belgian governments since the mid-1990s has been to make the labour market more inclusive, while coping with high public debt. This prioritisation was correct in light of the very low employment rate. Reforms have been successful: employment has grown considerably and is at a record-high level. Nevertheless, it remains somewhat below that in other advanced countries, where employment has grown as well.

However, in the shadow of increasing employment, productivity gains have fallen severely, and more than in peer countries. This is worrying since lower productivity growth means less progress in wages, living standards and well-being. In addition, the productivity slowdown has been concentrated in firms and regions that are already underperforming. It is therefore felt most strongly by workers in low-productivity, low-pay firms and regions. Should these trends continue, they may become a source of economic, social and political tensions.

Today, Belgium and its authorities face a twin policy challenge: to continue to support improvements in the labour market and to promote stronger productivity growth. Important initiatives, for example the National Pact for Strategic Investments and the establishment of a National Productivity Board, have been undertaken to rebalance the policy focus more towards productivity. This report explains why more measures are needed and which ones are the most promising. It describes three key facts about productivity and recommends a 7-Point Action Plan to restart productivity growth.

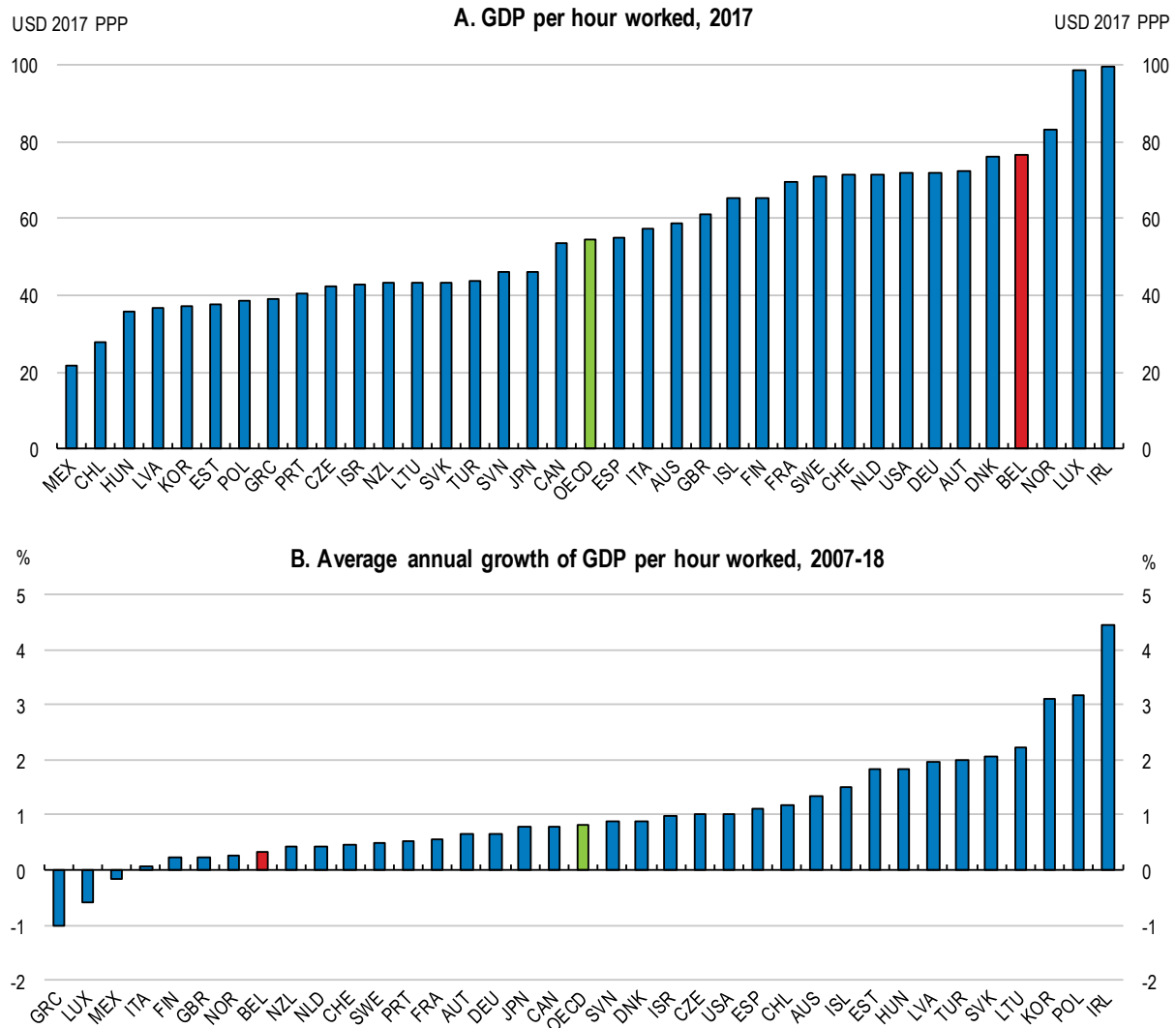
Belgium's productivity slowdown: Long-lasting and increasingly more severe

Higher productivity means working smarter. It allows workers to produce more in the same amount of time or to produce the same while working less: higher productivity increases people's wages and incomes or their time to enjoy leisure. Higher productivity is also desirable to better finance social needs, such as pensions or health care, and improve overall well-being. In addition, it is good for fiscal sustainability and reduces the tax burden on current and future generations. Higher productivity comes with positive developments, such as innovation, diffusion of knowledge and investment. It is distinct to the concept of competitiveness, which benchmarks Belgium's labour costs and business environment with those in other countries. Greater productivity growth improves competitiveness and makes therefore higher wages more affordable.

Fact 1: Productivity in Belgium: High, but growing more slowly than abroad

Belgium is a country with very high productivity (Figure 1, Panel A), thanks to several explaining factors that include good education, a technological edge in some sectors, a high stock of (non-residential) capital, a deep integration in global value chains and a strong presence of multinational enterprises. The high level of labour productivity helps afford high levels of labour costs.

The high level of Belgium's productivity is due to strong productivity gains in the decades after World War II. Then, in the 1980s and 1990s, labour productivity in Belgium and in the rest of the OECD grew by about the same rate. But since the turn of the century, and over the past ten years, productivity growth has been lower than in most other OECD countries (Figure 1, Panel B). The large historic productivity advantage has meant that even today Belgium is a high-productivity country, although this is set to change, if recent trends will continue.

Figure 1. Belgium has very high productivity, but low productivity growth rates

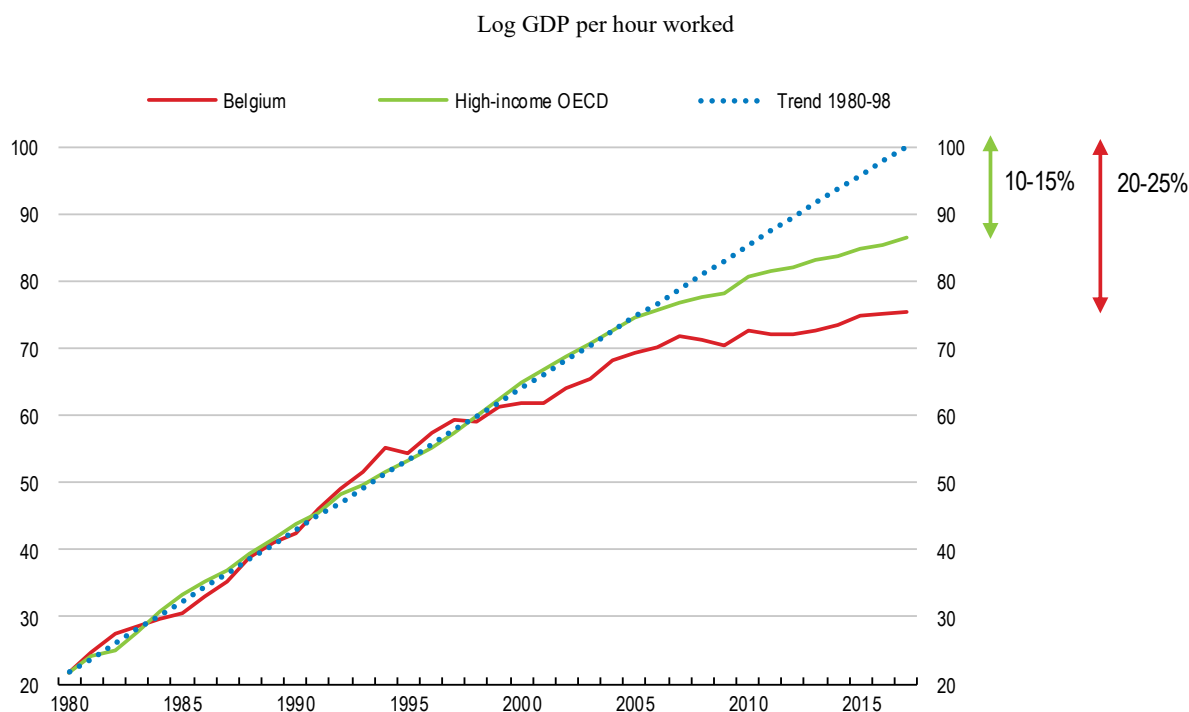
Note: The OECD number for labour productivity is total GDP divided by total hours worked in the OECD. In Panel B, data are measured in constant prices, USD 2010 purchasing power parities, and refer to 2007-17 for a few countries for which no data for 2018 are available.

Source: OECD estimates based on OECD Productivity Statistics Database.

The productivity shortfall can be associated with a significant welfare loss. To get an order of magnitude of the loss, one can compare actual productivity levels with a simple counterfactual that assumes that productivity growth would have continued at the average 1980-98 rate. On this yardstick, the labour productivity shortfall experienced by Belgium since 1998 is in the range of 20-25%, which is about twice as high as the shortfall for other high-income OECD countries (Figure 2). To some extent, one might expect countries with lower productivity to catch up with Belgium. However, such convergence in productivity should not be taken to be inevitable. In the 1980s and 1990s, Belgium was able to maintain the distance in productivity to other countries. Furthermore, within Belgium, as is shown below, there has been divergence, with productivity in Wallonia, the region with the lowest productivity level, growing at the lowest rate.

Based on this back-of-the-envelope calculation, global factors, common to all industrial countries, account for around half and Belgium-specific factors (taken to include a possible role of convergence) for the other half of the productivity slowdown in Belgium. From the comparison, it appears also that the productivity slowdown in Belgium started in the late 1990s and hence earlier than in many other OECD countries, where the slowing down set in in the second half of the subsequent decade.

Figure 2. The productivity shortfall in Belgium over the past two decades is 20-25%



Note: Data are measured in constant prices, USD 2010 purchasing power parities. The high-income OECD number is the average, weighted by the number of hours worked, for the following countries: Australia, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, the Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, the United Kingdom and the United States. The dotted line is a linear trend through the data points in 1980 and 1998. Its 2017 value is normalised to 100.

Source: OECD estimates based on OECD Productivity Statistics Database.

The slowdown of productivity that is observed across industrial countries has been documented extensively (OECD, 2015^[1]; OECD, 2016^[2]; Cordemans, 2018^[3]; Gordon and Sayed, 2019^[4]). To a certain extent, it comes as a surprise since a productivity boost could have been expected from rapid technological changes and investment-friendly low interest rates. Another element of the debate is that the productivity slowdown is sometimes argued to be due to mismeasurement of the value of digital products and other new technologies, but this is unlikely to be the main explanation (Byrne, Fernald and Reinsdorf, 2016^[5]; Ahmad, Ribarsky and Reinsdorf, 2017^[6]; Syverson, 2017^[7]).

The worrying global trend of declining productivity growth is a key issue for economists and policy makers. This *Review* is devoted to the Belgian economy, and focuses on Belgian specificities with respect to productivity, but these cannot be disconnected from explanatory factors behind the global slowdown. Among the numerous potential causes for the global slowdown are the following ones:

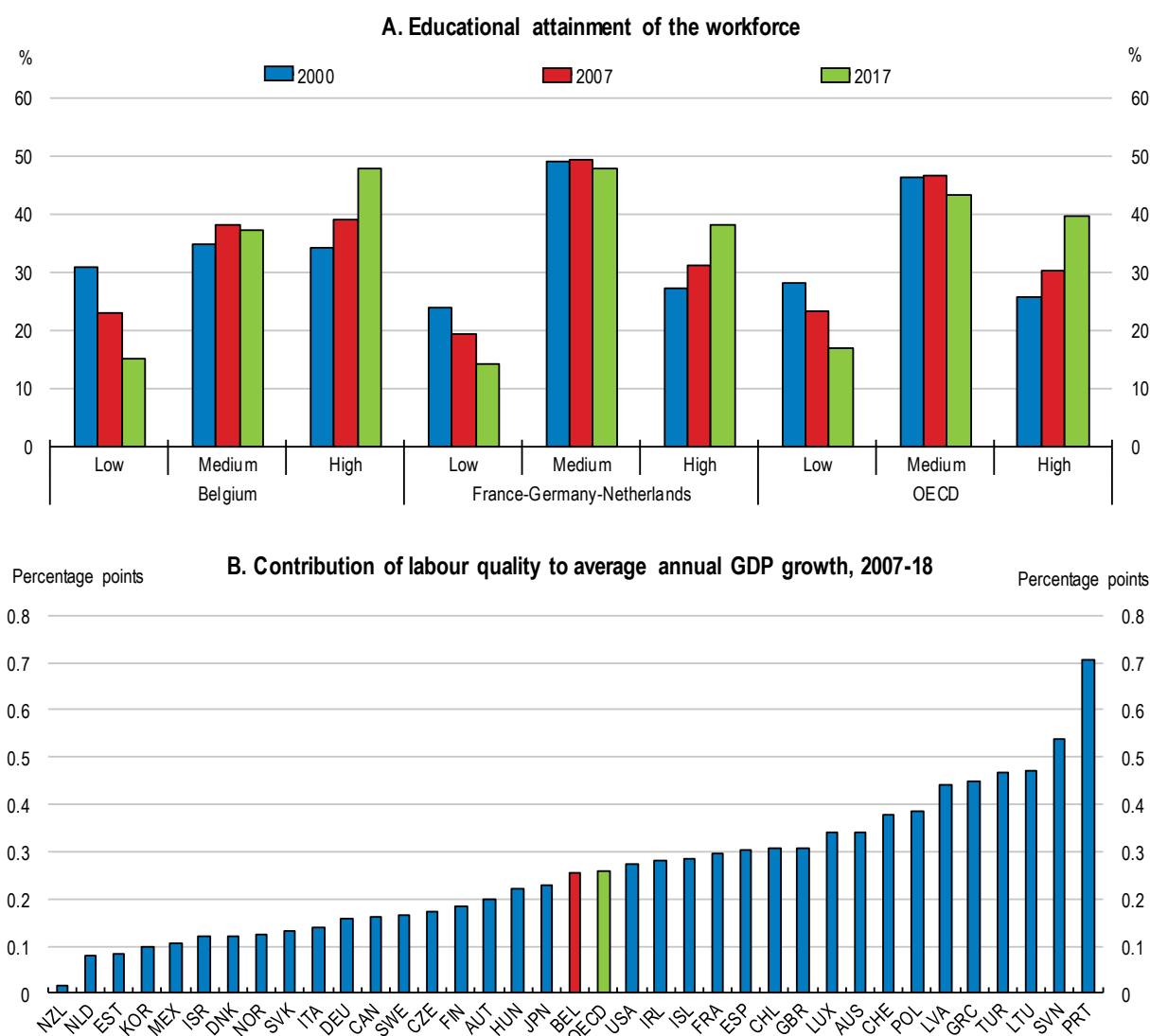
- a decline both in firm entry and exit and in workers' job mobility, which is likely to come at the expense of innovation and growth
- a rise of market concentration, in connection with fast growth at high-productivity companies and low growth at low-productivity companies
- an increase of “zombie firms” (i.e. financially troubled firms) which tie up capital and workers that would better move to more productive firms
- an adverse composition effect, with a decline of high-productivity manufacturing in favour of low-productivity services
- weak investment by the private and the public sector, especially in infrastructure, with negative effects for capital intensity and productivity.

Is Belgium's productivity slowdown not a problem but simply the corollary of the improvement in the employment rate? If employment increased on account of a stronger participation of low-skilled workers, average productivity of workers would mechanically decline. This hypothesis of a “productivity sacrifice”, according to which there is a trade-off between employment and productivity, deserves therefore special scrutiny, in particular given the rise of employment in Belgium.

Until around 1990, labour costs in Belgium had been very high, so that firms could only pay very productive workers. In part, this was due to very high and uncapped social security contributions. A U-turn followed in the 1990s, as epitomised by the Law of 1996 on the Promotion of Employment and the Preventive Safeguarding of Competitiveness. The policy to contain labour costs, often through cuts to social security contributions, has been pursued by subsequent governments, the latest example being the “tax shift” operation of the Michel Government. Some of the reductions in labour costs were targeted, at low-wage or high-skilled workers, while others were universal. In addition, in 2001, the government started the “service vouchers” programme (*titres-services* or *dienstencheques*), which had as its main impact the legalisation of household services that were previously performed informally. Households are entitled to buy vouchers at a heavily subsidised price, and with some tax deductibility on top, to pay for services in their home carried out by employees of licensed firms. More than 70 000 full-time equivalent jobs are registered under the scheme.

The lowering of labour costs and the introduction of the service vouchers have both made it easier for lower-skilled workers to find a job. This is, for example, evidenced by a decline in productivity in support service activities (see Figure 1.14) and a general increase in employment in low-productivity industries (OECD, 2019^[8]). But the negative effect that employment has had on the skill composition of the workforce has been far dominated by the positive effect through the general improvement in educational attainment. Belgium's workforce is much better educated today than 20 years ago, and the share of the low-skilled among the employed has declined more than in other countries (Figure 3, Panel A). Further evidence comes from estimates of labour quality (i.e. skill-adjusted labour input), according to which skill improvements contributed to GDP growth over the period 2007-18 the same in Belgium as in the OECD on average (Figure 3, Panel B).

The conclusion therefore is that the increase in employment is unlikely to be a significant explanation for the productivity slowdown in Belgium compared with other countries. The overall skill composition of workers, when proxied by education levels, has improved, not worsened. Related evidence suggests that the way workers are matched to jobs with their corresponding skill level has also not changed much over the past 15 years (see Figure 3.7).

Figure 3. Skill composition and labour quality have improved, despite rising employment

Note: Panel A: Low education is below upper secondary education; medium education is upper secondary or post-secondary education; and high education is tertiary education. The OECD number is the unweighted average of the following countries: Australia, Canada, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Korea, Latvia, Lithuania, Luxembourg, Mexico, the Netherlands, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The France-Germany-Netherlands number is the unweighted average. Panel B: The OECD number is the unweighted average of all 36 OECD countries.

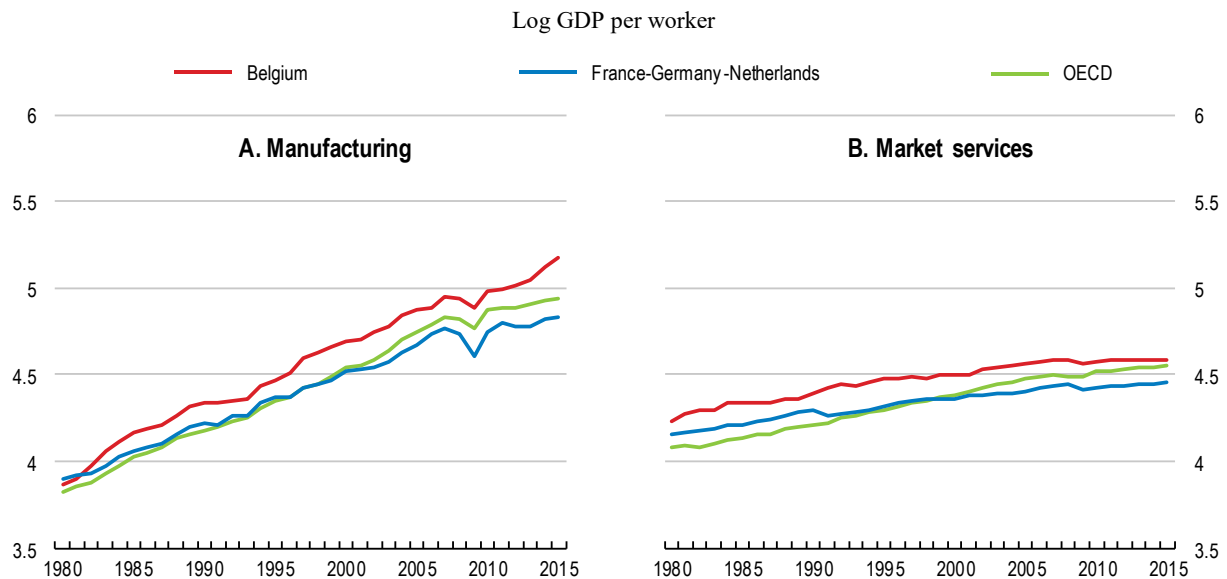
Source: OECD estimates based on OECD Education at a Glance and The Conference Board Total Economy Database.

Fact 2: Developments in productivity have been heterogeneous across sectors, firms and regions

Productivity growth has not been equally weak across all sectors, firms and regions. Comparing sectors, manufacturing and construction have done very well, also relative to other countries (Figure 4, Panel A). In contrast, labour productivity in market services (i.e. excluding education, health and public administration from the services total) has not risen

much and less than in the OECD on average (Figure 4, Panel B). Multifactor productivity of market services declined between 1995 and 2015 (see Figure 1.12), meaning that service firms became less efficient in the way they use their workers and capital in the production process. The dedicated section on sectoral productivity trends in Chapter 1 provides further details on these and related issues. The general patterns are similar to those identified, for example, by Biatour and Kegels (2017^[9]).

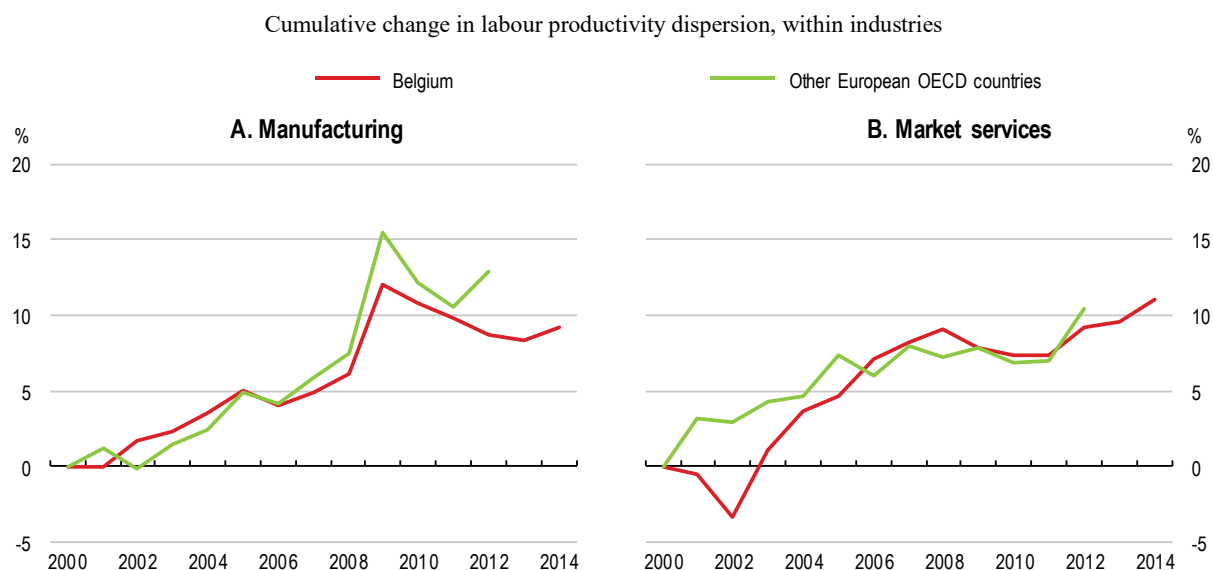
Figure 4. Productivity has grown strongly in manufacturing but stagnated in market services



Note: Data are measured in constant prices, USD 2010 purchasing power parities. The OECD number is the average, weighted by the number of workers in each sector, of the following countries: Australia, Austria, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States. The France-Germany-Netherlands number is the weighted average.

Source: OECD estimates based on harmonisation of several databases including OECD Structural Analysis (STAN) Database and EU-level analysis of capital, labour, energy, materials and service (EU-KLEMS) inputs data.

The heterogeneity in the evolution of productivity is seen not only across but also within sectors. New research conducted in the context of this *Review* shows that dispersion in labour productivity between firms in the same industry has increased, in manufacturing (Figure 5, Panel A) and market services (Figure 5, Panel B). This increased dispersion is also found by De Mulder and Godefroid (2018^[10]), who focus on Belgian data only, while the analysis in Chapter 2 allows for benchmarking developments in Belgium against those in other European countries. The growing gap between the best performers in a sector, the “frontier firms”, and lagging firms may indicate that diffusion of knowledge has declined. An alternative hypothesis is that the exit rate among laggards has declined, which could be the result of the low interest rates and the labour cost moderation policy. Less diffusion of knowledge and lower exit rates of laggards may go hand in hand with a lack of competition. Simultaneously, as Chapter 2 shows, the number of high-productivity firms in Belgium is large, especially in market services, which is generally positive, also as it is a prerequisite for beneficial diffusion effects.

Figure 5. Inequality in corporate performance has increased

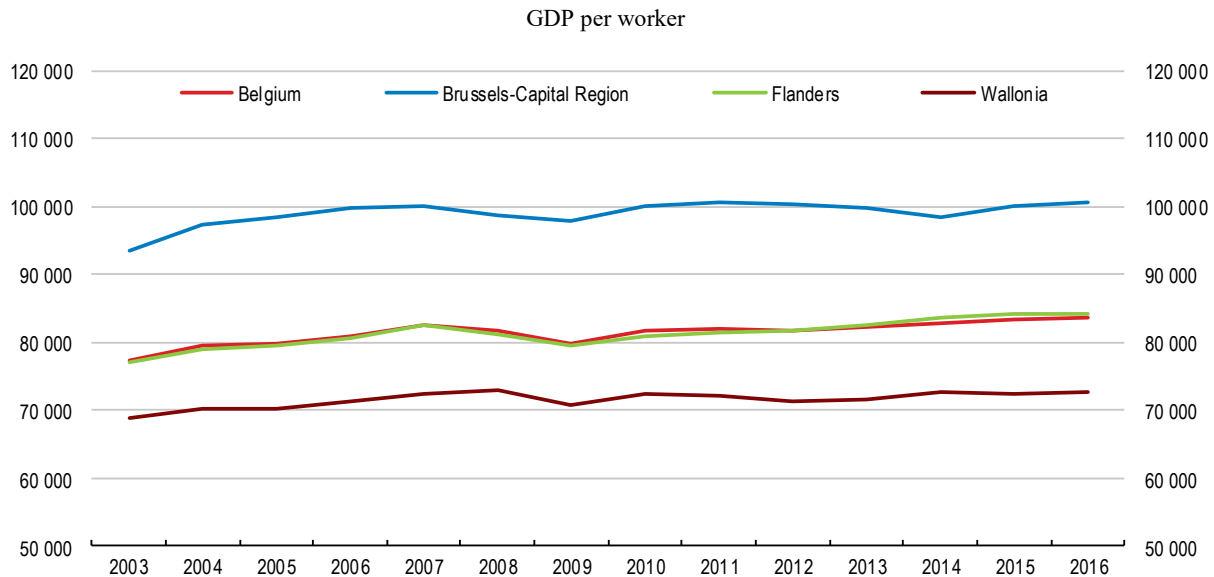
Note: Dispersion in labour productivity is measured as the ratio of the 90th to the 10th percentile of the productivity distribution. The “Other European OECD countries” number is the unweighted average of the following countries: Austria, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, the Netherlands, Norway, Portugal, Sweden and Switzerland. Data after 2012 are not available for all these countries, which is why the last data point for “Other European OECD countries” is 2012.

Source: OECD MultiProd Database, February 2019.

Another dimension of heterogeneity are differences in productivity between regions (Figure 6). Some of these have to do with differences in the regions’ economic structure, for example the Brussels-Capital Region is more urbanised and the manufacturing sector is larger in Flanders. Productivity is highest in the Brussels-Capital Region, followed by Flanders and then Wallonia. Productivity differences between the three regions are marked: workers in the Brussels-Capital Region are 38% and workers in Flanders are 16% more productive than workers in Wallonia. Between 2003 and 2016, productivity growth was subdued in all three regions. But it was lowest in Wallonia, the region with already the lowest level of productivity. The productivity gap of the Brussels-Capital Region and Flanders to Wallonia is thus growing, rather than closing. This divergence has occurred despite the predominance of services in the Brussels-Capital Region, which have seen a recent decline in multifactor productivity, as mentioned above.

Fact 3: Low dynamism in the business landscape and people’s work careers

To an important degree, productivity improvements are about a welfare-enhancing resource reallocation process, also known as Schumpeterian creative destruction. In Belgium, the reallocation process is rather slow, both at the level of firms and at the level of workers, as the following figures show.

Figure 6. Productivity performance varies between the three regions

Note: Data are measured in constant prices (EUR), with 2010 as the base year. Region of a worker is place of work, not place of residence.

Source: OECD Regional Statistics Database.

Among the 29 OECD countries for which data are available Belgium's firm entry rate is the second lowest (Figure 7, Panel A), and the likelihood that a new firm survives for five years is the second highest in Europe (Figure 7, Panel B). OECD economies exhibit a general trend towards less business dynamism, with declines in entry rates of firms and in job reallocation rates across firms. The same trend is observed for Belgium (Bijnens and Konings, 2018^[11]), although less than in other European countries, as the data in Chapter 2 show. Exit rates in manufacturing and services have even sharply increased. The evolution has therefore been less unfavourable in Belgium, but this also has to do with firm entry and exit and firm-to-firm job reallocation rates being lower than elsewhere, which reduces the scope for further declines. Workers' job tenure is longer than in other countries (Figure 8), so that Belgians move in and out of jobs less often.

A few cautionary words on this study

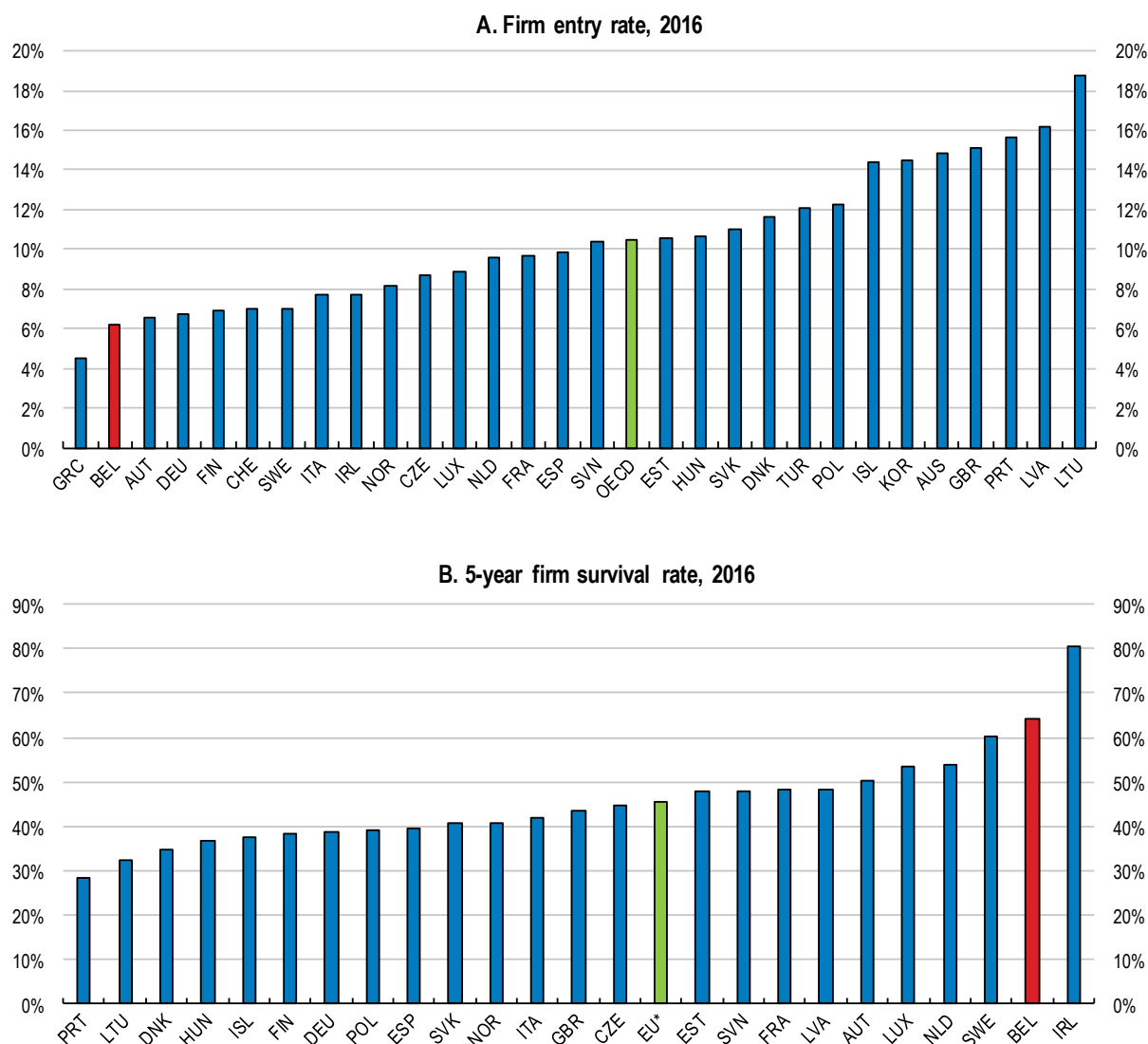
Several caveats should be kept in mind when reading this study that has as its focus how Belgium can stimulate productivity:

- Most attention will go to what could be improved, and therefore on weaknesses, not on strengths. This may convey a sense of a negative bias. However, a good part of Belgium is doing well. Future governments should not hinder it and, in a drive for policy change, not go against what goes well in Belgium.
- The main focus is on Belgian specificities, while many drivers of productivity and its slowdown are common to industrial countries. This is especially the case in a small, open and highly integrated economy such as Belgium, due, for example, to the importance of the international diffusion of innovation.
- The study is geared towards what public authorities may achieve with respect to productivity. It may convey a sense that they are in a position to achieve a lot over

a limited time span. However, significant hurdles exist, and some factors, such as the strategies pursued by firms, may be outside the authorities' reach.

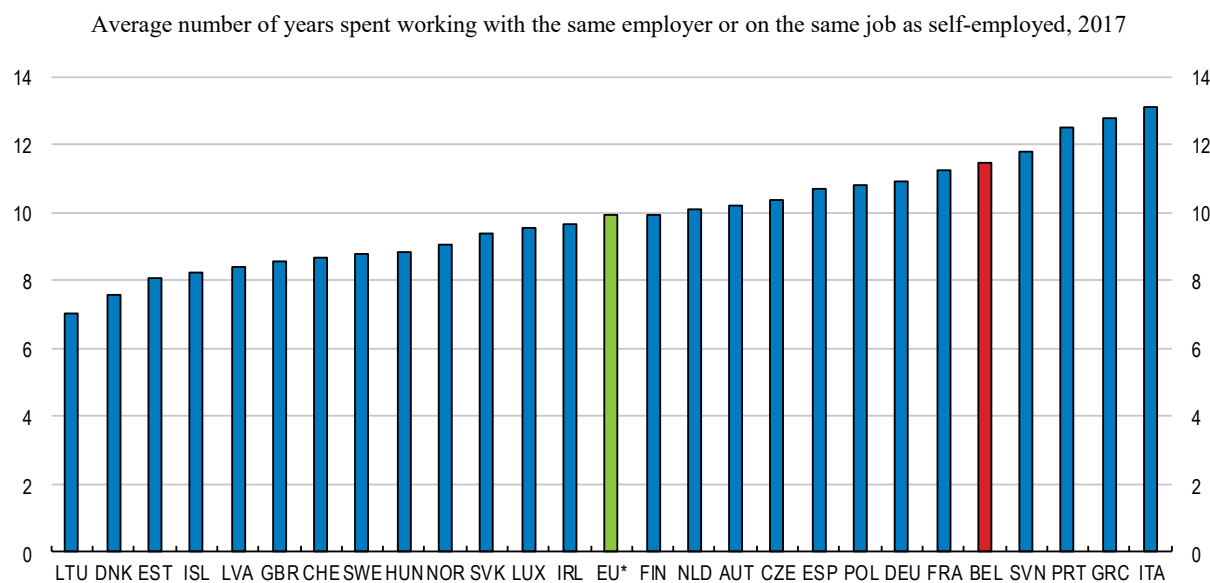
The recommendations in the report are largely based on international comparisons of competition, innovation, regulation, labour markets and skills, areas where the OECD has particular competencies. They draw on results in the three analytical chapters, build on material in the recent *OECD Economic Survey of Belgium* (OECD, 2017_[12]) and use many other policy-relevant insights.

Figure 7. Business dynamism is low



Note: Panel A: Firm entry rate is the share of new firms among all firms, including non-employers. The OECD number is the unweighted average of the OECD countries for which data are available. Panel B: 5-year firm survival rate is the share of firms still in place among all firms founded five years ago. The EU* number is the unweighted average of the European OECD countries for which data are available. Data refer to 2016 or last available year.

Source: OECD Structural and Demographic Business Statistics.

Figure 8. Fluidity in the labour market is low compared with other European countries

Note: The EU* number is the unweighted average of European OECD countries.

Source: OECD estimates based on European Labour Force Survey.

The 7-Point Action Plan to reignite productivity growth

Reform requires a whole-of-government approach with co-ordination of different ministries and, in some cases, governments. The main focus of this study is on what the federal government can do. The federal government is solely or predominantly in charge of taxation, social security, the labour law and competitiveness. Communities are in charge of education and fundamental research. Regions are in charge of a number of productivity-related areas, in particular innovation, vocational training, active labour market policies, transport infrastructure (with the exception of railways) and subsidies to corporations. The government has undertaken a range of measures to support productivity growth; they are summarised at the end of this chapter in Box 1. The recommended 7-Point Action Plan builds and expands on these initiatives.

The main objective of the reform plan is to instil more dynamism in the Belgian economy, both among firms and in the labour market. On the side of firms, entry and exit need to be made easier, competition needs to be enhanced and the growth of young innovative firms requires more policy support. On the labour market side, wage-setting and job mobility should become more flexible, while providing security and support to workers, both those in and out of work, through lifelong learning and help with the acquisition of high-demand skills. The first three actions in the Action Plan relate primarily to the business environment and the next three to the labour market and skills. The last action point describes how public spending and taxes can contribute to revive productivity growth.¹

Ideally, one would like to base prioritisation of policy reforms in the 7-Point Action Plan on data analysis. However, this is difficult, in particular as most reforms are multifaceted and cannot be captured by one single indicator. For example, no empirical model is readily

¹ The Action Plan focuses on the seven policy areas that are deemed to be the most important based on the analysis conducted. Others, which are not covered in the study, are relevant as well.

available to quantify the effect of employees' training entitlements on productivity growth. The OECD quantification framework by Égert and Gal (2017^[13]) can nevertheless be used to approximate the correlations of certain OECD reform indicators with productivity. This suggests that lowering barriers to entrepreneurship by 10% is associated with 1.2% higher productivity after five years. Reducing job protection for regular-contract workers by 10% and 10% more business R&D spending are linked with 1.1% and 0.1% higher productivity respectively after five years. While these estimates, which mix different empirical models and data sources, should be interpreted with care, they illustrate what a decisive difference policy action can make for productivity growth and thus people's incomes and well-being.

Action 1: Promoting competition between businesses, especially in services

Several different indicators suggest that competition in Belgium is weak compared with other countries. Firm entry and exit are low, and companies stay in business longer than elsewhere. A larger share of firms has negative profits for a prolonged period of time. At the same time, mark-ups are estimated to be smaller in Belgium (see Chapter 2). In *Doing Business* by the World Bank, Belgium is ranked behind France, Germany and the Netherlands, for example, and well below the average of OECD countries. When looking at direct measures of competition policy, product market regulation is evaluated to be considerably stricter than elsewhere (Figure 9, Panel A).² At the detailed sector level, rail transport, retail distribution, several professional services (lawyers, notaries, accountants, architects and estate agents) and retail sales of medicine are particularly tightly regulated (Figure 9, Panel B). Barriers in services sectors are assessed to be the highest in the OECD. These regulatory restrictions plausibly lie behind some of the very low productivity growth rates in services identified in the last section (see Figure 4).

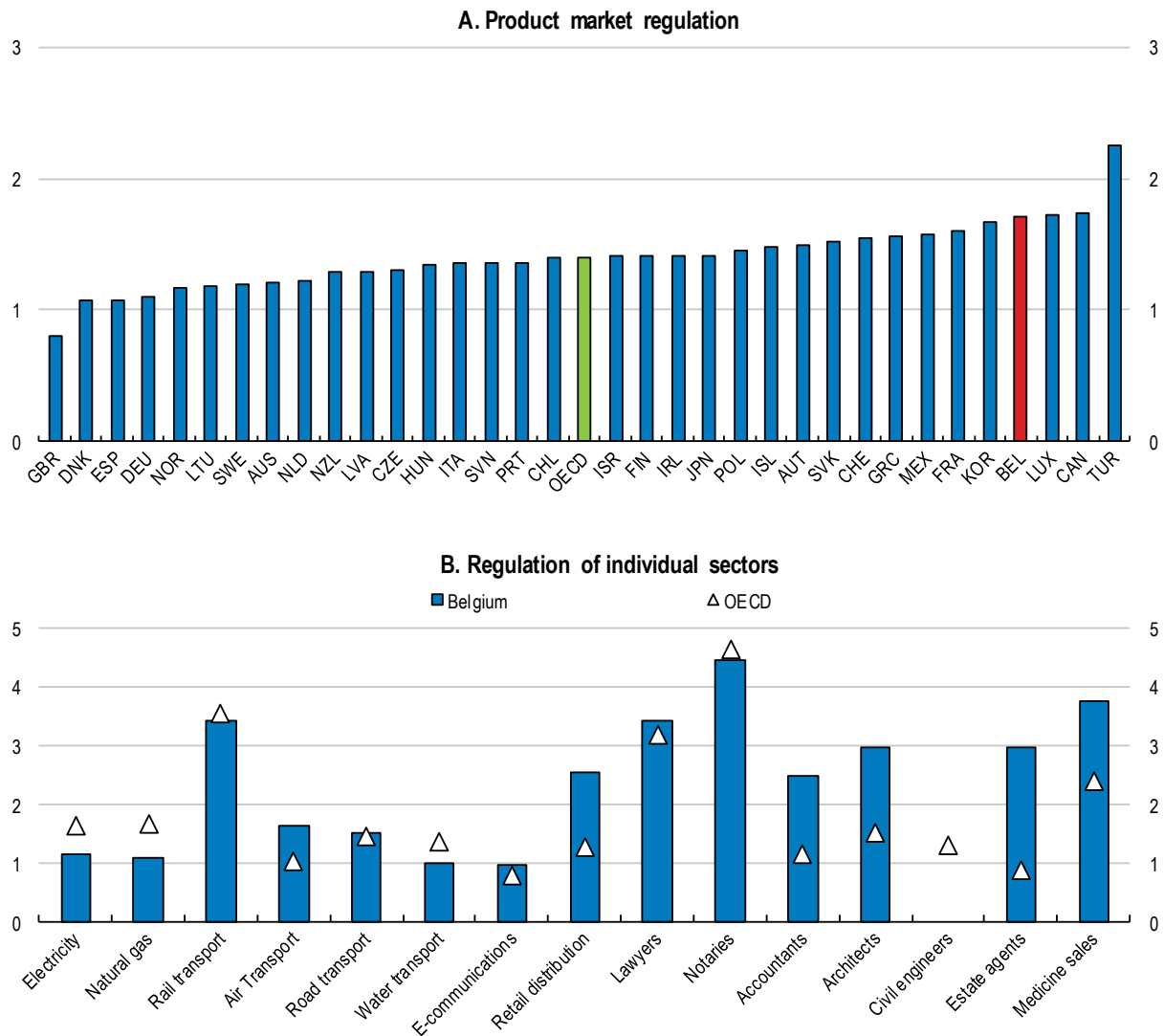
In macroeconomic data, anti-competitive product market regulations are associated with lower levels of multifactor productivity (Égert, 2016^[14]). As Chapter 2 suggests, one channel is that reforms reducing the strictness of product market regulation are linked with a higher firm entry rate. Estimates based on the European Commission's QUEST III R&D model indicate that a strong pro-competitive reform of three in Belgium relatively highly regulated professional services (lawyers, accountants and architects) would increase labour productivity by 0.2% after one year and 0.3% after ten years (Ingelbrecht, Kegels and Verwerft, 2018^[15]). The Institute of Auditors putting pressure on members to not charge fees that are deemed to be too low and the Council of Pharmacists having tried to prevent the emergence of a new business model (in the Medi-Market case) are examples of limits to competition set by councils of licensed liberal professionals.

The high level of wages in Belgium is primarily the result of high productivity, but it may also, to some extent, be a cause or a consequence of limited competition. It would be a consequence insofar as a lack of competition increases firms' profit margins and hence their ability to pay higher wages. It could also be a cause, as it raises the bar for any firm that considers entering the market. In this case, the positive capital-for-labour substitution effect on labour productivity through high labour costs is eroded by the negative impact of reduced competition on productivity.

² According to the 2013 indicators, before the 2018 update and revision, product market regulation in Belgium was evaluated to be less strict than in the OECD on average.

Figure 9. Product markets are more tightly regulated than in other countries

Product market regulation indicator (range 0-6), 2018



Note: The OECD product market regulation indicators measure distortions induced by state involvement and barriers to domestic and foreign entry; the higher is the value, the stronger are the regulatory restrictions. Sector-specific regulation indicators are available for the sectors depicted in Panel B. The OECD number is the unweighted average of the OECD countries for which data are available. For more information, see the website: <http://www.oecd.org/economy/reform/indicators-of-product-market-regulation>.

Source: OECD 2018 Product Market Regulation Database.

One way to promote competition would be to give consumers more choice and to facilitate changing providers. The proposal in telecommunications, where mobile rates are higher than in France for instance, to grant a license to a fourth mobile operator has been met with fierce resistance based on the argument that more competition would curtail the high profit margins needed for additional investment. Other examples are in the area of financial services. A change of asset managers is discouraged by the transfer costs charged by the exiting manager, which can go up to 3%, and by the financial transaction tax (*taxe sur les opérations de bourse*), amounting to 1.32% for the most popular form of mutual funds. The

nature of taxes on life insurance products prevents clients from switching providers and plays against competition as well.

Labour market regulations are also relevant for competition issues. For example, non-conventional work (especially in the evening, at night and during the weekend) is less frequent in Belgium than in neighbouring countries. This may hinder Belgium's international competitiveness and productivity outcomes in sectors (such as e-commerce) where atypical hours are needed to maintain production processes. In 2017, the share of workers involved in evening work was 8% in Belgium (versus an EU average of 15%), in night work 3% (versus 7% in the EU) and in shift work 7% (versus 19% in the EU) – see Denys (2019^[16]). The low rates have to do with hurdles in the form of regulatory restrictions, some of which have recently been softened, and salary surcharges. The authorities partly compensate these hurdles with a tax exemption on personal withholding in favour of night and shift work.

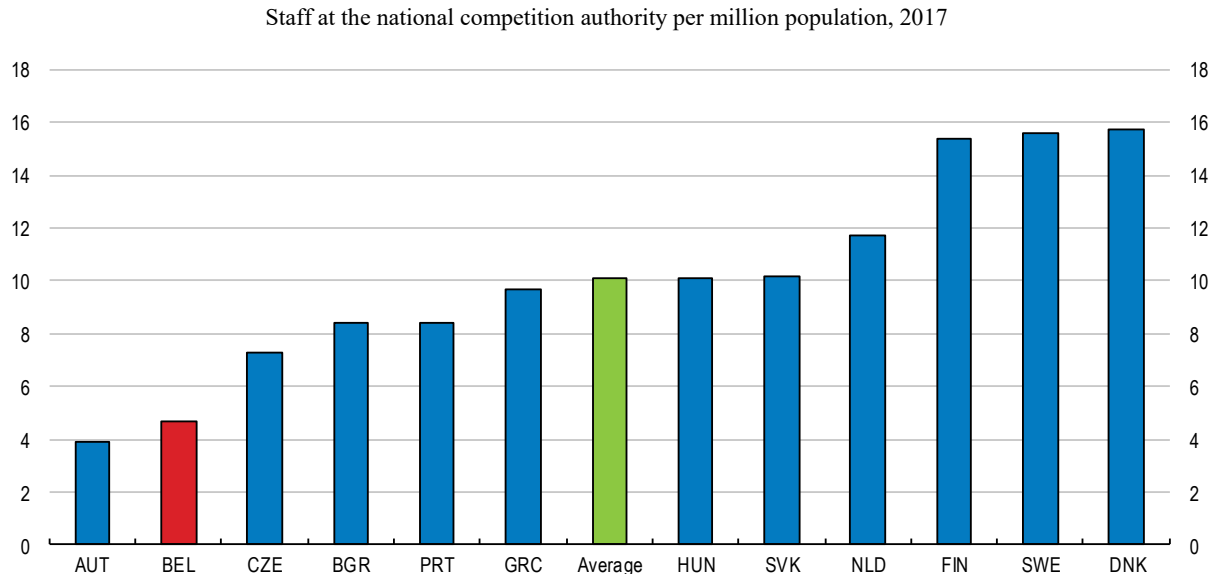
Competition in Belgium would be further enhanced by involving the competition authority in regulatory impact assessments as part of the development of primary laws and subordinate regulations. Assessments of the impact on competition are currently required to be included for all primary laws and some subordinate regulations (OECD, 2018^[17]).³ These assessments are conducted by the ministry that proposes the new law or regulation. The competition authority, however, does not participate in and is not informed of such assessments. Given its position as an external body with an independent view, it should be associated with the process of competition impact assessments. At the moment, this is, for example, the case in Australia, France and Italy. Such a reform would be in line with the *Recommendation of the OECD Council on Competition Assessment* (OECD, 2009^[18]; OECD, 2014^[19]).⁴

The capabilities of the competition authority could be further supported in several other ways, with the aim to spur competition and productivity. Additional funding will be required if the competition authority becomes involved in competition impact assessments. At the moment, the ratio of staff members per million inhabitants is already lower than on average in similarly sized EU countries (Figure 10). It should be noted that the comparison does not account for differences in the competences of the national competition authorities and in the number of relevant violations or competition cases. Recruitment and retention of staff at the competition authority may be issues, in light of the alternative professional possibilities in Brussels for competition experts and the hiring process which goes through the public sector recruitment agency. Directive 2019/1 by the European Commission underlines the importance of the national competition authorities and aims to empower them to be more effective enforcers. Recent measures have widened the mandate of the Belgian competition authority and facilitated its internal procedures.

³ For further details, see the OECD Indicators of Regulatory Policy and Governance (iREG) which also enter the OECD Product Market Regulation Database.

⁴ The *Recommendation of the OECD Council on Competition Assessment* states: “Competition bodies or officials with expertise in competition should be associated with the process of competition assessment.”

Figure 10. Belgium’s competition authority has fewer staff than those in other medium-sized EU countries



Note: The calculations do not account for differences in the competences of the national competition authorities and in the number of relevant violations or competition cases. “Average” is the unweighted average of the medium-sized EU countries (with a population of between 5 and 17 million) for which data are available. Belgium’s population is 11 million and so lies midway in this range. This country selection based on population is to avoid that economies of scale in competition oversight in small and large countries distort the cross-country comparison. Data refer to 2017 or last available year.

Source: Eurostat and European Competition Network.

Action 2: Improving the effectiveness of government support for R&D

Among OECD countries, Belgium has the highest level of government support for research & development (R&D) of firms (OECD, 2017^[20]). Direct government funding of R&D (in Belgium a regional competence) is close to the OECD average, while indirect R&D support through tax incentives (in Belgium a federal competence) is especially large. R&D tax incentives for firms are mainly made up of the following three measures (Dumont, 2019^[21]), the first of which acts at the level of the personal income tax and the next two at the level of the corporate income tax:

- Four individual schemes provide a partial exemption of the withholding tax on the wages of employees who are involved in R&D activities: for employees in firms involved in research collaboration with a university or other scientific institution; for employees in young innovative companies; and for R&D employees in general with a certain educational degree (two separate schemes).
- Firms receive a tax credit for R&D investment in fixed assets and patents.
- Firms also receive a tax deduction of 85% for “innovation income” that as of 2016 replaces the tax deduction for patent income. The concept of innovation income is broader than that of patent income; for example, it also takes into account income from copyright-protected software.

The three measures are not based on an additionality principle, in terms of net job creation, new investment or extra earnings from innovation. The National Court of Audit recently

criticised the complete absence of a mechanism that would control which firms take advantage of the measures. Worryingly, in the economy as a whole multifactor productivity has declined, or certainly not increased, over the last ten years (see Figure 1.8), despite the OECD-wide highest level of public support for R&D. Multifactor productivity growth was better in industries that benefit the most from the support schemes, for example manufacturing of pharmaceutical products. Still, these patterns raise questions about the effectiveness of the R&D support, amounting to close to 0.4% of GDP.

The Federal Planning Bureau recently concluded its third evaluation of Belgium's R&D tax incentives (Dumont, 2019^[21]). It finds that the four partial tax exemption schemes that act at the level of the personal income tax succeed in raising additional R&D activities. By contrast, no such positive results of additional R&D are found for the two measures that act at the level of the corporate income tax: the tax credit for R&D investment and the tax deduction for innovation income. Hence, these two measures seem to support exclusively R&D activities that would also have happened in the absence of the public support. These results are in line with the two earlier evaluations (Dumont, 2013^[22]; Dumont, 2015^[23]).

Another concern relates to the targeting of public support. Only 1.3% of all business R&D spending in Belgium (whether financed through government support or not) is undertaken by young firms that are less than five years old, some of which may have the best growth potential. De Mooij, Hebous and Hrdinkova (2018^[24]) state that virtually all benefits under the innovation income scheme go to large enterprises in the manufacturing sector. The tax benefits that are provided through the corporate income tax are biased against R&D active young firms as these often have no profits. Across countries, R&D tax incentives appear to be somewhat less good at targeting small and medium-sized firms than direct government funding (OECD, 2017^[20]). This is in line with new evidence in Chapter 2 which indicates that direct public R&D support helps laggard firms, many of which are young and small, catch up with the domestic frontier, while this is not the case for R&D tax incentives.

All this suggests that a rethink of Belgium's R&D support policy is necessary. The return on public R&D spending and the targeting of young firms with high growth potential and possibly the largest "bang for the buck" have to improve. To make the tax schemes more effective, especially those acting through the corporate income tax, consideration could for example be given to cap eligible sums at an upper limit, so that small firms would receive a larger pie. The Netherlands and Norway are two countries that are particularly successful at channelling support via tax incentive schemes to small and medium-sized enterprises.

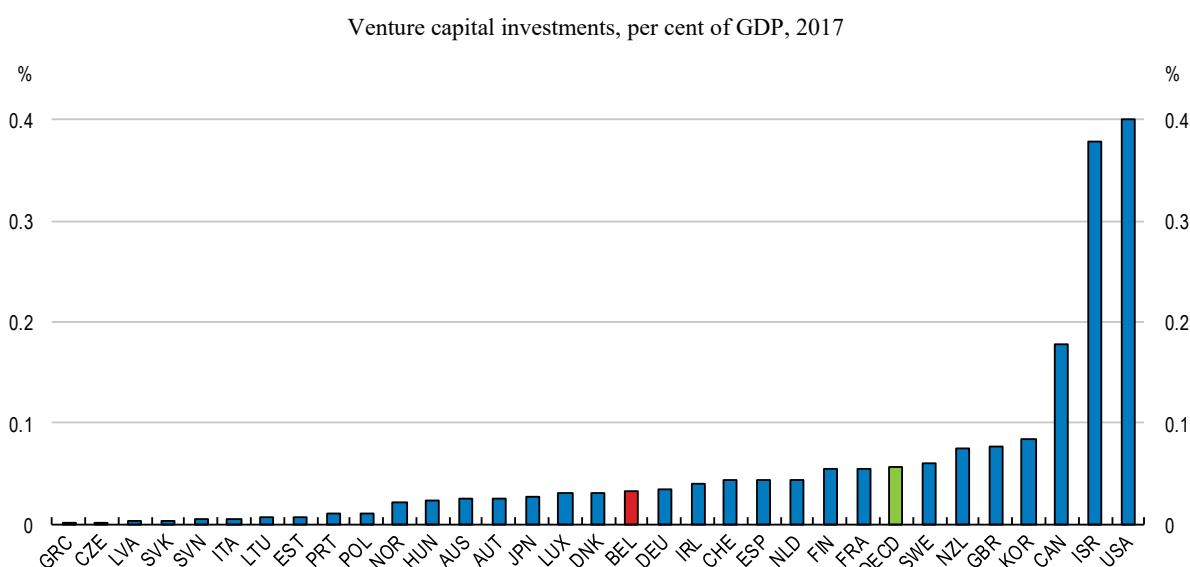
A challenging, but also promising reform would be to shift R&D support from the two tax incentive schemes at the corporate level to direct government funding. It is challenging since, as mentioned, tax credits are a federal and R&D funds a regional competence. But it would be worthwhile to contemplate initiating federal-regional-government discussions on this. Other countries (including Estonia, Hungary, the Slovak Republic and Slovenia) show how direct government funding of R&D can be designed to target small and medium-sized enterprises.

Action 3: Risk capital, risk attitudes and bankruptcy risk

Venture capital investments can be important to support productivity since they focus on firms with normally limited access to traditional banking finance. As the new analysis in Chapter 2 shows, venture capital could be one of the most powerful levers to raise the currently low firm entry rates (see Figure 7). Venture capital investments in Belgium are at the median and below the average in international comparison (Figure 11). Given the large size of domestic savings relative to GDP, venture capital could have been a comparative

advantage for Belgium, but it is not. To a certain extent, the low availability of venture capital is due to Belgian households' high degree of risk aversion in asset holdings. Home ownership, life insurance with interest rate guarantees, savings accounts and bank deposits make up most of domestic savings.

Figure 11. There is room to further strengthen the provision of venture capital



Note: Venture capital investments include seed, start-up and other early stage and later stage financing. The OECD number is the unweighted average of the OECD countries for which data are available.

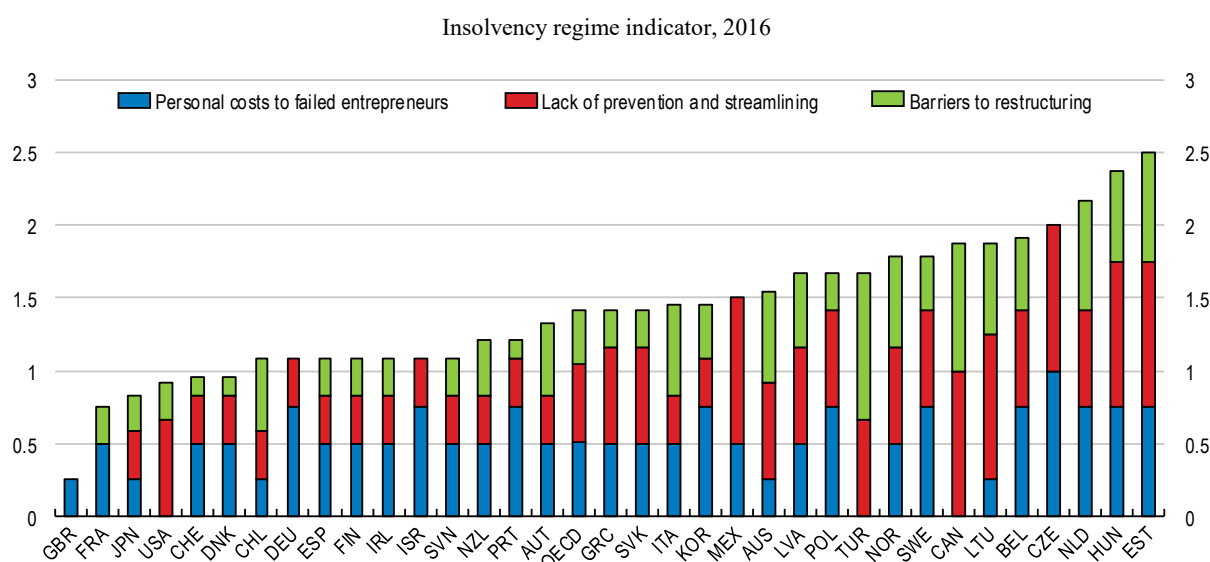
Source: OECD Entrepreneurship Financing Database.

Earlier this year, SFPI-FPIM, an investment company owned and controlled by the federal government, signed a joint agreement with the European Investment Fund, in which it pledged to provide up to EUR 100 million to support the financing of fast-growing small and medium-sized enterprises in Belgium. If the full amount was used for venture capital investments, it would lift venture capital in Belgium to its average size in the OECD. This is a commendable initiative, and its next stages should be monitored and fully implemented. The authorities could consider complementing these efforts to support equity financing for start-ups with an initiative to create a mini-bond market for small firms. Italy introduced a mini-bond market in 2012, and it has shown steady growth since then (OECD, 2018^[25]).

The relative scarcity of risk capital also calls for additional policy actions. One is to alter cultural mindsets towards greater risk-taking, both in terms of entrepreneurship and household savings. To this end, policies should aim at improving financial education and literacy (OECD, 2016^[26]). Riskier investments can be made more attractive by reducing the tax distortions against them, such as the large exemption of interest income on savings accounts, the tax privileges for life insurance and the low taxation of owner-occupied housing (OECD, 2018^[27]). Entrepreneurship could be fostered further by offering a better social safety net to entrepreneurs. Self-employed entrepreneurs who have to stop their activities, due to bankruptcy or other economic reasons, do not receive full unemployment benefits. They have access to the *droit passerelle*, which provides financial support but is subject to conditions and limited to a maximum of 12 months over the entire professional life. In this area, Belgium could draw on the experience from a recent reform in France that has brought failing entrepreneurs under the umbrella of social protection.

Bankruptcy carries a stigma that not only deters starters, but may also contribute to keep “zombie firms”, i.e. financially distressed firms, alive. A good insolvency regime can support productivity growth via resource reallocation to more productive firms and more efficient technology diffusion (Andrews, Adalet McGowan and Millot, 2017^[28]). Based on 2016 OECD indicators, the insolvency regime in Belgium is among the least favourable to productivity in OECD countries, because of high personal costs for failed entrepreneurs, a lack of mechanisms to prevent insolvency and high barriers to restructuring (Figure 12).⁵ The 2018 insolvency reform made resolving insolvency easier by expanding the scope of the law to all businesses and introducing new preventive measures. Nevertheless, room remains to further strengthen some design features of the insolvency regime relevant for productivity. The next *OECD Economic Survey of Belgium* will present a more in-depth analysis of the reform and the remaining gaps.

Figure 12. The insolvency regime in Belgium is among the least favourable to productivity



Note: The scores do not take into account insolvency reforms since 2016, including the 2018 insolvency reform in Belgium. The OECD number is the unweighted average of the OECD countries for which data are available.
Source: OECD questionnaire on insolvency regimes.

Industrial policy in Belgium has for a long time tried to keep declining sectors and firms afloat, going back to what were called the five “national sectors” (Lentzen and Arcq, 1981^[29]). Reluctance to let unviable large firms go can take various forms: regional public investment vehicles may take stakes in ailing firms, or the authorities may grant generous quantities of pollution permits. The *Loi sur la Continuité des Entreprises* and its *procédure en réorganisation judiciaire* may also be a factor behind the high number of zombie firms in Belgium compared with other European countries. This high share of zombie firms is identified in the statistical analysis of Chapter 2, based on data that have recently become available. A key policy lesson from the work on creative destruction has been so succinctly put by Dani Rodrik (Rodrik, 2010^[30]): “What determines success in industrial policy is the [...] capacity to let losers go.”

⁵ Belgium is assessed relatively better compared with other countries according to the insolvency indicators of the World Bank than those of the OECD (OECD, 2018^[52]).

Action 4: Making it easier for workers to move from ailing to fast-growing firms

Productivity can grow thanks to improvements within the firm and thanks to a reallocation process across firms. The second dimension on the reallocation process is of prime importance. It is about the entry of new firms, the exit of firms and the change in the relative weight of existing firms, with a positive impact when the change is in favour of more productive firms.

Many policies are relevant for the smooth transition of workers from firms that are in economic difficulty to others that are fast-growing: preventive measures by the old firm, job protection, the size and schedule of unemployment benefits, the support through active labour market policies and the training offered by the new firm. The principle should be to protect workers, not jobs. Most Belgian workers have good security, with unemployment benefits that are unlimited in duration and public employment services in the three regions that constantly try to improve their “business model”. However, as evidenced by the long job tenure rates (see Figure 8), the labour market is quite rigid, with few workers moving from one firm to another. In part, this has likely to do with the regulation of job protection.

Most studies find a negative association of job protection with productivity or productivity growth. In Belgium, employment protection legislation is light with respect to several important dimensions of individual dismissals for workers on regular contracts. However, employment protection for regular contracts against collective dismissals is stringent. Some degree of worker security on the job is good, as it encourages employees to invest in firm-specific expertise and employers to invest in their staff. But in Belgium regulation of collective dismissals is one of the strictest in the OECD, so at one extreme.

Job protection for regular-contract workers against individual dismissals is light along several important dimensions

Comparing Belgium with other advanced countries, employment protection is light along several important dimensions for regular workers against individual dismissals. In particular:

- Notification procedures: only the employee is to be notified of the dismissal, which makes the notification procedure simple and quick.
- Notice period and severance pay: the employer can choose between a notice period and a severance pay.
- Fair reasons for dismissal: any operational reason is a fair reason for dismissal. Dismissal can occur in the absence of economic difficulties, and no transfer to a different position needs to be attempted before dismissal.

Nevertheless, the OECD employment protection indicator suggests that in Belgium job protection for regular contracts against individual dismissals is at the OECD average (Figure 13, Panel A). The value is not lower due to restrictions in several dimensions: for one, notice periods and severance pay are high (3½ months and 3½ times the monthly wage against, for example, 2 months and 1 monthly wage in France). Second, as part of the labour market reform in 2014, probationary periods have been banned for regular workers.

By contrast, job protection for regular-contract workers against collective dismissals is stringent

Economic difficulties or technological change might push companies to restructure, leading them to dismiss a large number of employees over a limited time period. It is common that additional regulations apply in these situations. In Belgium, additional regulations apply to firms with more than 20 workers that dismiss within two months a minimum number of workers between 10 and 30, depending on firm size. The difference between regulations for individual and collective dismissals is particularly high in Belgium, so that based on the OECD indicator Belgium has the second most stringent employment protection legislation of collective dismissals in the OECD (Figure 13, Panel B). This is explained by restrictive regulation of collective dismissals in the following dimensions.

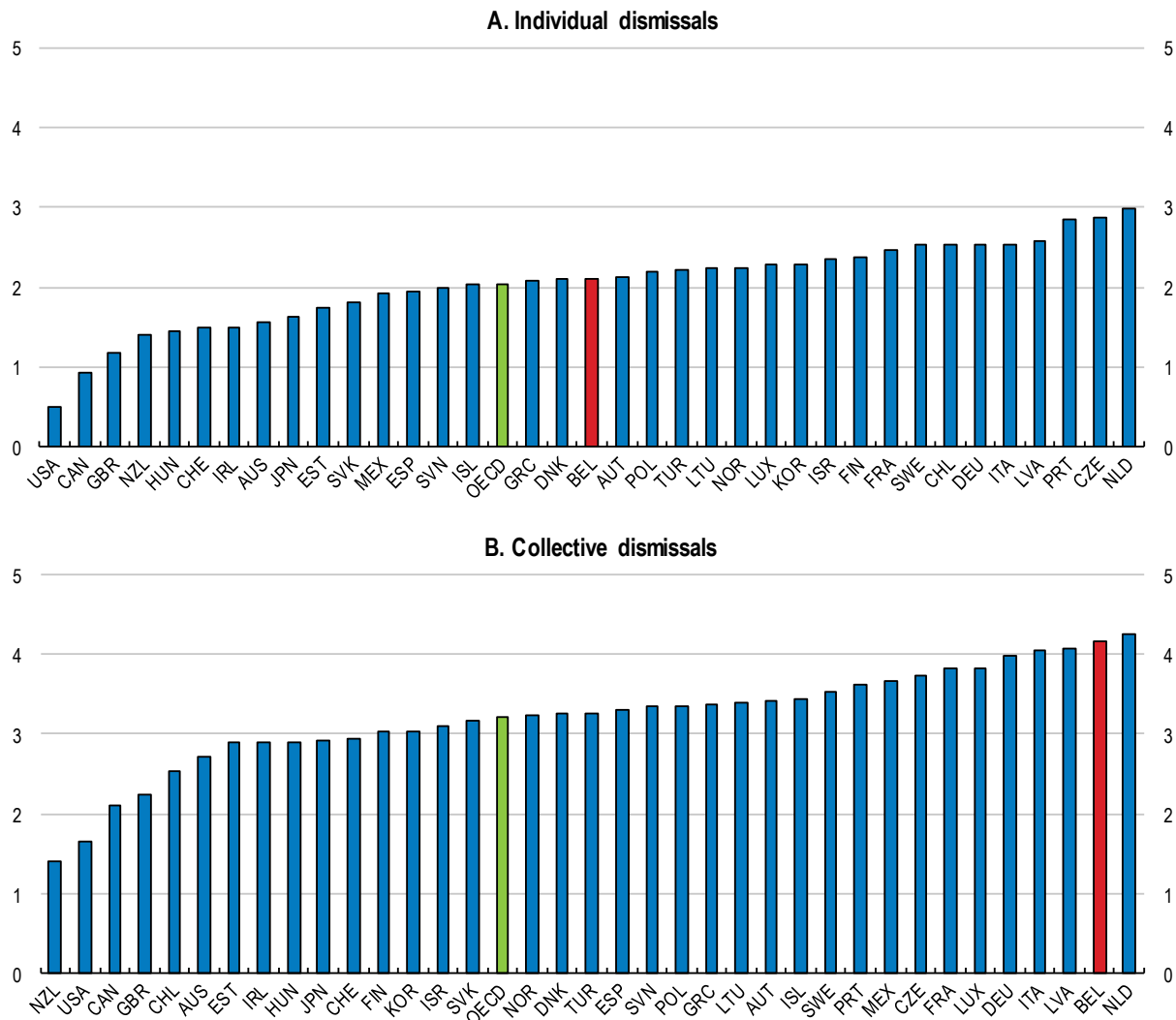
A collective dismissal requires two notifications. The first notification goes to the staff representatives and public authorities and must be followed by a consultation procedure with the works council, trade union delegates and staff representatives. It tends to be very long and involves significant legal uncertainty, as the law is not clear when the consultation is closed and employees can therefore easily challenge the notification procedure. Only when the consultation is closed, the firm can send the second notification to the public authorities with details on the planned redundancies. No dismissals can occur in the 30 to 60 days after the second notification, which extends also the time needed for the second phase. This notification procedure for collective dismissals is comparable to the one in France, where two rounds of notification are required as well. By contrast, the procedure is simpler in Germany and the Netherlands, where only one round of notification is required.

Fair reasons for dismissal are another source of regulatory gap between individual and collective dismissals in Belgium. While any operational reason is a fair reason for an individual dismissal, alternatives to a dismissal need to be considered before a collective dismissal, to show that the dismissal cannot be avoided. These alternatives are discussed in the framework of the consultation with the staff representatives. Employees also benefit from an “employment cell” which provides outplacement services to workers. Finally, as opposed to individual dismissals, collectively dismissed workers are eligible to both notice period and compensation, although longer notice periods are associated with lower compensation.

Given the gap in job protection against individual and collective dismissals, firms tend to avoid collective dismissals and postpone restructuring, with potentially detrimental consequences if these restructurings cannot finally be avoided. Job protection in the event of collective dismissals can be reduced through a variety of options. For example, the end of the consultation procedure could be clarified, either by setting explicit criteria in the law or by involving a third party, such as a social mediator. In addition, the two-step notification procedure could be simplified to be more in line with the procedures in Germany and the Netherlands, where only one notification is required. Another alternative would be the use of new forms of collective contract termination that, as opposed to dismissals, are mutually agreed by the firm and workers. Such mutual agreements were adopted in France in 2017 (*rupture conventionnelle collective*); at the individual level, they had been implemented in 2008 and have proven to be very popular as a means of partially replacing dismissals.

Figure 13. Job protection against collective dismissals is very high

Employment protection legislation indicators for workers in regular employment



Note: The data for most countries refer to 2013, the latest year in the database. The data for the United Kingdom refer to 2014 and for Lithuania to 2015. The data for Belgium, France, Italy, the Netherlands, Portugal, Slovenia and Spain are preliminary updates for 2018. The indicator for collective dismissals assumes that the range of the indicator for specific requirements for collective dismissals is 40% of that of the indicator for individual dismissals, to match the current joint indicator for individual and collective dismissals. The range for individual dismissals is 0-6 and for collective dismissals 0-8.4. A full update of the OECD Employment Protection Legislation Database is planned for 2020. The OECD number is the unweighted average of all 36 OECD countries. The website (<https://www.oecd.org/employment/emp/oecdindicatorsofemploymentprotection.htm>) provides further information.

Source: OECD estimates based on OECD Employment Protection Legislation Database.

Action 5: Improving education and creating a new culture of lifelong learning

Productivity is a matter of incentives, innovation and diffusion, but is also primarily a question of skills. Education and lifelong learning play a crucial role, and the impact of technological changes on the labour market will exacerbate their role. As eloquently stated by David Autor (Autor, 2015^[31]): “Human capital investment must be at the heart of any

long-term strategy for producing skills that are complemented by rather than substituted for by technological change.”

Better education

The relative educational attainment of the Belgian population has been historically high and remains well above the average of advanced countries, which in principle bodes well for the evolution of Belgium’s productivity. This indicator is, however, to a certain extent misleading from a productivity perspective, as it imperfectly reflects the effective skill level and matching of skills on the labour market. Requirements for reaching a given educational level may vary greatly across countries and students’ skills may not meet the expectations of employers.

As far as effective skills are concerned, Belgium used to perform above average, without being a top performer. This was due to a combination of Flanders exhibiting one of the highest scores and French-speaking Belgium underperforming in PISA, the OECD’s Programme for International Student Assessment. A recent study on Belgium combines the PISA results with two other sources: PIRLS (Progress in International Reading Literacy) and TIMSS (Trends in International Mathematics and Science Study) – see Van Damme, Bellens and Van den Noortgate (2018^[32]). It concludes that the ranking of French-speaking Belgium has remained low, while the situation in Flanders has deteriorated sharply since 2000. This means that Belgium, on average, may not be the high-performing country in terms of education it is assumed to be and that the evolution is unfavourable.

The excellence of universities is also of importance for productivity, in particular with respect to innovation and to firm-university collaborations on fundamental research. Even if the methodology of rankings of universities world wide is open to debate, according to the World University Rankings of the Times Higher Education, Belgium fares well, with three universities in the top 200, but without being top. In part, this has likely to do with the budgetary constraints regarding the financing of universities. Spending per student fell by 15-20% from 2008 to 2017, more than in Germany and in the Netherlands (Pourtois and Bogaert, 2019^[33]). This decline is likely to have an adverse effect on productivity, through its negative impact on both human capital and research.

Better skill matching

Besides educational attainment and the quality of education, it is also of importance for productivity to look at the matching process and in particular skill shortages and surpluses on the labour market. As the analysis in Chapter 3 based on the new OECD Jobs for Skills Database shows, skill imbalances overall exhibit similar levels as in other OECD countries (see Figure 3.7), and skill shortages are in about the same range as surpluses (see Figure 3.8). Shortages of workers arise mainly in high-skilled jobs, surpluses in low- and medium-skilled jobs. Chapter 3 finds that skill imbalances are relatively small in Flanders, while they are much higher in Wallonia and especially the Brussels-Capital Region. In all three regions, the high-skilled are in demand and the low- and medium-skilled in supply. Skill shortages are detrimental to productivity and to well-being, as firms have to abandon planned activities or ask their employees to work extra hours.

The OECD has very strong expertise in the area of skills, with PISA, the Survey of Adult Skills (PIAAC) and the Skills Centre. Flanders has had an active collaboration with the OECD, participating in PIAAC and commissioning an *OECD Skills Strategy* (OECD, 2019^[34]). The French Community, where skill shortages and surpluses appear to be more pronounced, should consider joining the forthcoming cycle of PIAAC, and the Brussels-

Capital Region and Wallonia may consider undertaking an *OECD Skills Strategy* project, too. The cross-country benchmarks that would come out of PIAAC and the skill reviews would further improve the understanding of skill issues in Belgium.

While Belgium-wide skill shortages and surpluses do not appear worse than in other countries, scope exists to improve the matching between the skills firms look for and the skills students acquire or workers have to offer. Last year, the government presented under the name “jobsdeal” a set of measures, with one objective being to alleviate skill shortages and stimulate productivity. For instance, older workers dismissed from restructuring firms will be paid training, for a minimum of EUR 3 600, in areas with recognised skill shortages. Another example is the extension (although not yet implemented), from three to four years, of the “career break” allowance (*credit-temps*) for workers who follow vocational training, again in areas with recognised skill shortages (*métiers en pénurie*).

More action in this direction would be welcome. For instance, students and workers should be better informed about the needs of employers and the job and wage prospects of different career tracks and programmes. Relevant authorities may also consider promoting more actively STEM (Science, Technology, Engineering and Mathematics) studies, where enrolment is low, and introduce quotas on the number of students in education programmes with little labour demand. The schedule of unemployment benefits over the unemployment spell matters for skill matching as well, since it affects how fast and to which type of jobs jobseekers return to employment. This is an area that is being investigated as part of the next *OECD Economic Survey of Belgium*.⁶

Better lifelong learning practices

Part of the answer to the skill problem will have to come from firms themselves. On top of overcoming possible prejudice against migrants, women, inexperienced workers or older workers, firms will have to invest more in the training of their young recruits and in lifelong learning. As Chapter 2 shows, an increase in training would help laggard firms become more productive and support their catch-up with respect to domestic frontier firms. It would thus work against the rise of productivity dispersion between the top firms and the rest (see Figure 5). Complementary research for Belgium supports the notion that training improves worker productivity (Konings and Vanormelingen, 2015^[35]).

Before 2017, firms, at their sector level, had to spend at least 1.9% of the wage bill on training. The percentage had been established 20 years earlier on the basis of the then observed average of the three main trade partners of Belgium (France, Germany and the Netherlands). The Constitutional Court instructed to change the rule, as the calculation and penalty (equivalent to a rather light 0.05% of the wage bill) were made at the sector level. It meant that a firm having spent more than 1.9% of the wage bill on training, but belonging to a sector where the threshold had not been reached, was also subject to the penalty.

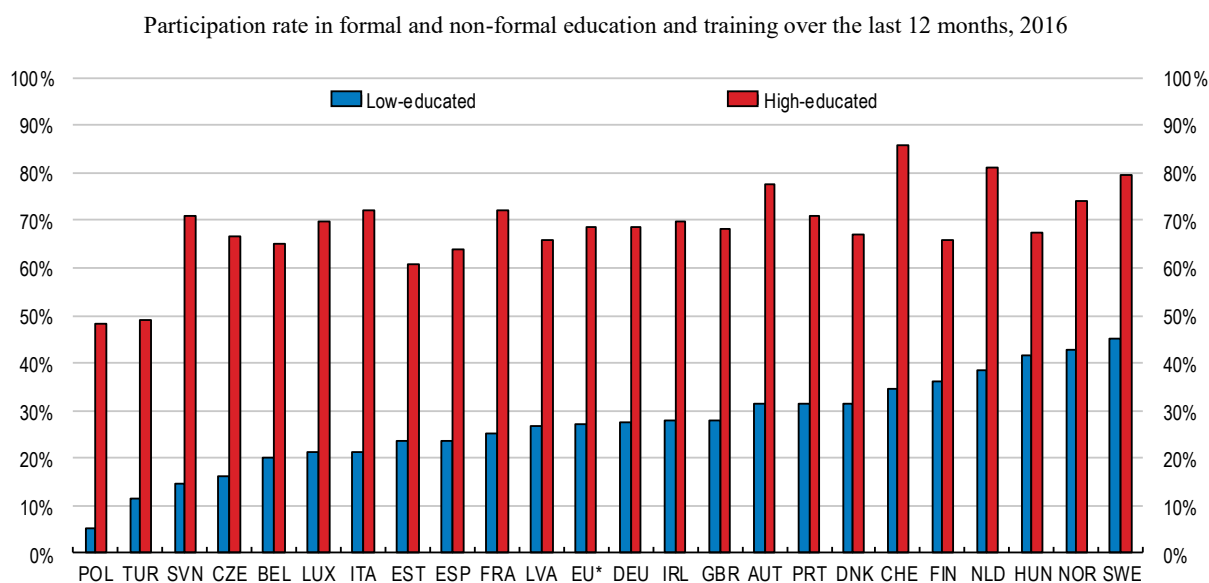
As of 2017, the training obligation has been changed into an objective of a firm’s average of at least five days of training a year, with very small enterprises being exempted. There is no right for the employee, on an individual basis, to get five days of training. In the new regime, if there is no collective agreement on the issue, every employee is entitled to two training days per year. The intention is to revise gradually the entitlement up from two to

⁶ Examples for additional reform options are to: *i*) contribute actively to a better perception of blue-collar work and vocational training; *ii*) enhance the support for early school leavers (*décrochage scolaire*), taking as an example the *école de la seconde chance* in France; and *iii*) commission an assessment of the public agencies in charge of active labour market policies.

five days, but so far this is not made mandatory. If it is not implemented, the default rule is that a firm has to offer on average at least two days of training to its employees. If the training is given outside the working hours, employees will be paid for the extra hours, but at the regular rate, with no pay for overtime. The new regime has backtracked in terms of lifelong learning efforts: with more than 200 working days a year, two days of training is equivalent to less than 1% of the working time, against the previous requirement to spend a minimum of 1.9% of the wage bill. Further, the spending rule was a requirement, whereas the new rule is an entitlement, which depends crucially on take-up.

A particular problem is that it is more the high-educated, which are often also the high-skilled, who benefit from training than less-educated adults who are likely to be the most in need. The participation rate of the low-educated is 20% in Belgium, which among the countries for which these Eurostat data are available is only lower in Poland, Turkey, Slovenia and the Czech Republic (Figure 14). The participation rate of the high-educated is 65%, close to the European average. It is likely that this is the result of both insufficient supply – firms not offering enough training – and insufficient demand – workers not willing to invest the necessary time and effort. This underlines the importance for firms to create interesting and relevant learning opportunities. In Norway, a country where training is high, firms can apply for programme grants for training of their employees (“Skills Plus Work”) to support their workers in acquiring numeracy and digital skills (OECD, 2019^[36]).

Figure 14. Only 1 in 5 low-educated adults receives training in Belgium



Note: The sample is all persons aged 25-64. Low-educated is below upper secondary education; and high-educated is tertiary education. The EU* number is the unweighted average of the OECD countries for which data are available.

Source: Eurostat Adult Education Survey.

Belgium needs to develop a comprehensive culture of lifelong learning and upgrade its requirements to strengthen training on the job. The calendar to reach the said objective of five working days, up from the current two days, is not yet fixed. It should be determined, and be ambitious. The legal entitlements to lifelong learning should be individual-specific, rather than firm-specific. This would ensure a better spreading of the training offers, so that it is not the already high-skilled workers who enjoy most of the efforts. To avoid low take-

up, legal entitlements may be combined with expenditure requirements for each firm, for example. Another avenue to raise firms' incentives to offer training would be to make them partly accountable for the difficulty of their laid-off workers to find a new job, following the lines of the so-called "experience rating" in the United States. In any case, it will be important to monitor besides the implementation of the entitlement by firms also the take-up of training by employees.

Action 6: Giving firms and workers more freedom to set wages

The relationship between wages and labour costs on the one hand and productivity on the other is multifaceted. Belgium is a high labour cost country; for example, the labour cost for an average earning unmarried individual with no children is the third largest in the OECD, behind Switzerland and Germany (OECD, 2019^[37]). High labour costs may lead companies to substitute machines for low-skilled workers, raising measured productivity. Higher wages allow families to invest more in the education of their children and to have workers in better health and more motivated. At the same time, high labour costs may also deter foreign direct investment and start-ups, two important drivers of productivity.

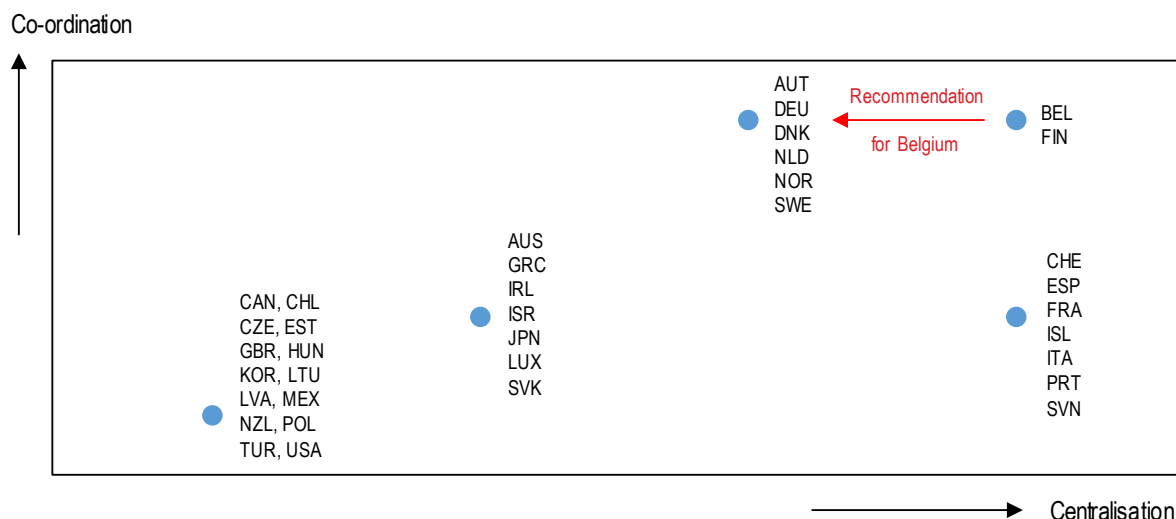
Besides the average level of labour costs, the way wages are set for individual workers and firms can influence productivity when it alters the incentives of workers and firms and the job reallocation process. As this section discusses, this can occur through several channels: the collective bargaining system, the seniority-related pay schedule and provisions for early retirement.

The collective bargaining system

The collective wage bargaining system in Belgium is characterised by a high degree both of wage centralisation across firms and wage co-ordination across sectors (OECD, 2017^[38]). Centralisation refers to the level at which collective agreements are negotiated; the purpose of wage co-ordination is to account for aspects of external competitiveness and macroeconomic conditions, for example by setting a common wage target. Among OECD countries, only Finland has a system that is similarly centralised across firms and at the same time co-ordinated across sectors (Figure 15). Collective bargaining in Belgium covers around 95% of workers in the labour market, making it, besides Austria and France, the country with the highest coverage.

Collective bargaining systems aspire to achieve a wide range of objectives: a high-quality work environment, an appropriate level and fair distribution of wages, a high level of employment, strong productivity growth and a resilient and adaptable economy. The core idea is to prevent a "race to the bottom" in terms of working conditions. Some systems are better apt than others at delivering on this wide range of objectives. As Chapter 3 describes, the Belgian system has done well at the macroeconomic level in preserving or regaining competitiveness over the last ten years, also thanks to the measures taken by the Michel Government. However, the concern is that wages are not adaptable enough at the level of the individual firm to support career opportunities of workers and productivity growth.

Figure 15. Moving Belgium’s collective bargaining system more closely to a model of “organised decentralisation” would help promote productivity growth



Note: The figure depicts five categories of collective bargaining systems: 1. predominantly centralised and co-ordinated systems (BEL, FIN); 2. organised decentralised and co-ordinated systems (AUT, DEU, DNK, NLD, NOR, SWE); 3. predominantly centralised and weakly co-ordinated systems (CHE, ESP, FRA, ISL, ITA, PRT, SVN); 4. largely decentralised systems (AUS, GRC, IRL, ISR, JPN, LUX, SVK); and 5. fully decentralised systems (CAN, CHL, CZE, EST, GBR, HUN, KOR, LTU, LVA, MEX, NZL, POL, TUR, USA).

Source: Graphical illustration of the taxonomy of collective bargaining systems in OECD (2017^[38]) and OECD (2018^[39]).

In analyses based on a multitude of data sources, centralised and co-ordinated systems with high collective bargaining coverage, like the one in Belgium, have been found to be linked with many good economic outcomes: they are correlated with higher employment, lower unemployment, lower wage inequality and a higher-quality work environment (OECD, 2018^[39]). However, the evidence in OECD (2018^[39]) also shows that such a centralised bargaining system tends to be associated with lower productivity growth, indicating that the lack of wage flexibility at the firm level, which characterises centralised systems, may come at the expense of lower productivity growth. In related work, Garnero, Rycx and Terraz (2019^[40]) show that hourly productivity is higher in firms in Belgium that have a firm-level agreement (complementing the sector-level agreement). While this result on its own should be taken with some caution, since approach and data do not allow the authors to establish causality from decentralisation to productivity beyond doubt, it goes in the same direction and adds to the other evidence in OECD (2018^[39]) and in this report.

New analysis in Chapter 3 documents that wages at different firms are more similar in Belgium than in other countries, despite notable differences between firms in terms of productivity. The firm coverage of the dataset used for this analysis varies across countries, which could influence the magnitude of the results. The wage-productivity alignment across firms is, however, much weaker in Belgium than in all other countries, including those for which coverage is also good (see Figure 3.4). Within Belgium, it also appears to be weaker in sectors that are more centralised. Further analysis based on Belgian data suggests that the low level of wage flexibility contributes to low labour reallocation to high-productivity firms and thus weak productivity growth (see Figure 3.6). The concern is that the maximum wage norm and the detailed pay scales in Belgium restrain the extent to which high-performing firms can offer higher wages, attract skilled workers, innovate and grow.

At the other end, legally-binding wage indexation (in combination with regulation of job protection) makes it difficult for firms in economic difficulty to reduce the wage bill.

The challenge for Belgium's policy makers is to instil more dynamism of wages and jobs across firms, while preserving the benefits that the current collective bargaining model brings. Giving firms and workers more freedom to set wages does not require a complete shift from sector- to firm-level bargaining. Such a shift could lead to a decline in bargaining coverage, undermining the inclusiveness of the system. Experience in a number of OECD countries shows that less radical options are available – often referred to as “organised decentralisation” – and can work well. These are based on sectoral framework agreements that explicitly leave space for further adaptation at the level of the firm or allow for opt-outs under certain conditions. As the *OECD Jobs Strategy* (OECD, 2018^[41]) stresses, such framework agreements preserve the integrity of sector-level bargaining, while enabling a closer link of wages with productivity at the firm level.

Different forms of organised decentralised systems of collective bargaining are in place in Austria, Denmark, Germany, the Netherlands, Norway and Sweden, countries that, like Belgium, tend to maintain good levels of wage equality (OECD, 2018^[39]). The models in these countries offer a range of options on how Belgium could loosen up somewhat the defining nature of sector-level agreements (Ibsen and Keune, 2018^[42]). One option would be wider corridor agreements at the sector level that allow for more room to set wages at the level of each firm. Another option would be to allow for more frequent exceptions to the favourability principle via opt-out clauses, as in Austria and Germany. This principle says that a firm-level agreement can only improve the terms for workers set in the sector-level agreement. In organised decentralised systems, the social partners decide when it does not apply. The social partners have this possibility also in Belgium, but they very rarely make use of it. Both these elements of collective agreements, the width of agreements and opt-out clauses, fall in the domain of the social partners and should thus in the first place be discussed by them; the federal government could encourage their use by conditioning administrative extensions of collective agreements on them, as France did in its reform of 2017 (Carcillo et al., 2019^[43]). Experiences from other countries show that more flexibility at the level of the individual firm is well compatible with wage co-ordination to maintain external competitiveness at the national level.

Seniority-based pay

While wages in collective agreements are no longer legally related to the age of the worker, seniority within the firm continues to play a significant role in the total package offered to workers, both in the private and the public sector. Collective agreements foresee automatic wage increases in relationship with seniority (on top of wage indexation), and these are much more pronounced for white-collar than blue-collar workers. In addition, promotions, and the accompanying wage increases, are often related to seniority in the firm. On top of the direct pay, also other components of the total package offered to workers are related to seniority. The number of paid holidays often rises with seniority thresholds. The design of private pension schemes favours seniority: with defined-benefit pensions, the return on private pension fund contributions (which are heavily tax-subsidised) rises with seniority. The way severance payments are calculated provides an additional incentive not to change employers, as the higher is the seniority, the higher is the indemnity. When a firm has to scale down employment, the “normal” way of selecting who has to leave is on the basis of “last in, first out”. All these features are likely to discourage employees from changing jobs and, together with the lack of lifelong learning, make job reallocation more difficult.

Early retirement schemes

Early retirement provisions are another channel which hinders a smooth welfare-enhancing labour reallocation process. Firms facing difficulties would benefit from seeing part of the workforce resigning to go working for a firm with a brighter outlook. It would lighten the wage bill, without having to pay expensive severance checks. Simultaneously, it would be good for fostering the growth of firms that are in better shape and likely more productive. Early retirement with a rather limited loss of income for the worker, as it is the case in Belgium where the pension penalties for a shorter career are far from actuarial neutrality, plays against this process. It is particularly the case for ailing firms, in which workers, anticipating future lay-offs, would normally have a strong incentive to search for another job without delay. But as early retirement provisions are more lenient for “restructuring enterprises”, allowing retirement at the age of 56 (in 2018), older workers of ailing firms have an incentive to keep their current job with the hope of being entitled to enrol in such a scheme instead of moving to an expanding firm. The gradual tightening over recent years of conditions for early retirement, also for those targeted at “restructuring enterprises”, have reduced the problem, but scope remains for further improvement.

Action 7: Making the public finances more friendly to productivity growth

The public authorities can also boost productivity through public investment and tax reform.

More and better public investment

Public investment and infrastructure investment in particular, for instance in terms of transportation, energy and telecommunication, is associated with higher productivity and growth (Sutherland et al., 2009^[44]; Fournier, 2016^[45]). Better infrastructure enables more competition and economies of scale, in addition to stimulating economic activity.

Belgium’s infrastructure, and especially its transport infrastructure (roads, railways and waterways), is rated to be of poor quality (World Economic Forum, 2018^[46]). Among the 23 EU countries that are in the OECD, Belgium is the country with the 4th largest per cent of firms naming transport infrastructure an obstacle to investment (OECD, 2019^[47]). Antwerp and Brussels are said to be among the most congested cities. Traffic congestion penalises productivity, as it leads to higher costs for corporations, a less efficient labour reallocation process and a loss of attractiveness for foreign direct investment. The low quality of infrastructure is not surprising, given that public investment in per cent of GDP is, at around 2% only, the sixth-lowest of the 30 OECD countries with available data (see Figure 1.10).⁷ The long fiscal consolidation process that started in the 1980s has, in part, been achieved at the expense of public investment.

Future fiscal plans should change course and make public investment a priority. To free up spending, a comprehensive spending review could help identify areas for savings. Such a spending review would be suited to co-function as a tool to improve efficiency, or productivity, in the public sector.

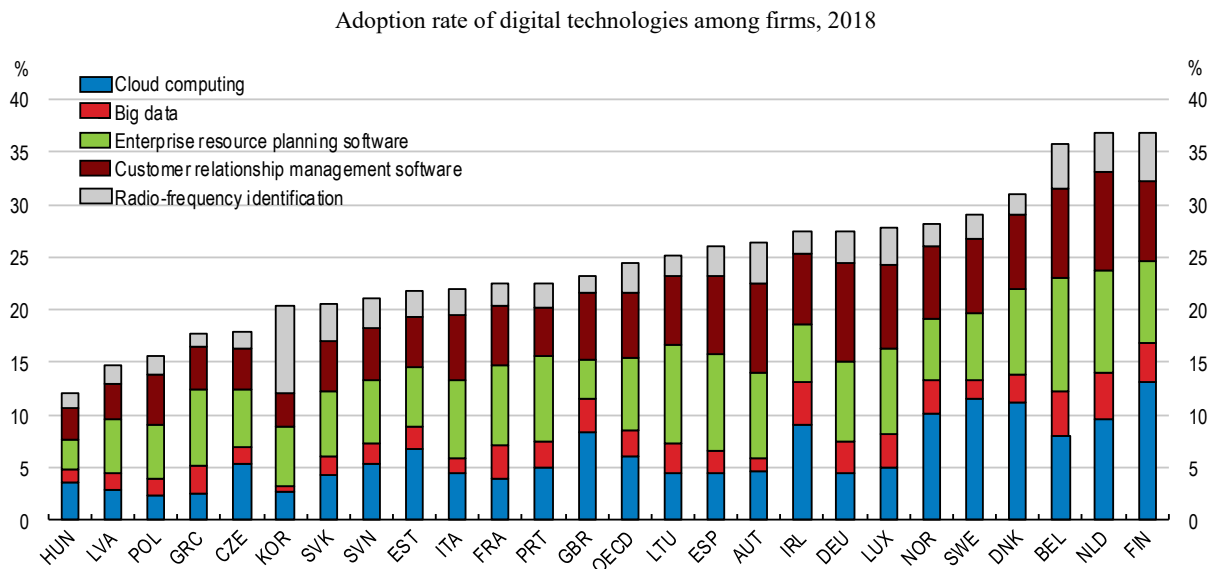
Government policy can also influence private investment, dampened too following the global financial and economic crisis. Regarding energy, given that the sector is largely

⁷ Public investment is taken to be general government gross capital formation. There are differences across countries in the scope of the general government sector, which means that some care is needed when comparing public investment across countries.

operated by the private sector, the influence of the authorities on investments is exerted through the regulatory framework, including with respect to the calendar of exiting nuclear production and to subsidies for idle spare capacities based on fossil fuel. More broadly, the authorities may support private investment in general terms by being more efficient, from delays to grant permits to the speed with which courts handle judicial affairs. The lack of harmonisation of rules and norms across the three regions is also a source of concern.

Aware of the lack of investments, the federal government announced in 2017 the elaboration of a National Pact for Strategic Investments. A Strategic Committee, mostly composed of CEOs and academics, was set up to draft it. It delivered its report in October 2018 which identifies six priority areas: digital; cybersecurity & digital trust; education; health; energy; and transport. A total amount of EUR 150 billion of investment over the period 2019-30 has been put forward, with 45% of it to be financed by the public sector. This comes close to 1.5% of yearly GDP. The focus in the Pact on digitalisation is welcome, since this is likely to be critical for future productivity gains (Sorbe et al., 2019^[48]). The leading edge of Belgian firms in this area has to be nurtured (Figure 16).

Figure 16. Belgian firms have a leading position in digitalisation



Note: The height of the bar gives the average adoption rate across the five technologies. The five components give the contribution of the adoption of each technology to the overall average. Only enterprises with ten or more employees are considered. The OECD number is the unweighted average of the OECD countries for which data are available. Data refer to 2018 or last available year.

Source: OECD ICT Access and Usage by Businesses Database.

The government has recently to an increasing degree appointed experts to inform policy making. This was the case for the National Pact for Strategic Investments. Another example is the establishment of the National Productivity Board, which follows a recommendation by the Council of the European Union. The Board is composed of federal as well as regional representatives and brings together academics, representatives of the economic sphere and members of institutions that have had a long tradition of independent research and analysis on productivity and competitiveness issues. Its mandate combines research, advocacy and policy advice and its establishment is positive. Nevertheless, some doubts remain about the effectiveness of this new body: members will not work full time since they are employed

elsewhere; they cannot formulate policy recommendations, only offer options; their budget is small; and the EU rule prevents them from analysing the impact of wage formation on productivity. To make the most out of this new institution, it may be useful to look at the experience also in non-EU countries, some of which, like Australia, have had powerful and influential productivity commissions for some time – see Banks (2015^[49]) and Renda and Dougherty (2017^[50]).

A tax system no longer hindering the resource reallocation process

As documented in Figure 7 and Figure 8, Belgium is characterised by a slow process of reallocating resources, with employees changing relatively less employers, and with low business entry and exit. One likely contributor is that Belgians change the place where they live less frequently than fellow Europeans. The tax system tends to be one factor behind a lack of residential and job mobility (Andrews, Caldera Sánchez and Johansson, 2011^[51]):

- Belgium's tax system treats owner-occupied housing more favourably than several other types of investments (Figure 17), which matters since homeowners move less than tenants.
- High registration duties on real estate transactions deter moving; in addition, duties in the Brussels-Capital Region and in Wallonia are not transferable, in contrast to Flanders where people pay duties in full at the time of the first purchase but, if they sell their home and buy another one in Flanders, they pay duties only on the price difference between the new and the old home.

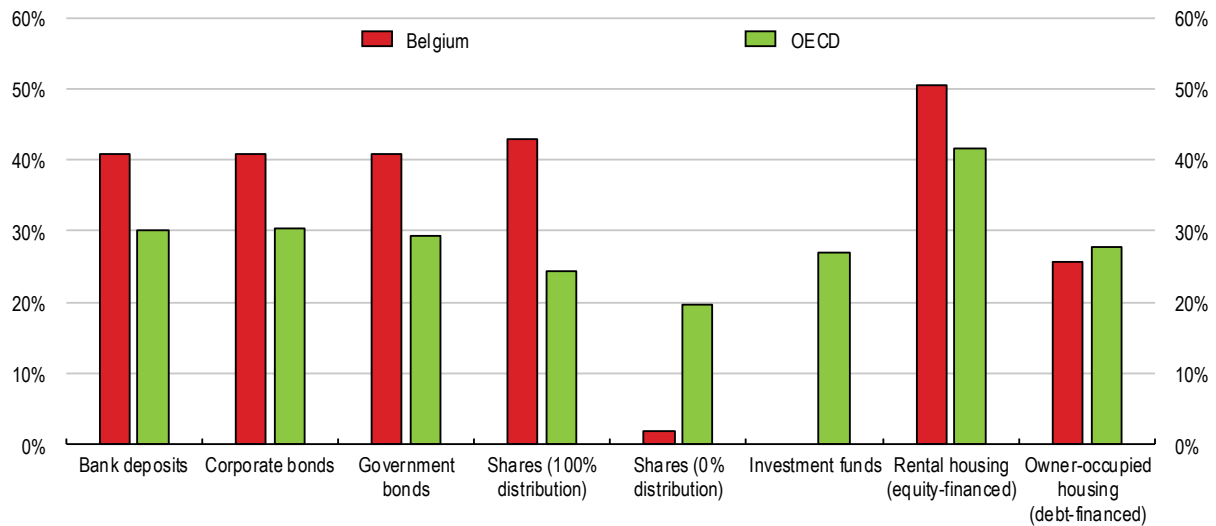
The result is that people are less likely to change employer, which may come as a hindrance to productivity. The same factors, together with others such as the favourable tax treatment of company cars, also increase traffic congestion, with again a negative effect on productivity. The public authorities should address these issues. In addition, linguistic barriers may explain the limited mobility of Belgian households, too. The public authorities could draw on the experiences of countries such as Luxembourg and Switzerland, which show that it is possible to achieve a higher degree of bilingualism among the population.

The taxation of labour income may also hinder the resource reallocation process. The marginal tax rate is rapidly rather high in Belgium, with a tax rate schedule of 45% for annual taxable income above EUR 22 300, and of 50% from EUR 39 700 onwards. The effective marginal tax rate on labour income is even higher. This means that the gross salary increase obtained from moving to a higher-paying employer translates into a quite subdued net-of-tax rise, reducing the incentive to change employer.

The unequal taxation of different asset classes may hold back productivity also in other ways than through reduced mobility. In particular, there is currently no tax on capital gains in Belgium. Given this unusual situation, the expectation of some is that at a point in time capital gains will be taxed. This expectation, in turn, gives an incentive to successful entrepreneurs to sell their stake before the introduction of such a tax. As a result, young firms, some of which are among the most able to boost productivity, may be sold early, often to foreign corporations, before reaching their full potential. Thus, in the absence of a capital gains tax, Belgium may have the worst outcome: the required pre-tax rate of return on investment may be driven upwards by the expectation of the introduction of such a tax and, at the same time, such an expectation can provide a strong incentive to sell firms at a too early stage of development. It would be interesting to investigate the magnitude of this expectation effect on the behaviour of entrepreneurs and, if confirmed to be of importance, this problem of tax uncertainty should be resolved.

Figure 17. Owner-occupied housing, capital gains and investment funds are undertaxed

Marginal effective tax rate on different types of savings for an average wage earner, 2016



Note: Corporate and government bonds give the average of issued at par and issued at discount. The tax rates are adjusted for country-specific average inflation over the period 2011-16. The OECD number is the unweighted average of OECD countries.

Source: OECD (2018^[27]).

Box 1. Main recent reforms to boost productivity growth

This box summarises some of the main recent reforms in the areas covered by this *Review*, but it is not exhaustive. These measures have, to the extent possible, been taken into account in the policy discussion of this chapter. However, for the most part they are not reflected in the empirical investigations (Chapters 1-3), mainly because the use of micro-data limits the period of analysis.

- **Competition:** The company law reform redefined the concept of enterprise to also include liberal professions, farmers and non-profit sectors. In 2018, the insolvency law was reformed to apply to all enterprises, improve conditions for second chance for entrepreneurs and introduce new informal proceedings. A draft law plans to further simplify the system by limiting the number of company forms to four and to integrate association law into the companies and associations code. Access to the accounting profession was improved. Measures to improve the functioning of the competition authority include the “B2B Act”, which bans abusive practices among businesses, and the hiring of eight new agents.
- **Innovation:** In January 2018, a partial tax exemption for the remuneration of R&D employees with a bachelor’s degree in qualifying study fields was introduced, with the aim to boost innovation by small and medium-sized enterprises. In 2016, the tax deduction for patent income was replaced by a tax deduction for “innovation income”.
- **Financing innovation and growth:** The “Belgian Growth Fund” was set up to channel savings from institutional investors to venture capital funds that invest in Belgian growth firms. An income tax credit was introduced for individuals who invest in shares of young small and medium-sized enterprises.
- **Pensions:** To increase the effective average age of retirement, career length and age conditions for early retirement schemes were tightened (see the *2017 Economic Survey of Belgium* for further details).
- **Labour markets:** The “Workable Work Act” introduced the objective of five training days per year. The “jobsdeal” includes measures to encourage training in professions facing a labour shortage. The Central Economic Council is currently preparing a report on seniority pay.
- **Transportation and mobility:** The main initiatives include extra investment by the federal government to complete the Brussels suburban railway network and the introduction of the “Mobility Budget” which allows the company car budget to be spent on alternative modes of transport in 2019.
- **Digitalisation:** The federal government continued to support the digital transformation through the “Digital Belgium Action Plan”. All three regions introduced new initiatives to promote the development of their digital ecosystems, including in the area of cybersecurity. These include the “bedigital.brussels Strategy” in the Brussels-Capital Region, the “Digital Wallonia 2019-24 Plan” in Wallonia and the “Artificial Intelligence Plan” in Flanders.

References

- Ahmad, N., J. Ribarsky and M. Reinsdorf (2017), “Can potential mismeasurement of the digital economy explain the post-crisis slowdown in GDP and productivity growth?”, *OECD Statistics Working Papers*, No. 2017/9, OECD Publishing, Paris, <https://dx.doi.org/10.1787/a8e751b7-en>. [6]
- Andrews, D., M. Adalet McGowan and V. Millot (2017), “Confronting the zombies : Policies for productivity revival”, *OECD Economic Policy Papers*, No. 21, OECD Publishing, Paris, <https://dx.doi.org/10.1787/f14fd801-en>. [28]
- Andrews, D., A. Caldera Sánchez and Å. Johansson (2011), “Housing markets and structural policies in OECD Countries”, *OECD Economics Department Working Papers*, No. 836, OECD Publishing, Paris, <https://dx.doi.org/10.1787/5kgk8t2k9vf3-en>. [51]
- Autor, D. (2015), “Why are there still so many jobs? The history and future of workplace automation”, *Journal of Economic Perspectives*, Vol. 29/3, pp. 3-30, <http://dx.doi.org/10.1257/jep.29.3.3>. [31]
- Banks, G. (2015), “Institutions to promote pro-productivity policies: Logic and lessons”, *OECD Productivity Working Papers*, No. 1, OECD Publishing, Paris, <https://dx.doi.org/10.1787/5jrql2tsvh41-en>. [49]
- Biatour, B. and C. Kegels (2017), “Growth and productivity in Belgium”, *Federal Planning Bureau Working Papers*, No. 11-17, https://www.plan.be/admin/uploaded/201710170946530.WP_1711_11557.pdf. [9]
- Bijnens, G. and J. Konings (2018), “Declining business dynamism”, *CEPR Discussion Papers*, No. 12615, https://cepr.org/active/publications/discussion_papers/dp.php?dpno=12615. [11]
- Byrne, D., J. Fernald and M. Reinsdorf (2016), “Does the United States have a productivity slowdown or a measurement problem?”, *Brookings Papers on Economic Activity*, Vol. Spring 2016, pp. 109-157, <https://www.brookings.edu/bpea-articles/does-the-united-states-have-a-productivity-slowdown-or-a-measurement-problem>. [5]
- Carcillo, S. et al. (2019), “Assessing recent reforms and policy directions in France: Implementing the OECD Jobs Strategy”, *OECD Social, Employment and Migration Working Papers*, No. 227, OECD Publishing, Paris, <https://dx.doi.org/10.1787/657a0b54-en>. [43]
- Cordemans, N. (2018), “Is weak productivity growth a fatality?”, *NBB Economic Review December 2018*, pp. 67-80, https://www.nbb.be/doc/ts/publications/economicreview/2018/ecoreviv2018_h4.pdf. [3]
- De Mooij, R., S. Hebous and M. Hrdinkova (2018), “Growth-enhancing corporate tax reform in Belgium”, *Nordic Tax Journal*, Vol. 2018/1, pp. 1-17, <https://content.sciendo.com/view/journals/ntaxj/2018/1/article-p1.xml>. [24]

- De Mulder, J. and H. Godefroid (2018), “Productivity slowdown: Findings and tentative explanations”, *NBB Economic Review December 2018*, pp. 51-66, https://www.nbb.be/doc/ts/publications/economicreview/2018/ecoreviv2018_h3.pdf. [10]
- Denys, J. (2019), *Het Verdriet van de Belgische Arbeidsmarkt*, Randstad Research, https://www.randstad.be/content/798ae301-0d40-4953-bb0c-f7b9565473cd/Arbeidsmarktanalyse_2019_Randstad_Research.pdf. [16]
- Dumont, M. (2019), “Tax incentives for business research and development in Belgium: Third evaluation”, *Federal Planning Bureau Working Papers*, No. 4-19, https://www.plan.be/admin/uploaded/201905070904440.WP_1904_11894.pdf. [21]
- Dumont, M. (2015), “Evaluation of federal tax incentives for private research and development in Belgium: An update”, *Federal Planning Bureau Working Papers*, No. 5-15, https://www.plan.be/admin/uploaded/201506290956410.WP_1505_11037.pdf. [23]
- Dumont, M. (2013), “The impact of subsidies and fiscal incentives on corporate research and development expenditures in Belgium”, *Federal Planning Bureau Working Papers*, No. 1-13, https://www.plan.be/admin/uploaded/201301280944400.WP_1301_10432_E.pdf. [22]
- Égert, B. (2016), “Regulation, institutions, and productivity: New macroeconomic evidence from OECD Countries”, *American Economic Review*, Vol. 106/5, pp. 109-113, <http://dx.doi.org/10.1257/aer.p20161026>. [14]
- Égert, B. and P. Gal (2017), “The quantification of structural reforms in OECD countries: A new framework”, *OECD Journal: Economic Studies*, Vol. 2016/1, pp. 91-108, https://dx.doi.org/10.1787/eco_studies-2016-5jg1lqspxtvk. [13]
- Fournier, J. (2016), “The positive effect of public investment on potential growth”, *OECD Economics Department Working Papers*, No. 1347, OECD Publishing, Paris, <https://dx.doi.org/10.1787/15e400d4-en>. [45]
- Garnero, A., F. Rycx and I. Terraz (2019), “Productivity and wage effects of firm-level collective agreements: Evidence from Belgian linked panel data”, *OECD Social, Employment and Migration Working Papers*, No. 223, OECD Publishing, Paris, <https://dx.doi.org/10.1787/132aa88e-en>. [40]
- Gordon, R. and H. Sayed (2019), “The industry anatomy of the transatlantic productivity growth slowdown”, *NBER Working Papers*, No. 25703, <https://www.nber.org/papers/w25703>. [4]
- Ibsen, C. and M. Keune (2018), “Organised decentralisation of collective bargaining : Case studies of Germany, Netherlands and Denmark”, *OECD Social, Employment and Migration Working Papers*, No. 217, OECD Publishing, Paris, <https://dx.doi.org/10.1787/f0394ef5-en>. [42]
- Ingelbrecht, M., C. Kegels and D. Verwerft (2018), “Economic impact of professional services reform in Belgium: A DSGE simulation”, *Federal Planning Bureau Working Papers*, No. 9-18, https://www.plan.be/admin/uploaded/201807050841450.WP_1809_11737.pdf. [15]

- Konings, J. and S. Vanormelingen (2015), “The impact of training on productivity and wages: Firm-level evidence”, *Review of Economics and Statistics*, Vol. 97/2, pp. 485-497, http://dx.doi.org/10.1162/REST_a_00460. [35]
- Lentzen, É. and É. Arcq (1981), “Les secteurs nationaux”, *Courrier Hebdomadaire du CRISP*, Vol. 938/33, pp. 1-37, <http://dx.doi.org/10.3917/cris.938.0001>. [29]
- OECD (2019), *Getting Skills Right: Engaging Low-Skilled Adults in Learning*, OECD Publishing, Paris, <http://www.oecd.org/els/emp/engaging-low-skilled-adults-2019.pdf>. [36]
- OECD (2019), *OECD Compendium of Productivity Indicators 2019*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/b2774f97-en>. [8]
- OECD (2019), *OECD Economic Outlook, Volume 2019 Issue 1*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/b2e897b0-en>. [47]
- OECD (2019), *OECD Skills Strategy Flanders: Assessment and Recommendations*, OECD Skills Studies, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264309791-en>. [34]
- OECD (2019), *Taxing Wages 2019*, OECD Publishing, Paris, https://dx.doi.org/10.1787/tax_wages-2019-en. [37]
- OECD (2018), *Economic Policy Reforms 2018: Going for Growth Interim Report*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/growth-2018-en>. [52]
- OECD (2018), *Good Jobs for All in a Changing World of Work: The OECD Jobs Strategy*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264308817-en>. [41]
- OECD (2018), *OECD Capital Market Review of Italy 2018: Mapping Report*, OECD Publishing, Paris, <http://www.oecd.org/daf/ca/OECD-Capital-Market-Review-Italy-Mapping-Report-2018.pdf>. [25]
- OECD (2018), *OECD Employment Outlook 2018*, OECD Publishing, Paris, https://dx.doi.org/10.1787/empl_outlook-2018-en. [39]
- OECD (2018), *OECD Regulatory Policy Outlook 2018*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264303072-en>. [17]
- OECD (2018), *Taxation of Household Savings*, OECD Tax Policy Studies, No. 25, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264289536-en>. [27]
- OECD (2017), *OECD Economic Surveys: Belgium 2017*, OECD Publishing, Paris, https://dx.doi.org/10.1787/eco_surveys-bel-2017-en. [12]
- OECD (2017), *OECD Employment Outlook 2017*, OECD Publishing, Paris, https://dx.doi.org/10.1787/empl_outlook-2017-en. [38]
- OECD (2017), *OECD Science, Technology and Industry Scoreboard 2017: The Digital Transformation*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264268821-en>. [20]

- OECD (2016), *OECD Economic Outlook, Volume 2016 Issue 1*, OECD Publishing, Paris, [2]
https://dx.doi.org/10.1787/eco_outlook-v2016-1-en.
- OECD (2016), *OECD/INFE International Survey of Adult Financial Literacy Competencies*, [26]
 OECD Publishing, Paris, <http://www.oecd.org/daf/fin/financial-education/OECD-INFE-International-Survey-of-Adult-Financial-Literacy-Competencies.pdf>.
- OECD (2015), *The Future of Productivity*, OECD Publishing, Paris, [1]
<https://dx.doi.org/10.1787/9789264248533-en>.
- OECD (2014), *Experiences with Competition Assessment: Report on the Implementation of the 2009 OECD Recommendation*, OECD Publishing, Paris, [19]
<http://www.oecd.org/daf/competition/Comp-Assessment-ImplementationReport2014.pdf>.
- OECD (2009), *Recommendation of the OECD Council on Competition Assessment*, OECD [18]
 Publishing, Paris, <http://www.oecd.org/daf/competition/OECD-Recommendation-Competition-Assessment.pdf>.
- Pourtois, M. and H. Bogaert (2019), “Etude comparative du financement public des universités en Belgique, aux Pays-Bas et en Allemagne”, *Série Politique Economique*, No. 95, [33]
<https://www.unamur.be/eco/economie/cerpe/cahiers/cahiers/cahiern95>.
- Renda, A. and S. Dougherty (2017), “Pro-productivity institutions: Learning from national experience”, *OECD Productivity Working Papers*, No. 7, OECD Publishing, Paris, [50]
<https://doi.org/10.1787/d1615666-en>.
- Rodrik, D. (2010), “The return of industrial policy”, *Project Syndicate*, <https://www.project-syndicate.org/commentary/the-return-of-industrial-policy>. [30]
- Sorbe, S. et al. (2019), “Digital dividend: Policies to harness the productivity potential of digital technologies”, *OECD Economic Policy Papers*, No. 26, OECD Publishing, Paris, [48]
<https://doi.org/10.1787/273176bc-en>.
- Sutherland, D. et al. (2009), “Infrastructure investment: Links to growth and the role of public policies”, *OECD Economics Department Working Papers*, No. 686, OECD Publishing, Paris, [44]
<https://dx.doi.org/10.1787/225678178357>.
- Syverson, C. (2017), “Challenges to mismeasurement explanations for the US productivity slowdown”, *Journal of Economic Perspectives*, Vol. 31/2, pp. 165-186, [7]
<http://dx.doi.org/10.1257/jep.31.2.165>.
- Van Damme, J., K. Bellens and W. Van den Noortgate (2018), “Evolutie van de effectiviteit van Belgische en Vlaamse onderwijssystemen”, *Tijdschrift voor Onderwijsrecht en Onderwijsbeleid*, Vol. 3, https://issuu.com/diekeure/docs/torb_-_evolucie_van_de_effectivitei. [46]
- World Economic Forum (2018), *Insight Report: The Global Competitiveness Report 2018*, [46]
<http://www3.weforum.org/docs/GCR2018/05FullReport/TheGlobalCompetitivenessReport2018.pdf>.

Chapter 1:
The productivity slowdown in Belgium:
Main economy-wide and sectoral trends

Belgium has one of the highest productivity levels in the OECD. However, productivity growth has declined over the past decades, more so than in most other OECD and main neighbouring economies. The decline in labour productivity growth has been mainly due to lower multifactor productivity growth, while capital deepening has held up better. The manufacturing sector, even though its productivity has slowed, has outperformed the rest of the OECD. By contrast labour productivity growth in services has been lower and declined more sharply than in the rest of the OECD.

Belgium has one of the highest labour productivity levels in the OECD, reflecting many strengths, such as a qualified workforce, a high stock of productive capital, a technological edge in some manufacturing sectors and a good integration in global value chains. However, labour productivity growth has been weak over the past two decades, mainly because of sluggish multifactor productivity growth.

Labour productivity has slowed in most OECD countries. The slowdown reflects both the legacy of the global financial crisis and its aftermath, as well as structural factors such as declining business dynamism and weaker technology diffusion across firms. It has been more pronounced in Belgium than in the average OECD country and the main neighbouring economies, suggesting that Belgian-specific factors may have compounded common drags on productivity.

Some sectors have done better than others. Manufacturing productivity has slowed, but has outperformed the rest of the OECD. By contrast, the performance of market services has been very weak.

This chapter provides an overview of productivity developments in Belgium and the driving forces behind them at the macroeconomic level. It also looks at productivity differences at the regional and sector level.

1.1. Productivity in Belgium: High, but growing slowly

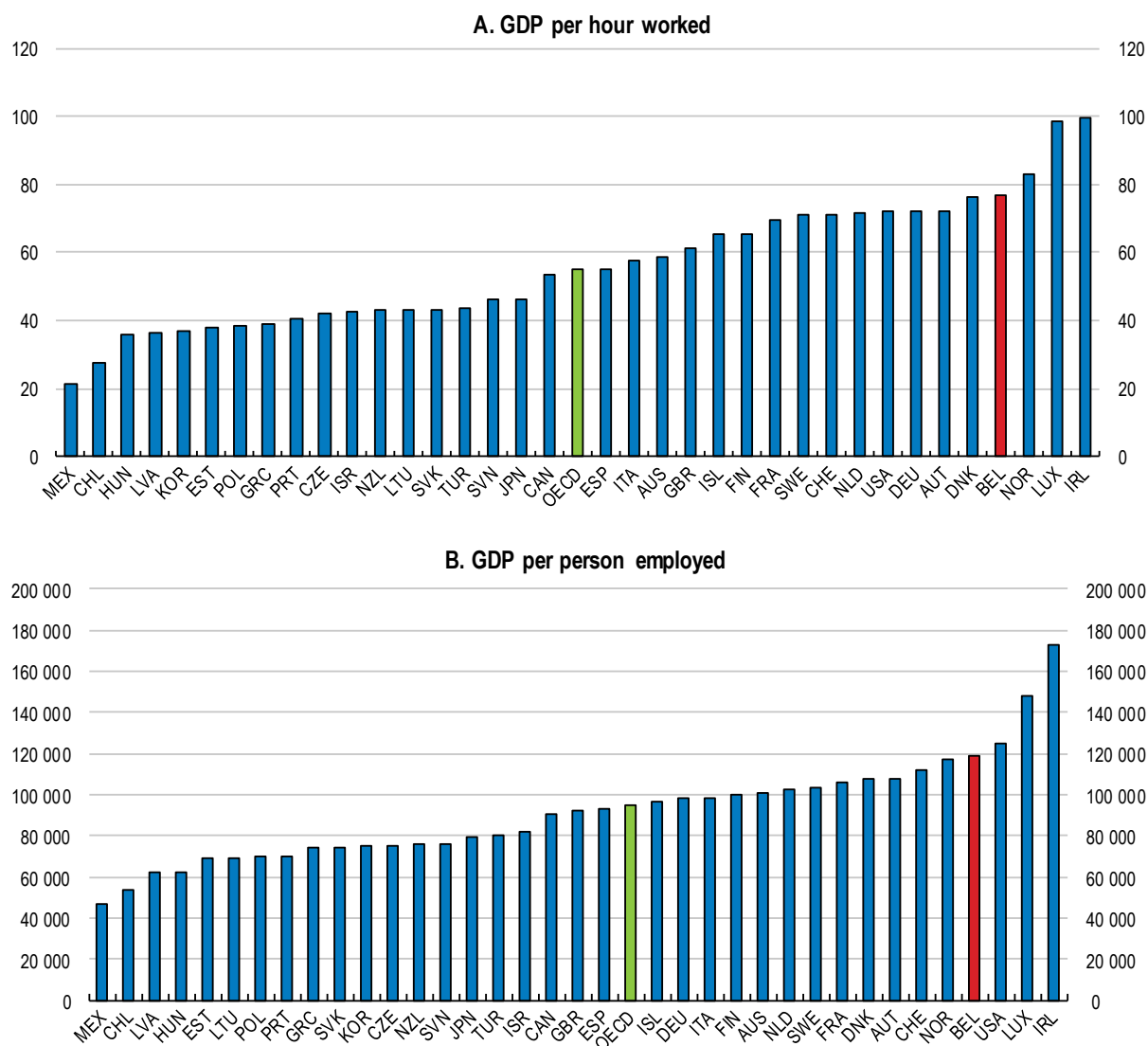
An important determinant of living standards is the evolution of GDP per capita, which can be decomposed into growth in labour productivity (GDP per hour worked) and changes in labour utilisation (hours worked per person). In the long run, labour productivity is the main driver of GDP per capita, since hours worked cannot increase indefinitely. In Belgium, labour utilisation has been relatively stable since the 1990s, as higher employment has been offset by a decline in hours worked per worker. Stable labour utilisation means that evolutions in GDP per capita growth over the past decades have essentially reflected changes in labour productivity.

Labour productivity in Belgium is high

Belgium's GDP per hour worked is about 35% higher than in the OECD on average and among the highest in the OECD (Figure 1.1, Panel A).¹ When using the number of persons employed as an alternative measure of labour input, Belgium's ranking is also high (Figure 1.1, Panel B).²

¹ Comparisons of labour productivity across countries need to be considered cautiously, as some of the observed productivity differences may come from cross-country variations in the measurement of labour input, and especially from a lack of adjustment to the measurement of hours worked. Countries which make no adjustments to measures of average hours worked extracted from labour force surveys appear to systematically over-estimate labour input (e.g. since they can include hours paid but not used in production) and thereby under-estimate labour productivity levels. The productivity numbers in this section incorporate the adjustments proposed by Ward, Zinni and Marianna (2018^[40]) to take this issue into account. These adjustments affected the number of hours worked for Austria, Estonia, Finland, Greece, Latvia, Lithuania, Poland, Portugal, Sweden and the United Kingdom.

² While productivity based on hours worked is generally the preferred measure of labour productivity, as it removes cross-country differences in the full-time/part-time composition of the workforce and reflects overtime work as well as hours worked in additional jobs, the number of

Figure 1.1. Belgium has very high labour productivity

Note: Data are measured in current prices for 2017, USD 2017 purchasing power parities. The OECD number is total OECD GDP divided by total hours worked in Panel A and by the total number of persons employed in Panel B.

Source: OECD Productivity Statistics Database.

This high level of productivity reflects several factors, including:

- A highly qualified workforce with a high percentage of tertiary education graduates in the working-age population: 40% of 25-34-year-old men and 51% of 25-34-year-old women have tertiary educational attainment (OECD, 2018^[1]).
- A technological edge in some manufacturing sectors, in particular in chemical and metal products (Biatour et al., 2007^[2]).

persons employed is often used as a proxy for labour input, especially when data on total hours worked is not available (OECD, 2018^[22]).

- A high stock of productive capital: the rapid increase in the relative price of labour in the 1970s led to investment rationalisation and strong capital deepening (Biatour et al., 2007^[2]). Although capital deepening has slowed since the 1970s in Belgium, it has outperformed developments in neighbouring countries (as further discussed below).
- A high integration in global value chains (GVCs): participation in GVCs can boost productivity through various channels, including technology transfers, increased knowledge spillovers, economies of scale and access to a larger variety of cheaper or higher-quality imported inputs (Criscuolo and Timmis, 2017^[3]). Belgium has about 45% of foreign value added content in its manufactured exports, which is one of the highest among OECD countries (OECD, 2018^[4]).

The flip side of Belgium's high level of labour productivity is an employment rate that is below the OECD average: in 2018, 64.5% of the working-age population in Belgium versus 68.4% in the OECD on average.³ Groups that are under-represented in the labour market (low-skilled youth, people with care responsibilities, migrants, people with disabilities and older people) tend to be employed in less productive activities, which "inflates" Belgium's position in cross-country productivity comparisons (OECD, 2018^[5]). For example, only 46.5% of those aged 25-64 years and with only a below-upper secondary level of education were employed in Belgium in 2017, compared with 57.4% in the OECD on average. This reflects, among other factors, relatively high labour costs on low-skilled labour.

Labour productivity growth has been weak since the mid-1990s

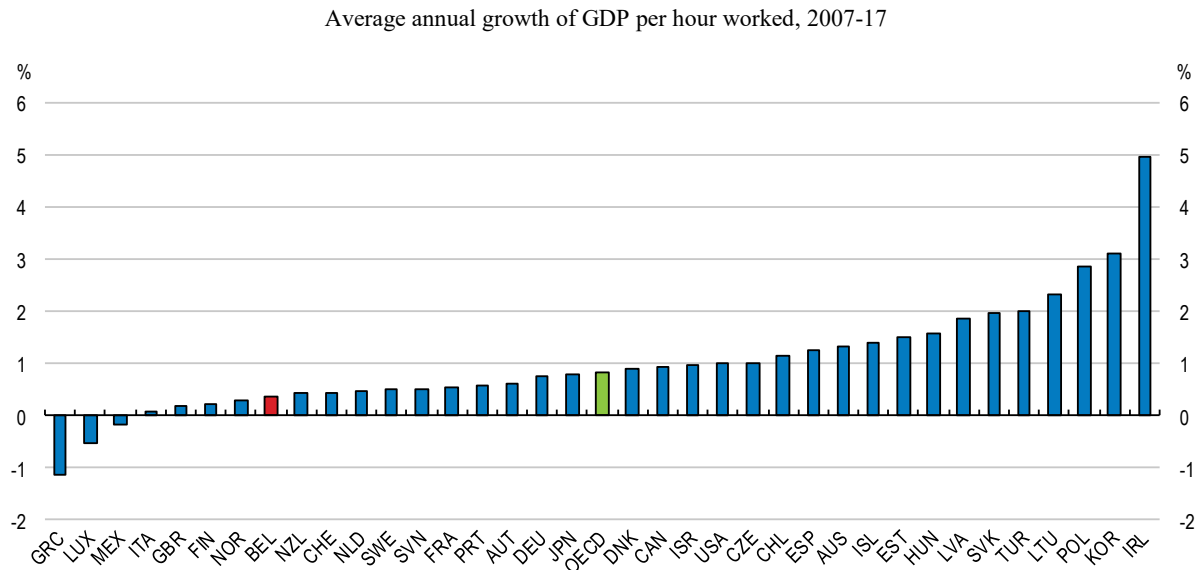
While the level of labour productivity in Belgium is among the highest in the OECD, its growth has been relatively low in the past decades. Over the period 2007-17, Belgium's labour productivity grew by 0.3% per year on average, one of the lowest rates among OECD countries and less than half of the OECD average (Figure 1.2).

The slowdown of labour productivity in Belgium started in the early 1990s and has become particularly severe since the onset of the global financial and economic crisis (Figure 1.3). It began earlier and has been more pronounced than in many OECD and the three main neighbouring countries. To some extent, it reflects convergence by countries with lower initial productivity levels. Indeed, countries with initially low productivity have more potential to catch up to best performers, for example by adopting existing technologies and best policy practices.

Estimating the total shortfall in labour productivity over the past two decades

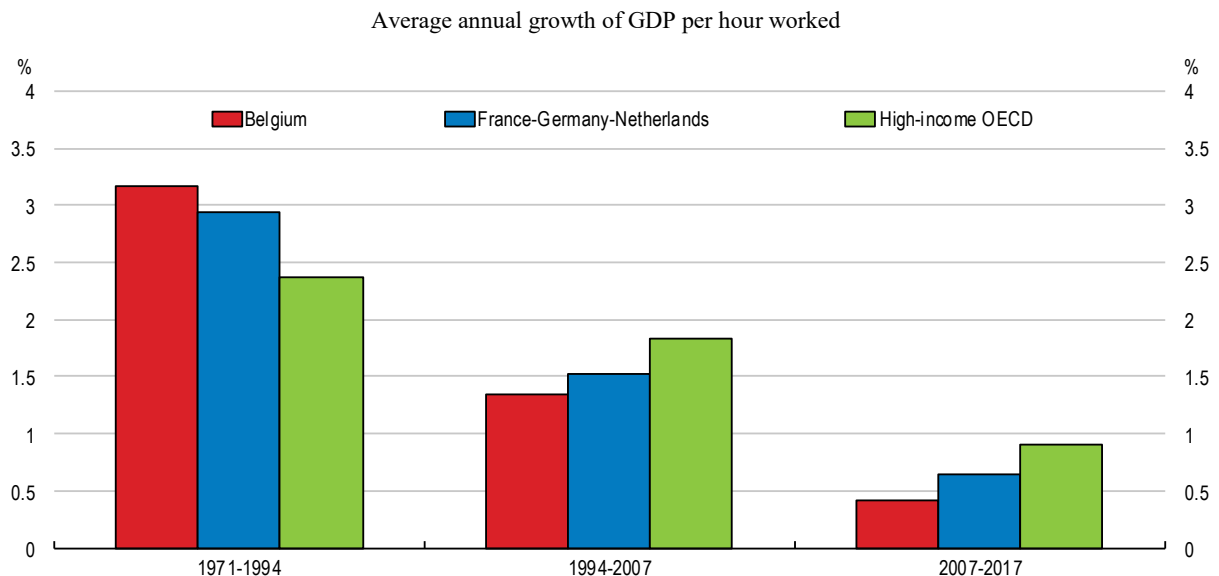
From 1980 to 1998, labour productivity in Belgium and in the rest of the OECD grew by about the same rate. To illustrate the magnitude of the productivity slowdown since this period, one can compare actual productivity levels with a simple counterfactual assuming that productivity growth would have continued at the average 1980-98 rate. On this yardstick, the labour productivity shortfall experienced by Belgium since 1998 is in the range of 20-25% and about twice as high as for the rest of the OECD (Figure 1.4).

³ The employment rate is respectively 65.3%, 75.9% and 77.2% in France, Germany and the Netherlands.

Figure 1.2. Belgium's labour productivity growth has been low

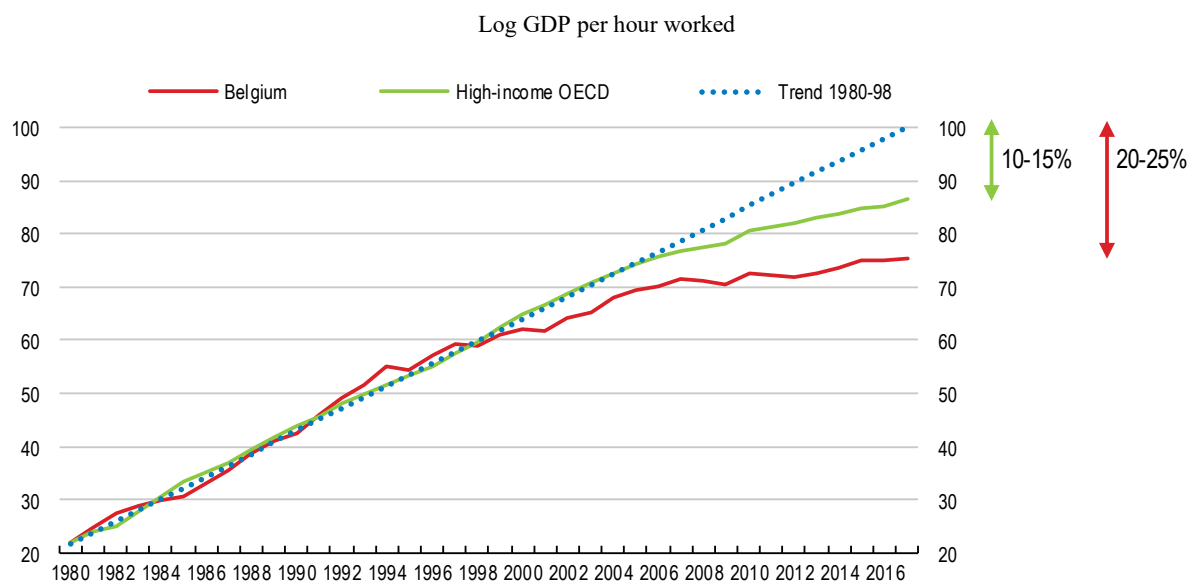
Note: Data are measured in constant prices, USD 2010 purchasing power parities. The OECD number for labour productivity is total GDP divided by total hours worked in the OECD.

Source: OECD Productivity Statistics Database.

Figure 1.3. Belgium's labour productivity growth has fallen sharply

Note: Data are measured in constant prices, USD 2010 purchasing power parities. The high-income OECD number is the average, weighted by the number of hours worked, for the following countries: Australia, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, the Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, the United Kingdom and the United States. The France-Germany-Netherlands number is the weighted average. Differences between the average productivity growth rates between the three periods 1971-94, 1994-2007 and 2007-17 are statistically significant (Chow, 1960_[6]).

Source: OECD estimates based on OECD Productivity Statistics Database.

Figure 1.4. The productivity shortfall in Belgium over the past two decades is 20-25%

Note: Data are measured in constant prices, USD 2010 purchasing power parities. The high-income OECD number is the average, weighted by the number of hours worked, for the following countries: Australia, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, the Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, the United Kingdom and the United States. The dotted line is a linear trend through the data points in 1980 and 1998. Its 2017 value is normalised to 100.

Source: OECD estimates based on OECD Productivity Statistics Database.

With labour productivity one-fifth to one-quarter smaller today than what it would have been without a slowdown, GDP is also one-quarter to one-fifth lower than if there had been no productivity slowdown. Furthermore, the shortfall in productivity in Belgium has translated into a shortfall in wages, as wages tend to co-move with labour productivity, mainly because raising real wages is the most direct mechanism through which the benefits of productivity growth are transferred to workers (Meager and Speckesser, 2011^[7]). For many workers, the effects of low productivity growth on wage growth have in Belgium, as in several other OECD countries, been compounded by the fall in the labour share⁴ and rising wage inequality – as Schwellnus, Kappeler and Pionnier (2017^[8]) find when looking at data from 1995 to 2014.

Labour productivity is highest in the Brussels-Capital Region and grows at the fastest pace in Flanders, leaving Wallonia behind

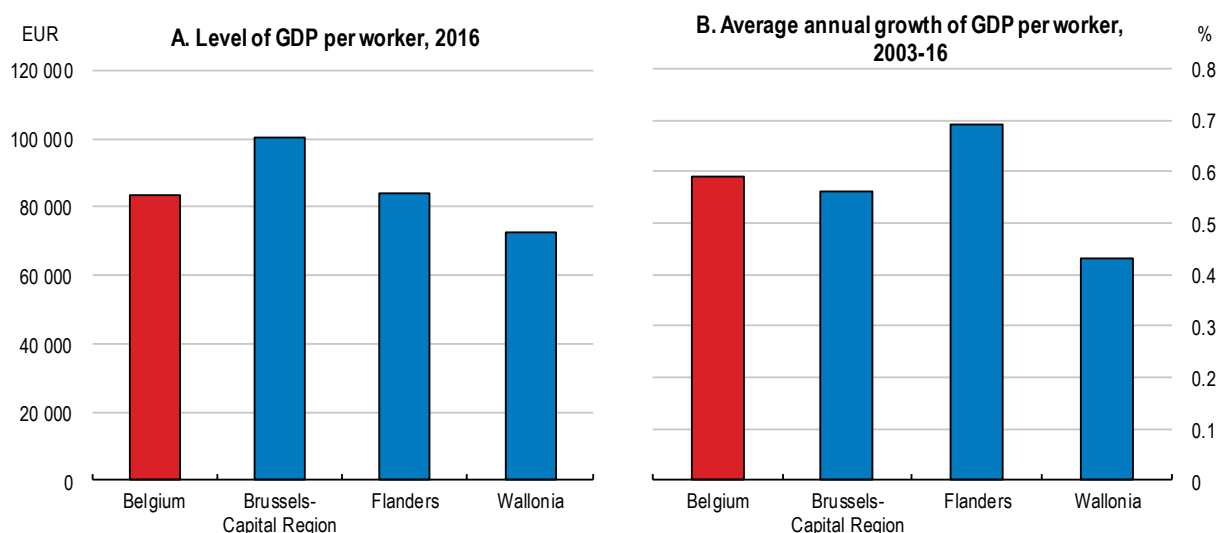
While Belgium's productivity is high at the national level, disparities across regions are large. The Brussels-Capital Region is where productivity is the highest, with GDP per person employed (at place of work⁵) 19% higher than in Flanders and 38% higher than in

⁴ The labour share is the ratio of total nominal labour compensation to value added at factor cost.

⁵ Many workers in Belgium commute to the Brussels-Capital Region from other regions for work. According to 2016 data from the European Commission, about half of the jobs in the Brussels-Capital Region were held by commuters from Flanders and Wallonia. However, this does not affect productivity measures as these commuters are counted in the Brussels-Capital Region for both GDP and employment. Still, the fact that many corporate groups locate their headquarters (and therefore

Wallonia (Figure 1.5, Panel A). Between 2003 and 2016, Flanders reduced the productivity gap with the Brussels-Capital Region, but the gap of Wallonia with the other two regions widened (Figure 1.5, Panel B).

Figure 1.5. Productivity performance varies between the three regions



Note: Data are measured in constant prices, with 2010 as the base year. Region of a worker is place of work, not place of residence.

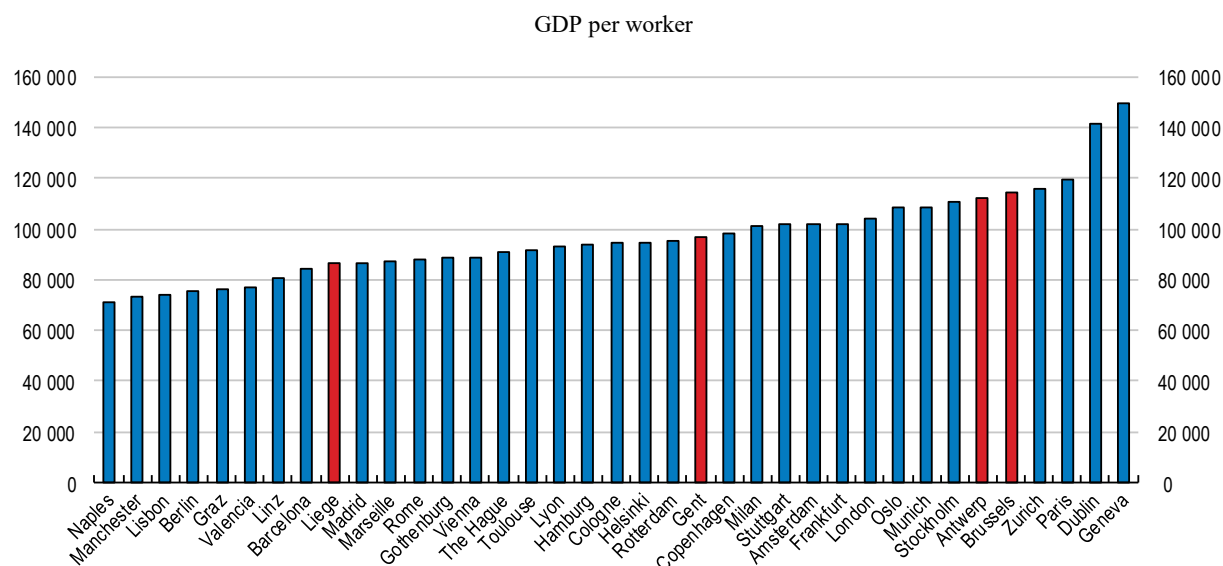
Source: OECD Regional Statistics Database.

The high productivity observed in the Brussels-Capital Region may be, at least partly, related to the fact that higher economic concentration (i.e. a greater number of companies per square kilometre) is associated with higher productivity. Economically concentrated areas tend to attract talented workers, have better infrastructure and encourage stronger competition among firms, and cities also have higher abilities to better match skills and jobs. Furthermore, agglomeration effects can lead to positive externalities such as knowledge spillovers and better connections among firms. When controlling for worker, job and firm characteristics across the three Belgian regions, productivity gaps between the Brussels-Capital Region, Flanders and Wallonia have been shown to be smaller (Rycx, Saks and Tojerow, 2016^[9]).

Brussels and Antwerp are among the best-performing metropolitan areas⁶ in Europe, ranking respectively fifth and sixth in terms of GDP per worker, behind Geneva, Dublin, Paris and Zurich. Liege, by contrast, has a much lower productivity level (Figure 1.6).

certain incomes common to the group) in Brussels can inflate the productivity of the Brussels region compared with the others.

⁶ Metropolitan areas are functional urban areas with a population of at least 500 000. They follow a harmonised definition developed by the OECD in cooperation with the European Commission. For more details, see OECD (2012^[43]).

Figure 1.6. Some Belgian metropolitan areas have high labour productivity

Note: Data are for 2015, USD 2010 purchasing power parities, except for Zurich, Geneva and Dublin for which data are for 2014.

Source: OECD Regional Statistics Database.

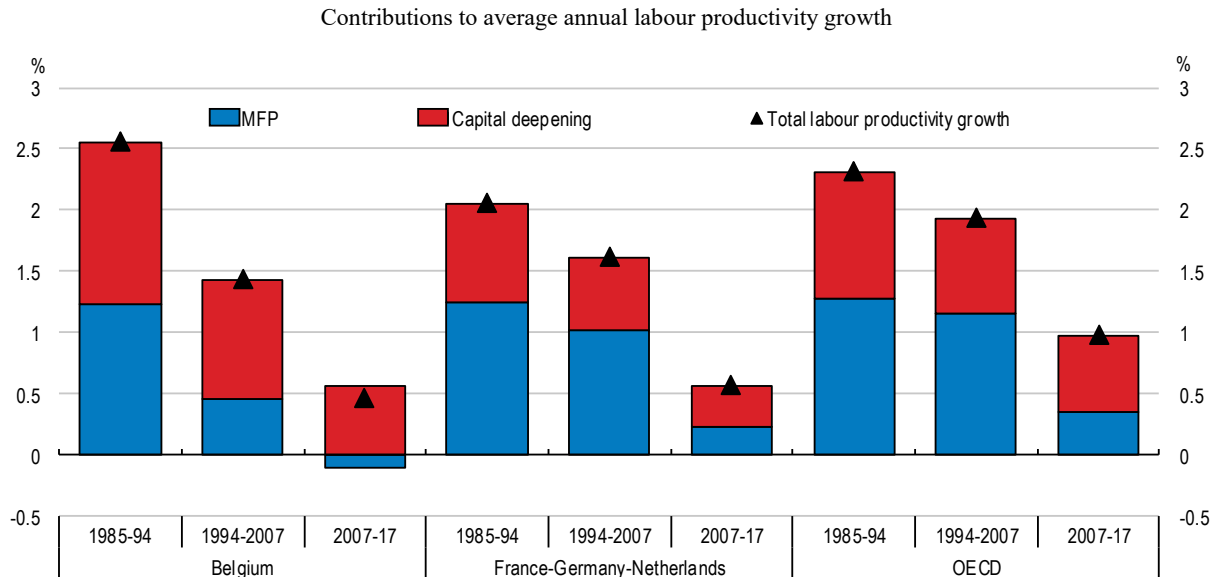
Stagnant MFP has been the main cause of Belgium's productivity slowdown

Conceptually, labour productivity growth can be achieved either by increasing capital per hour worked, i.e. capital deepening, or by improving the efficiency with which labour and capital inputs are used in the production process, i.e. multifactor productivity (MFP).⁷ Belgium's productivity slowdown has been due to lower growth in both capital deepening and MFP. Still, capital deepening held up relatively well compared with other OECD countries, and especially with France, Germany and the Netherlands. By contrast, the decline in MFP growth has been particularly severe. Over 1985-94, MFP growth explained about half of the increase in labour productivity. Since then, its contribution has fallen sharply, much more than elsewhere. Lower MFP growth accounts for 60-70% of the slowdown in labour productivity (Figure 1.7).

Since 2000, MFP has been virtually stagnant (Figure 1.8). The lack of MFP growth is worrying as it may reflect low efficiency gains, for example owing to weak innovation and diffusion of technologies across firms. Chapter 2 studies in depth labour productivity developments at the firm level.

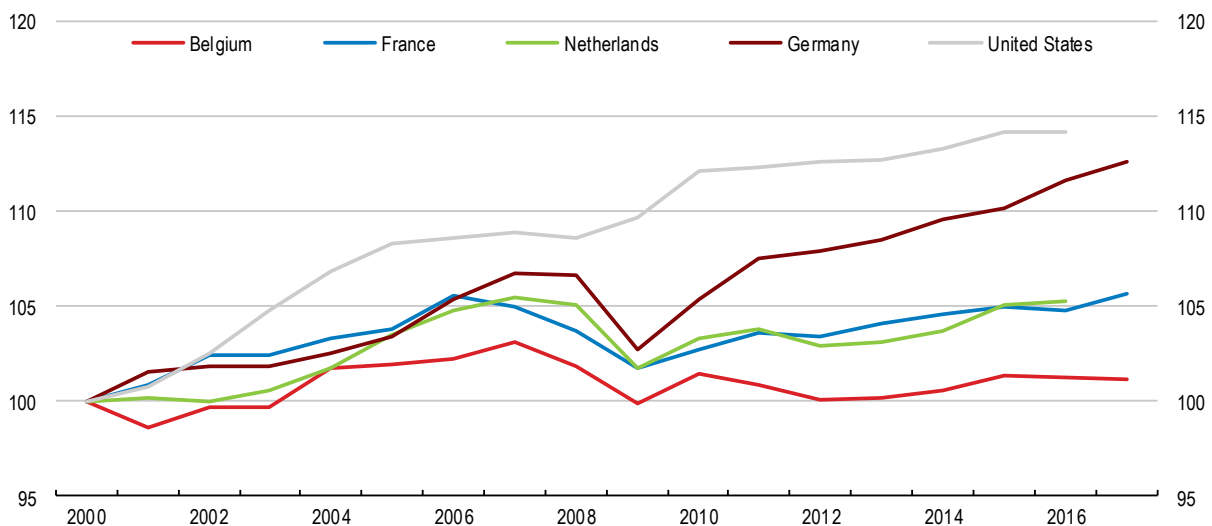
⁷ Growth in MFP is measured as a residual of a Solow production function, i.e. the part of GDP growth that cannot be explained by growth in capital and labour inputs. OECD (2018^[22]) explains the details of the OECD approach to estimating MFP. Changes in MFP can, for example, reflect changes in the composition of the workforce, management practices, general knowledge, network effects, spillovers from production factors or economies of scale – all factors that can boost productivity growth.

Figure 1.7. The lack of MFP growth has been the main drag on Belgium's productivity growth



Note: Labour productivity is measured as GDP per hour worked. Data are measured in constant prices, USD 2010 purchasing power parities. The OECD number is the unweighted average for the following countries: Australia, Austria, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Korea, the Netherlands, New Zealand, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States. Data for Austria are available from 1996, for New Zealand from 1987 and for Switzerland from 1992. Data for Ireland are available until 2014, for Portugal and Sweden until 2015 and for Japan, Korea, the Netherlands, New Zealand and the United States until 2016. The France-Germany-Netherlands number is the unweighted average.
Source: OECD estimates based on OECD Productivity Statistics Database.

Figure 1.8. Multifactor productivity in Belgium has been virtually stagnant



Note: Data are measured in constant prices. The 2000 values are normalised to 100. Growth in MFP is measured as a residual of a Solow production function, i.e. the part of GDP growth that cannot be directly accounted for by growth in labour (total hours worked) and capital inputs.
Source: OECD estimates based on OECD Productivity Statistics Database.

1.2. Main reasons for the productivity slowdown in Belgium

Common reasons across OECD countries

Several factors have been advanced to explain the productivity slowdown that has affected most OECD countries, including Belgium, in the past couple of decades: legacy of the recent global financial and economic crisis; structural factors; and measurement issues.

Even though the productivity slowdown started before the global financial and economic crisis, there is evidence that the crisis has dampened productivity through various channels across OECD countries, including:⁸

- Tight credit conditions in the years following the crisis and sustained economic, political and regulatory uncertainty which have led to a sharp decline in investment – both private and public – thereby weighing on innovation (Adler et al., 2017_[10]; McKinsey Global Institute, 2018_[11]).
- The weakening of banks that may have contributed to the survival of so-called “zombie firms” (i.e. firms that would have exited in a fully competitive environment). These firms have been shown to dampen productivity. See Chapter 2 for more on zombie firms and productivity in Belgium.
- Growing misallocation of capital and labour resources both before and after the global financial crisis (Adler et al., 2017_[10]). For example, certain countries have experienced construction bubbles leading to a misallocation of resources towards the construction sector.
- The decline in trade growth and plateauing of integration of global value chains, two important drivers of productivity (OECD, 2017_[12]).

While productivity growth has been particularly weak since the crisis, the slowdown started well before, suggesting that structural factors are also key to explain the productivity slowdown in OECD countries. They include the following, partly interrelated, factors:

- A structural decline in business dynamism, with a general trend towards a lower entry rate of new firms, a lower exit rate of less productive firms and less reallocation towards productive firms (Adalet McGowan et al., 2015_[13]; Calvino, Criscuolo and Verlhac, 2018_[14]; Adalet McGowan, Andrews and Millot, 2017_[15]). This factor seems to be particularly prominent in Belgium (see Chapter 2 for more details).
- The growing dispersion in productivity performance between leading firms and their non-frontier counterparts (“laggard firms”) within countries and sectors: this growing dispersion mainly reflects disproportionately low growth of low-productivity firms (Berlingieri et al., 2018_[16]). This issue is discussed in more detail in Chapter 2.
- Weaker technology diffusion across firms, adoption lags and transition costs: these have been linked to the so-called “productivity paradox” or “new Solow paradox” (Acemoglu et al., 2014_[17]), whereby the recent rapid development of information and communication technologies has coincided with the slowdown in productivity

⁸ For a more detailed analysis of the impact of the global financial and economic crisis on labour productivity, see Ollivaud and Turner (2015_[41]) and Ollivaud, Guillemette and Turner (2018_[42]).

(Andrews, Nicoletti and Timiliotis, 2018^[18]; McKinsey Global Institute, 2018^[11]). Andrews, Criscuolo and Gal (2016^[19]) find that the OECD-wide pace of technological convergence has declined by one-third since the late 1990s, while Gal et al. (2019^[20]) show that only firms at the technological frontier have benefited in full from digital technologies.

- Structural changes in economic activities in favour of services: the shift from manufacturing to services, with a rising share of workers in the services sector as a result of greater demand for services, has been a moderate but persistent drag on labour productivity growth, as productivity in services tends to be lower than in manufacturing. In almost all major OECD countries, the top three sectors with the largest employment gains during 2010-16 had below-average productivity, with restaurants, health and residential care activities often growing strongly (Sorbe, Gal and Millot, 2018^[21]; OECD, 2018^[22]). This has also been the case in Belgium, as the next section shows in detail.
- Population ageing: the links between demographics and productivity are complex, but there is some evidence that population ageing has dampened productivity growth (Aiyar, Ebeke and Shao, 2016^[23]). The situation of Belgium is similar to the OECD average, with the share of workers aged between 55 and 64 increasing from 8% in 2000 to 16% in 2017. Ariu and Vandenberghe (2014^[24]) find that the MFP of the Belgian workforce declined by 4.5 percentage points from 1991 to 2013 as a result of the increase in the share of older workers in total employment. Projections suggest that this number could reach 7 percentage points by the mid-2020s.

Some analysts have also pointed to the possibility that productivity growth might be underestimated – the “mismeasurement hypothesis” – especially because of the growing importance of the digital economy. For example, intangible assets (e.g. data, algorithms) are not fully measured, which can lead to underestimating MFP growth in the period where they are developed and subsequently overestimating it when they are used as inputs to production (Brynjolfsson, Rock and Syverson, 2018^[25]). Most researchers, however, concur with the conclusion that these potential mismeasurements – while deserving more attention – are not sufficient to explain the productivity slowdown (Ahmad, Ribarsky and Reinsdorf, 2017^[26]; Sichel, 2019^[27]).

Some Belgian specificities

In addition to these factors that are common to most OECD countries, several factors that are specific to Belgium may also have contributed to the productivity slowdown. They include:

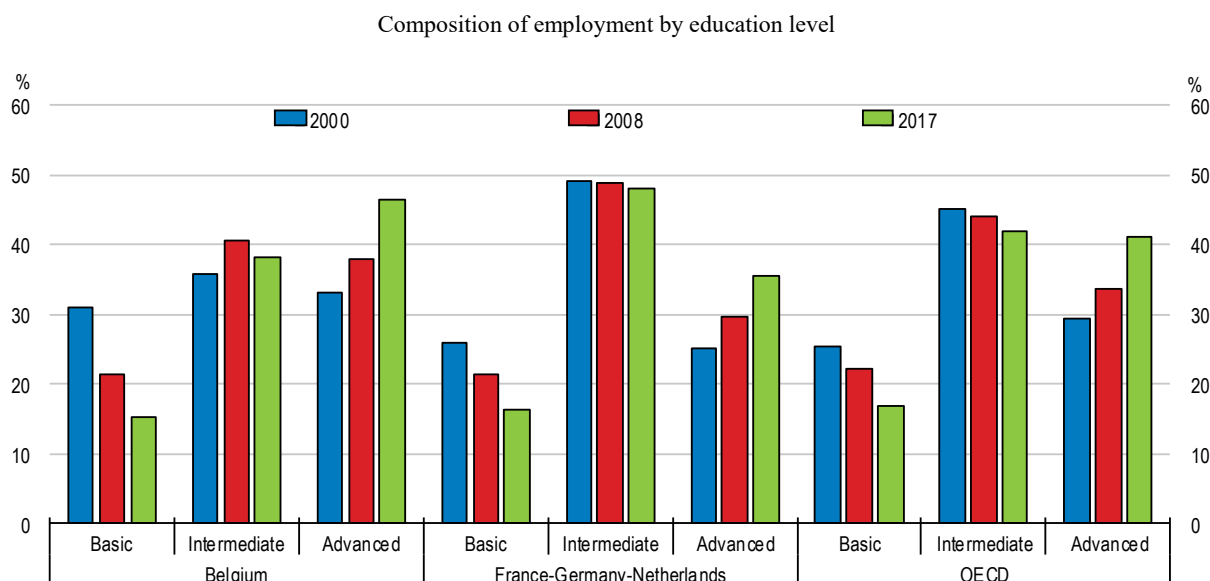
- the skill composition of Belgian employment
- a segmented labour market, including between the three regions
- low public investment
- lack of translation of relatively high R&D spending into MFP growth.

Changes in the skill composition of employment (e.g. as a result of an increasing share of employment in low-productivity activities) can affect average labour productivity. In Belgium, labour market policies over the past two decades have aimed to increase the historically low employment rate, particularly among low-skilled workers. In 2003, the Belgian government introduced the service voucher scheme targeted at household help

services in an attempt to reduce informal economic activity and to raise the employment of low-skilled workers. The scheme proved popular (European Commission, 2017^[28]). Between 2000 and 2014, employment in the sector “Administrative and support service activities” increased from 5% of total hours worked in Belgium to 8% (OECD, 2017^[29]). This sector also faced the strongest decline in labour productivity growth: GDP per person employed declined on average by 2.4% per year between 2005 and 2015.

This illustrates the employment-productivity trade-off (“productivity sacrifice”) between raising productivity and integrating low-productivity workers in the labour force (Dumont and Kegels, 2016^[30]; Bourlès and Cette, 2005^[31]). Despite this effect, the overall education composition of the Belgian workforce – admittedly a rough proxy for skills – has generally improved over the past decade, slightly more than in the OECD on average and the main neighbouring countries (Figure 1.9).

Figure 1.9. The education level of Belgian workers has improved over the past 20 years



Note: Employment numbers comprise all persons of working age who, during a specified period, were either in paid employment or self-employment. Data are disaggregated by level of education which refers to the highest level of education completed, classified according to the International Standard Classification of Education. “Basic” level of education here includes “basic” and “less than basic”. The OECD number is the unweighted average for the following countries: Canada, Denmark, Finland, France, Germany, Italy, the Netherlands, Norway, Spain, Sweden, the United Kingdom and the United States. The France-Germany-Netherlands number is the unweighted average.

Source: OECD estimates based on ILO Statistics Database.

A potential issue regarding skills is that the proportion of tertiary students who graduate from science, technology, engineering and mathematics (STEM) fields is low by international standards. In 2016, less than 20% of tertiary students graduated from one of these fields in Belgium, against 24% on average across the OECD (OECD, 2018^[1]). As the demand for STEM skills is likely to increase in the context of digitalisation, a shortage of workers with STEM skills can be an obstacle to higher productivity growth. The issue of skills in Belgium is discussed in more detail in Chapter 3.

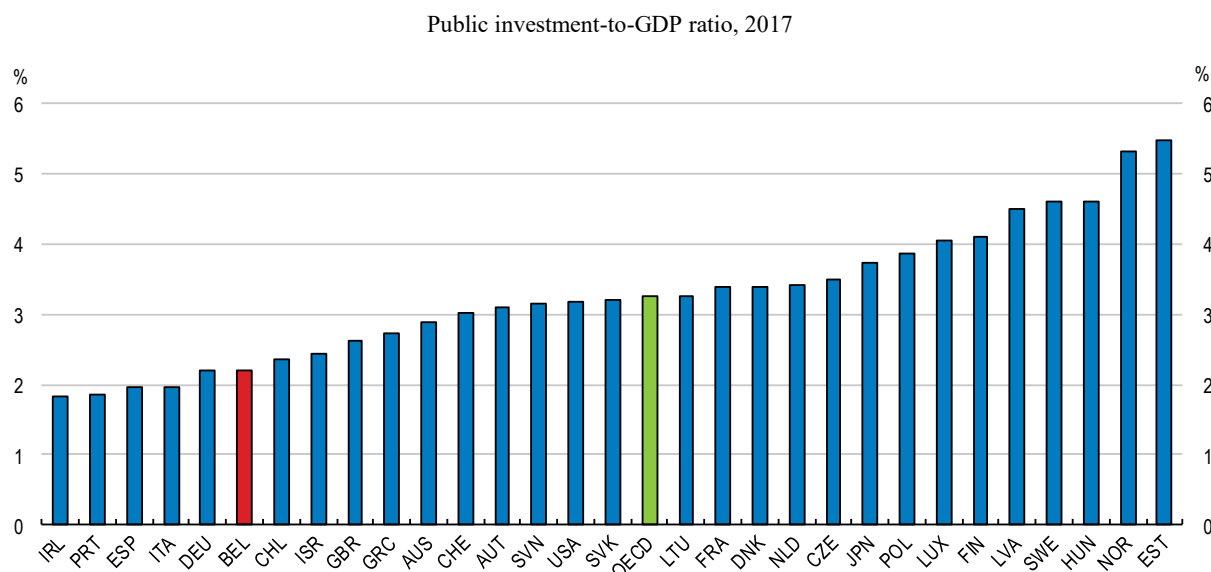
The Belgian labour market is highly segmented, with, for example, large differences in the unemployment rate across the three regions. In 2017, the unemployment rate was 4.4% in Flanders, 9.8% in Wallonia and 15% in the Brussels-Capital Region. This regional variation reflects differences in regional characteristics and linguistic barriers, but also housing market rigidities (OECD, 2017^[29]). The homeownership rate is high: based on EU-SILC data, 73% of the Belgian population own their own home, a much higher rate than in neighbouring countries. Belgian homebuyers have to bear very high transaction costs which hinder residential mobility. Low residential mobility tends to be associated with less efficient labour markets, skill mismatches and low worker reallocation, weighing on economic performance and labour productivity (Caldera Sánchez and Andrews, 2011^[32]).

Overall investment in Belgium is relatively high. With a share of GDP at 23.5% in 2017, Belgium performs better than the euro area on average and its three main neighbouring countries. This is mainly due to business investment, while public investment is low, compared both with its past levels and other countries (Biatour and Kegels, 2017^[33]). The public investment-to-GDP ratio stands at 2.2% (Figure 1.10). This low level of public investment has hindered infrastructure maintenance and resulted in a poor quality of infrastructure by international standards, particularly network infrastructure (i.e. road, waterways and rail) – see European Commission (2018^[34]) and World Economic Forum (2018^[35]). Poor infrastructure has weighed on mobility, creating traffic congestion and hampering productivity growth, while also contributing to higher CO₂ emissions and air pollution – see OECD (2017^[36]) and European Commission (2018^[37]). Commuters in Brussels and Antwerp spend on average 195 and 141 hours respectively in traffic per year (Inrix, 2018^[38]).⁹ To address such shortfalls in public investment, the Belgian authorities have announced a National Pact for Strategic Investments which aims to provide incentives for public and private investments focusing notably on digitalisation, cybersecurity, transport and education (Comité Stratégique, 2018^[39]).

Spending on research and development (R&D) is relatively high and has been fostered by various policies such as tax incentives at the federal level and regional grants (OECD, 2017^[29]). Although it is still short of the Lisbon strategy which sets an objective of 3% of GDP spent on R&D, with 2.6% of GDP, R&D spending in Belgium is somewhat higher than in the euro area on average (2% in 2017).¹⁰ However, this relatively high level of R&D spending has not translated into high multifactor productivity growth in Belgium, pointing towards inefficiencies in the Belgian research and innovation system. Furthermore, investment in research and innovation is concentrated in only a few sectors which are already highly productive. The main sectors investing in R&D are the biopharmaceutical sector, which accounts for about one-third of total business R&D, and firms specialising in computer, electronic and optical products and chemicals (European Commission, 2018^[37]).

⁹ Commuters in Paris and London spend on average 237 and 227 hours respectively in traffic per year.

¹⁰ These numbers are from the OECD Science, Technology and R&D Statistics Database. R&D spending is defined as total expenditure on R&D carried out by resident companies, research institutes and university and government laboratories.

Figure 1.10. Belgium's public investment-to-GDP ratio is low

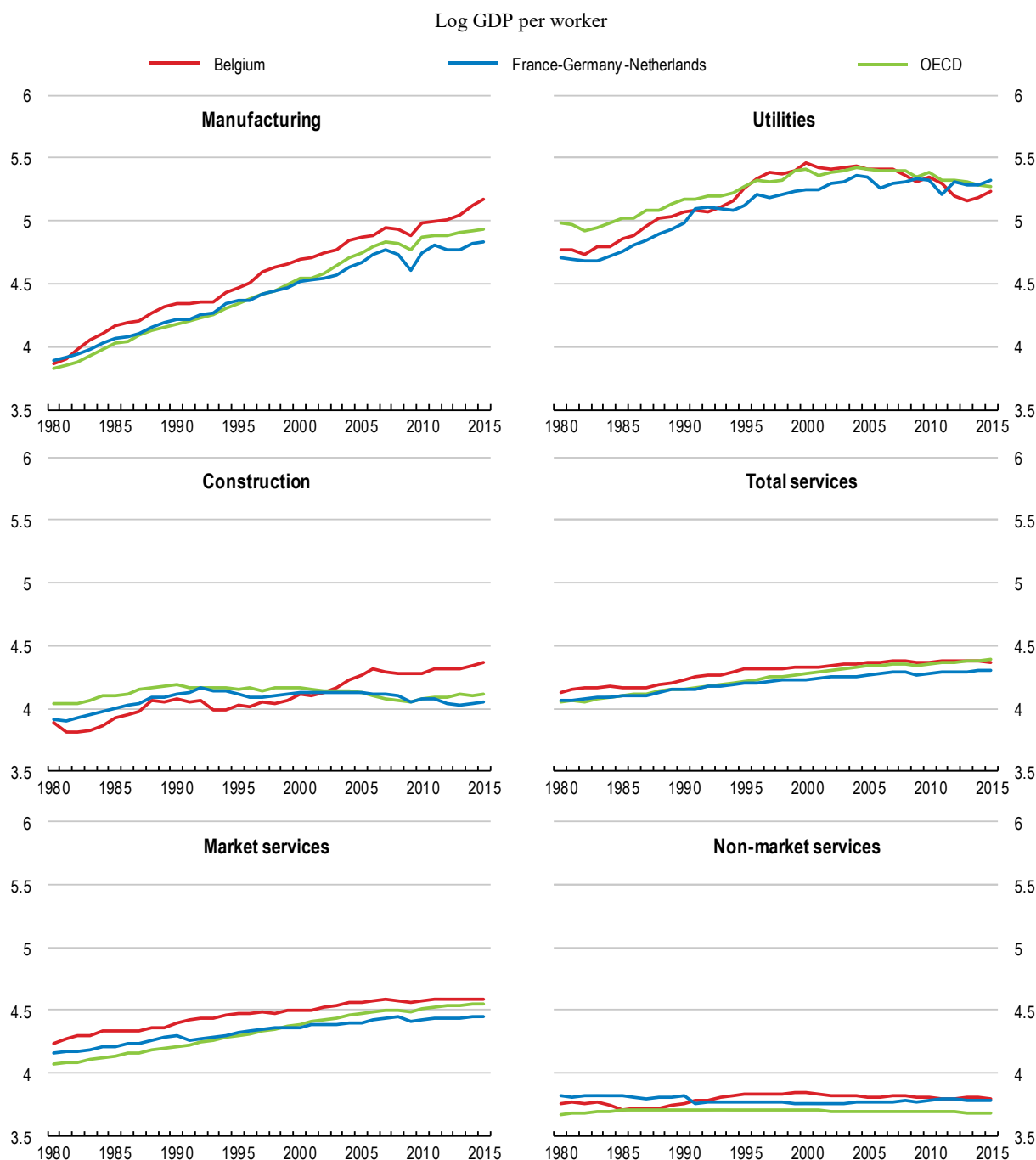
Note: The OECD number is the unweighted average of OECD countries. Data refer to 2017 or last available year.

Source: OECD National Accounts Statistics Database.

1.3. Sectoral analysis

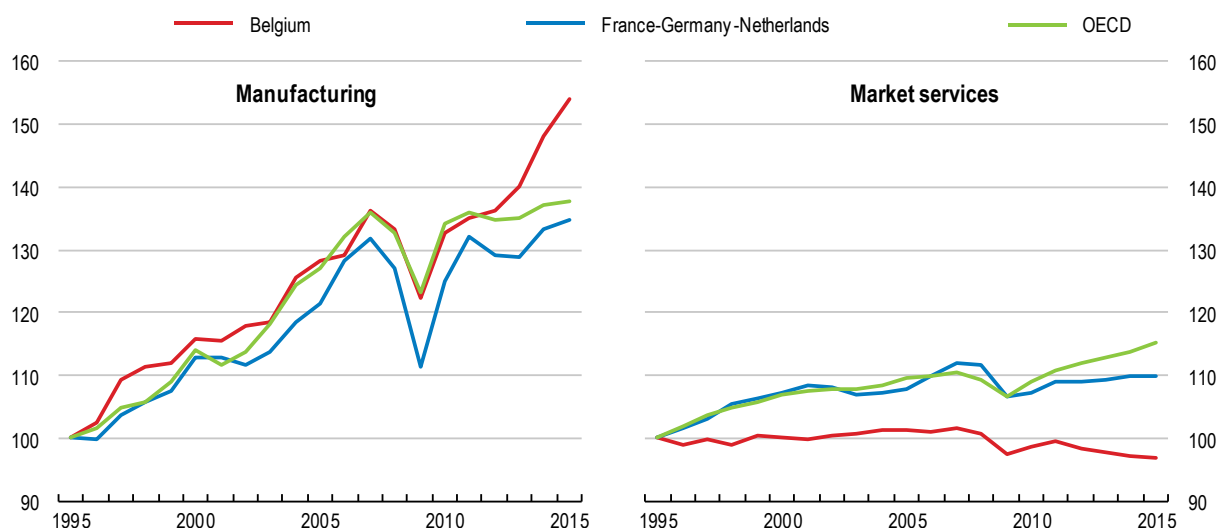
This section assesses sectoral productivity developments and their contribution to aggregate numbers (Figure 1.11 and Figure 1.12).¹¹ The productivity of the Belgian manufacturing sector has slowed, but continued to outperform the OECD on average, as well as an average of France, Germany and the Netherlands. Since 1998, labour productivity in Belgium's manufacturing sector has grown by 3.2% per year, while in the rest of the OECD it has grown by 2.9% and in the three main neighbouring countries by 2.3%. In part, this is explained by the outperformance of multifactor productivity. Productivity in the construction sector also has grown more strongly than elsewhere.

¹¹ Manufacturing is taken to correspond to NACE Rev. 2 sectors 10 to 33, utilities to sectors 35 to 39, construction to sectors 41 to 43, services to sectors 45 to 99, market services to sectors 45 to 82 and non-market services to sectors 84 to 99.

Figure 1.11. Developments in labour productivity: Breakdown by main activity

Note: Data are measured in constant prices, USD 2010 purchasing power parities. The OECD number is the average, weighted by the number of workers in each industry, for the following countries: Australia, Austria, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom and the United States, except for the sectors for which data for value added or employment are missing. The France-Germany-Netherlands number is the weighted average.

Source: OECD estimates based on harmonisation of several databases including OECD Structural Analysis (STAN) Database and EU-level analysis of capital, labour, energy, materials and service (EU-KLEMS) inputs data.

Figure 1.12. Developments in multifactor productivity: Breakdown by main activity

Note: The OECD and France-Germany-Netherlands numbers are weighted averages of MFP indexed at 100 in 1995 by national GDP in current prices. Growth in MFP is measured as a residual of a Solow production function, i.e. the part of GDP growth that cannot be explained by growth in labour (total number of persons employed) and capital inputs.

Source: OECD estimates based on harmonisation of several databases including OECD Structural Analysis (STAN) Database and EU-level analysis of capital, labour, energy, materials and service (EU-KLEMS) inputs data.

By contrast, labour productivity growth in services has been lower and declined more sharply than in the rest of the OECD. This is particularly the case for market services which have seen their productivity growth fall from 1.3% per year between 1980 and 1998 to 0.6% between 1998 and 2015. Labour productivity growth in market services in the OECD on average in the same periods fell from 1.5% to 1%. In line with these trends, multifactor productivity in market services has declined since 1995, contrary to the increases in other OECD countries. This suggests a lack of efficiency gains, a slower pace of innovation and weak diffusion of technologies across firms in this sector in Belgium (see Chapter 2). As mentioned above, the weak productivity performance of market services also reflects the integration of more low-skilled workers with lower productivity into the labour market, as a result of policies to increase Belgium's low employment rates.

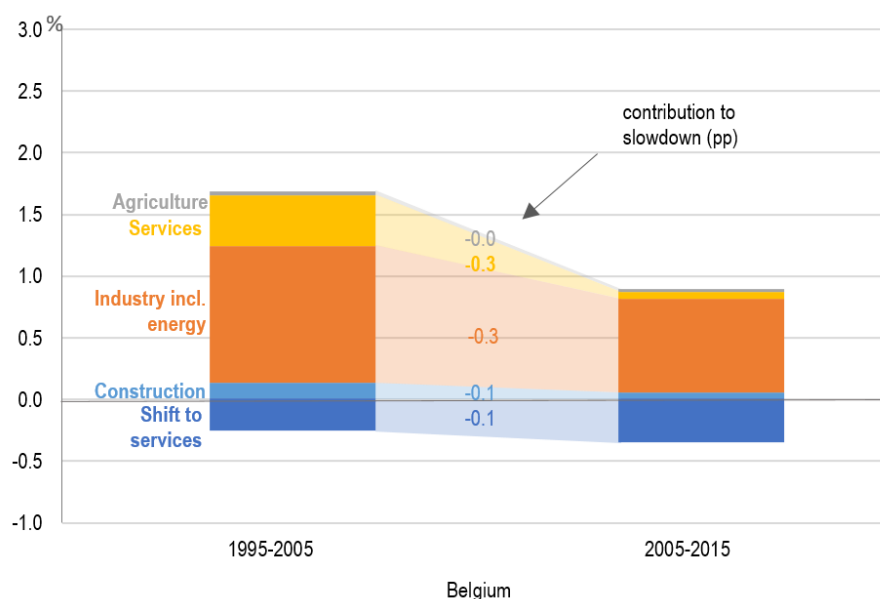
Productivity in non-market services has been effectively flat.¹² In the utilities sector, growth has also been weaker in Belgium than in the rest of the OECD.

Structural changes to the economy, especially the increasing share of services in total value added and employment, have contributed to the overall productivity slowdown as services tend to have lower productivity levels and growth (Sorbe, Gal and Millot, 2018^[21]). A shift-share analysis enables to disentangle the contributions to the aggregate productivity growth rate of within-industry productivity growth and changes in the industry composition.

¹² Measuring productivity in non-market services, which include education, health and general public services, and comparing it with other sectors poses challenges because of the lack of market prices and the difficulties to measure outputs in these sectors (Sorbe, Gal and Millot, 2018^[21]). As a result, international differences in the productivity performance of non-market services, as well as historical comparisons, should be interpreted with caution.

Annual labour productivity growth in Belgium fell from 1.4% per year between 1995 and 2005 to 0.5% between 2005 and 2015. The structural shift effect was negative in both periods, reflecting that industries with higher productivity growth saw their share in total employment decline in both periods. It was an even larger drag on productivity growth between 2005 and 2015, reducing annual productivity growth by 0.4 percentage points per year.¹³ Nevertheless, lower within-industry growth accounted for most of the slowdown between the two periods (Figure 1.13). While a negative structural shift was present in most advanced countries, it reduced productivity growth more strongly in Belgium. On average in the OECD, the shift to services reduced annual productivity growth by 0.2 percentage points in both the 1995-2005 and 2005-15 periods (Sorbe, Gal and Millot, 2018^[21]).

Figure 1.13. Contributions to annual labour productivity growth



Note: The decomposition of labour productivity (GDP per person employed) growth into the three components of the shift-share analysis follows: $\frac{Y_T}{L_T} - \frac{Y_0}{L_0} = \sum_{j=1}^J \theta_{j0} \left(\frac{Y_{jT}}{L_{jT}} - \frac{Y_{j0}}{L_{j0}} \right) + \sum_{j=1}^J (\theta_{jT} - \theta_{j0}) \frac{Y_{j0}}{L_{j0}} + \sum_{j=1}^J (\theta_{jT} - \theta_{j0}) \left(\frac{Y_{jT}}{L_{jT}} - \frac{Y_{j0}}{L_{j0}} \right)$ where $\frac{Y_T}{L_T} - \frac{Y_0}{L_0}$ is the labour productivity growth between years 0 and T, j is the industry and θ_{jT} is the share of workers in industry j in year T. The first component corresponds to the within-industry productivity growth effect, the second to the static component of the structural change effect (static shift effect), and the third is the dynamic component of structural change (dynamic shift effect). Only the sum of the two shift effects is shown.

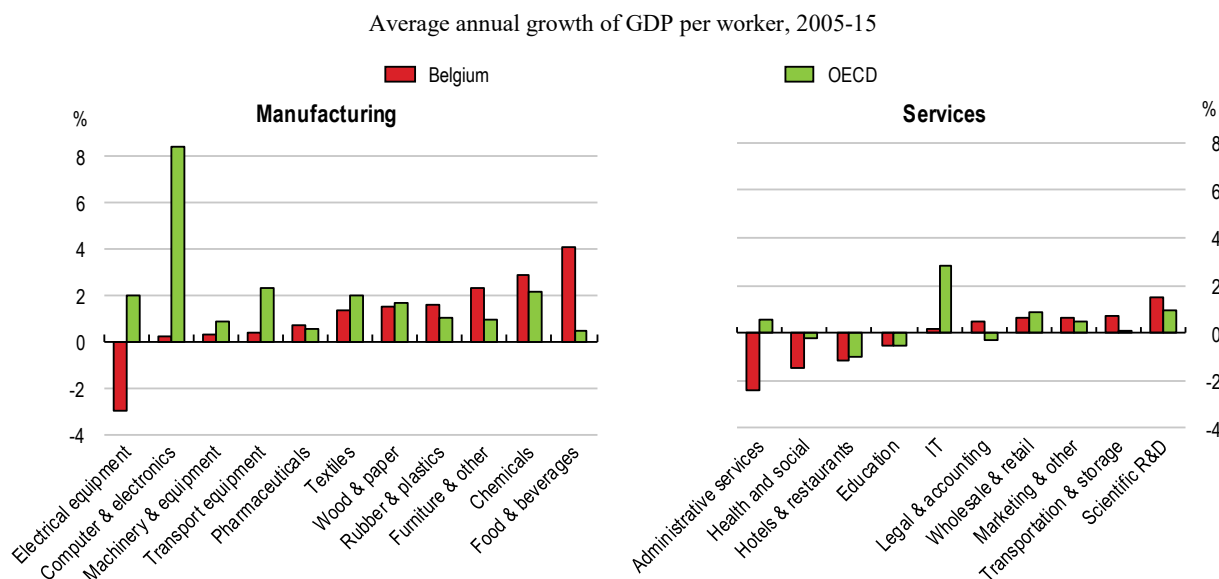
Source: OECD estimates based on harmonisation of several databases including OECD Structural Analysis (STAN) Database and EU-level analysis of capital, labour, energy, materials and service (EU-KLEMS) inputs data.

An analysis of labour productivity growth at a more detailed sector level (two-digit or group of two-digit sectors according to the NACE Rev.2 classification) within manufacturing and services shows a heterogeneous picture (Figure 1.14). While labour productivity growth in

¹³ Previous research that compares different time periods – before (2000-07) and after the global financial crisis (2009-15) – finds that the negative structural shift effect shrank after the crisis, suggesting that the post-crisis productivity slowdown is not explained by a shift to services (Biatour and Kegels, 2017^[33]).

manufacturing sectors tended to outperform the rest of the OECD, in services a majority of sectors had lower productivity growth, especially sectors which also account for a large share of total employment in Belgium, such as administrative services, health and social work activities and hotels and restaurants. Furthermore, productivity growth has been particularly low compared with the rest of the OECD in IT-related manufacturing sectors (computers and electronics) and in ICT services. This is in spite of Belgium's relatively good rank in Europe's Digital Economy and Society Index (8th, in front of Germany and France, but behind the Netherlands).¹⁴

Figure 1.14. Developments in labour productivity: Breakdown by individual sectors



Note: Data are measured in constant prices, USD 2010 purchasing power parities. The OECD number is the average, weighted by the number of workers in each industry, for the following countries: Austria, Canada, Denmark, Finland, France, Germany, Ireland, Iceland, Italy, Japan, Korea, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, the United Kingdom and the United States, except for the sectors for which data for value added or employment are missing.

Source: OECD estimates based on harmonisation of several databases including OECD Structural Analysis (STAN) Database and EU-level analysis of capital, labour, energy, materials and service (EU-KLEMS) inputs data.

¹⁴ The Digital Economy and Society Index is a composite index that summarises relevant indicators on Europe's digital performance and tracks the evolution of EU member states in digital competitiveness.

References

- Acemoglu, D. et al. (2014), “Return of the Solow Paradox? IT, Productivity, and Employment in US Manufacturing”, *American Economic Review*, Vol. 104/5, pp. 394-399, <http://dx.doi.org/10.1257/aer.104.5.394>. [17]
- Adalet McGowan, M. et al. (2015), *The Future of Productivity*, OECD, Paris, <https://www.oecd.org/eco/OECD-2015-The-future-of-productivity-book.pdf>. [13]
- Adalet McGowan, M., D. Andrews and V. Millot (2017), “The Walking Dead? Zombie Firms and Productivity Performance in OECD Countries”, *OECD Economics Department Working Papers*, No. 1372, OECD, <http://dx.doi.org/10.1787/18151973>. [15]
- Adler, G. et al. (2017), “Gone with the Headwinds: Global Productivity”, *IMF Staff Discussion Note*, No. SDN/17/04, International Monetary Fund, <https://www.imf.org/en/Publications/Staff-Discussion-Notes/Issues/2017/04/03/Gone-with-the-Headwinds-Global-Productivity-44758>. [10]
- Ahmad, N., J. Ribarsky and M. Reinsdorf (2017), “Can potential mismeasurement of the digital economy explain the post-crisis slowdown in GDP and productivity growth?”, *OECD Statistics Working Papers*, No. 2017/09, OECD, Paris, <http://dx.doi.org/10.1787/18152031>. [26]
- Aiyar, S., C. Ebeke and X. Shao (2016), “The Impact of Workforce Aging on European Productivity”, <https://www.imf.org/external/pubs/ft/wp/2016/wp16238.pdf>. [23]
- Andrews, D., C. Criscuolo and P. Gal (2016), “The Best versus the Rest: The Global Productivity Slowdown, Divergence across Firms and the Role of Public Policy”, *OECD Productivity Working Papers*, No. 5, OECD, Paris, <http://dx.doi.org/10.1787/24139424>. [19]
- Andrews, D., G. Nicoletti and C. Timiliotis (2018), “Digital technology diffusion: A matter of capabilities, incentives or both?”, *OECD Economics Department Working Papers*, No. 1476, OECD Publishing, Paris, <https://dx.doi.org/10.1787/7c542c16-en>. [18]
- Ariu, A. and V. Vandenberghe (2014), “Assessing the role of ageing, feminising and better-educated workforces on TFP growth”, No. No. 265, NBB, <http://hdl.handle.net/10419/144477www.econstor.eu>. [24]
- Berlingieri, G. et al. (2018), “Last but not least: laggard firms, technology diffusion and its structural and policy determinants”, OECD. [16]
- Biatour, B. et al. (2007), “Growth and productivity in Belgium”, No. Working paper 5-07, Federal Planning Bureau. [2]
- Biatour, B. and C. Kegels (2017), “Growth and Productivity in Belgium”, *Belgium Federal Planning Bureau Working Paper*, No. 11-17. [33]

- Bourlès, R. and G. Cette (2005), “A comparison of structural productivity levels in the major industrialised countries”, No. 41, OECD Economic Studies, <http://www.oecd.org/economy/growth/40505385.pdf>. [31]
- Brynjolfsson, E., D. Rock and C. Syverson (2018), “The Productivity J-Curve: How Intangibles Complement General Purpose Technologies”, *NBER Working Paper*, No. 25148, <http://www.nber.org/papers/w25148>. [25]
- Caldera Sánchez, A. and D. Andrews (2011), “Residential Mobility and Public Policy in OECD Countries”, *OECD Journal: Economic Studies*, Vol. 2011, <http://dx.doi.org/10.1787/19952856>. [32]
- Calvino, F., C. Criscuolo and R. Verlhac (2018), *Declining business dynamism: evidence and causes*, OECD, [https://one.oecd.org/document/DSTI/CIIE/WPIA\(2018\)6/en/pdf](https://one.oecd.org/document/DSTI/CIIE/WPIA(2018)6/en/pdf) (accessed on 12 November 2018). [14]
- Chow, G. (1960), “Tests of Equality Between Sets of Coefficients in Two Linear Regressions”, *Econometrica*, Vol. 28/3, pp. 591-605, <https://www.jstor.org/stable/pdf/1910133.pdf?refreqid=excelsior%3Ac31a19478d9b0e8a499ab36bdd6abbf0>. [6]
- Comité Stratégique (2018), *Pacte National pour les Investissements Stratégiques - Rapport du Comité Stratégique*, https://www.premier.be/sites/default/files/articles/Report_FULL-FR_WEB_FINAL.pdf. [39]
- Criscuolo, C. and J. Timmis (2017), “The Relationship Between Global Value Chains and Productivity”, *International Productivity Monitor*, Vol. 32, pp. 61-83, <https://ideas.repec.org/a/sls/ipmsls/v32y20174.html>. [3]
- Dumont, M. and C. Kegels (2016), “Young Firms and Industry Dynamics in Belgium”, No. 6-16, Federal Planning Bureau, <https://biblio.ugent.be/publication/8507280/file/8507281>. [30]
- European Commission (2018), “2018 European Semester: Country Report Belgium”, Commission Staff Working Document, <https://ec.europa.eu/info/sites/info/files/2018-european-semester-country-report-belgium-en.pdf>. [37]
- European Commission (2018), *European Construction Sector Observatory - Country Profile Belgium*. [34]
- European Commission (2017), *2017 European Semester: Country Report Belgium*, <https://ec.europa.eu/info/sites/info/files/2017-european-semester-country-report-belgium-en.pdf>. [28]
- Gal, P. et al. (2019), “Digitalisation and productivity: in search of the holy grail - Firm-level empirical evidence from European countries”, *Economics Department Working Paper*, No. No. 1533, OECD. [20]
- Inrix (2018), *INRIX 2017 Global Traffic Scorecard*, <http://inrix.com/scorecard/>. [38]

- McKinsey Global Institute (2018), *Solving The Productivity Puzzle: The Role Of Demand And The Promise Of Digitization*, McKinsey&Company. [11]
- Meager, N. and S. Speckesser (2011), *Wages, productivity and employment: A review of theory and international data*, Institute for Employment Studies. [7]
- OECD (2018), *Education at a Glance 2018: OECD Indicators - Belgium Country Note*, OECD Publishing, Paris. [1]
- OECD (2018), *Good jobs for all in a changing world of work: The OECD Jobs Strategy*, OECD Publishing, Paris. [5]
- OECD (2018), *OECD Compendium of Productivity Indicators 2018*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/pdtvy-2018-en>. [22]
- OECD (2018), *The changing nature of international production: Insights from Trade in Value Added and related indicators*, OECD Publishing, Paris. [4]
- OECD (2017), *Key Issues Paper, Meeting of the OECD Council at Ministerial Level, Paris 7-8 June 2017*, <https://www.oecd.org/mcm/documents/C-MIN-2017-2-EN.pdf>. [12]
- OECD (2017), *OECD Economic Surveys: Belgium 2017*, OECD Publishing, Paris, https://dx.doi.org/10.1787/eco_surveys-bel-2017-en. [29]
- OECD (2017), *OECD Economic Surveys: Belgium 2017*, OECD Publishing, Paris, https://dx.doi.org/10.1787/eco_surveys-bel-2017-en. [36]
- OECD (2012), *Redefining “Urban”: A New Way to Measure Metropolitan Areas*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264174108-en>. [43]
- Ollivaud, P., Y. Guillemette and D. Turner (2018), “Investment as a transmission mechanism from weak demand to weak supply and the post-crisis productivity slowdown”, *OECD Economics Department Working Papers*, No. 1466, OECD Publishing, Paris, <https://dx.doi.org/10.1787/0c62cc26-en>. [42]
- Ollivaud, P. and D. Turner (2015), “The effect of the global financial crisis on OECD potential output”, *OECD Journal: Economic Studies*, OECD Publishing, Vol. 2014(1), pp. 41-60, <https://www.oecd.org/eco/growth/The-effect-of-the-global-financial-crisis-on-OECD-potential-output-OECD-Journal-Economic-Studies-2014.pdf>. [41]
- Rycx, F., Y. Saks and I. Tojerow (2016), “Misalignment of Productivity and Wages across Regions? Evidence from Belgian Matched Panel Data”, <http://ftp.iza.org/dp10336.pdf>. [9]
- Schwellnus, C., A. Kappeler and P. Pionnier (2017), “Decoupling of wages from productivity: Macro-level facts”, *OECD Economics Department Working Papers*, No. no.1373. [8]
- Sichel, D. (2019), “Productivity Measurement: Racing to Keep Up”, *NBER Working Paper*, No. 25558, <https://www.nber.org/papers/w25558>. [27]

- Sorbe, S., P. Gal and V. Millot (2018), “Can productivity still grow in service-based economies?: [21]
Literature overview and preliminary evidence from OECD countries”, *OECD Economics
Department Working Papers*, No. 1531, OECD Publishing, Paris,
<http://dx.doi.org/10.1787/18151973>.
- Ward, A., M. Zinni and P. Marianna (2018), “International productivity gaps: Are labour input [40]
measures comparable?”, [https://www.oecd-ilibrary.org/economics/international-productivity-
gaps_5b43c728-en](https://www.oecd-ilibrary.org/economics/international-productivity-gaps_5b43c728-en).
- World Economic Forum (2018), *The Global Competitiveness Report 2018*, [35]
[http://www3.weforum.org/docs/GCR2018/05FullReport/TheGlobalCompetitivenessReport20
18.pdf](http://www3.weforum.org/docs/GCR2018/05FullReport/TheGlobalCompetitivenessReport2018.pdf).

Chapter 2:

The firm dimension of productivity:

The role of productivity dispersion and business dynamics

Aggregate trends emerge from the productivity performance at the firm level and from the process of creative destruction. This chapter relies on micro-data to uncover the role of both processes for productivity and employment growth. The divergence between the most and the least productive firms in Belgium mostly arises from the worsening performance of firms at the bottom of the distribution, especially in services. The evidence suggests that government-financed research and development and training would ease the diffusion of technologies from the domestic frontier and favour the catch-up of the least productive firms. Start-up dynamics is also relatively low in Belgium, and markedly declining in services. Improvements in the business environment would spur market entry and contribute to the productivity-enhancing reallocation of labour.

Designing adequate policy responses to the challenge of the productivity slowdown in Belgium requires studying the microeconomic processes that shape aggregate productivity developments, namely: *i)* the productivity performance within firms; and *ii)* the reallocation of inputs across firms. The two processes underlie creative destruction, which is pivotal to employment growth. This chapter provides an in-depth analysis of both mechanisms in Belgium.

Given the substantial heterogeneity of economic performances across firms, the analysis ought to go beyond the representative firm paradigm. This chapter relies on the OECD distributed micro-data projects MultiProd and DynEmp to reach the required level of granularity. When relevant, the analysis compares Belgium with a set of other European OECD countries.

The micro-data show contrasted productivity patterns within firms. The productivity of the “average firm” has increased in manufacturing industries in Belgium since 2000, while it has stagnated in services. Moreover, the productivity differences between the most and the least productive firms have become larger on average across industries, mostly due to the worsening performance of firms at the very bottom of the productivity distribution vis-à-vis the median firm, especially in services. Finally, the productivity gap between frontier firms and laggards has increased more in Belgium than in other countries, pointing to a particularly pronounced weakening of technology and knowledge diffusion from the top to the bottom.

Belgian laggards have a strong potential for productivity growth, as they comprise young, small and dynamic firms. This chapter provides new evidence regarding public policies that are associated with faster productivity convergence of laggard firms, such as public training expenditure, public expenditure on research and development, and flexible labour market institutions. For example, raising public training expenditure to the average level observed in other countries could accelerate the catch-up of Belgian laggards by 7-8%.

The micro-data also point to the relatively slow reallocation of labour inputs in Belgium. Young firm activity is lower than in other countries, and the contribution of firm entry and exit to job creation is subdued. Firm entry and job reallocation among incumbent firms have declined since 2000, especially in services. Moreover, old firms that are in persistent financial difficulties (“zombies”) tie up a sizeable share of labour and capital inputs.

Dynamic start-ups are key in fostering the process of creative destruction in Belgium. This chapter provides new evidence regarding public policies that are associated with spurring firm entry, such as the availability of venture capital, the efficiency of the judiciary system, and competition-friendly product market regulations.

The structure of the chapter is as follows. Section 2.1 offers a detailed introduction and summary of the main findings. Section 2.2 describes firm-level performance across the productivity distribution and investigates the role of policies in the catch-up of firms at the bottom of the distribution. Section 2.3 focuses on business dynamism and employment dynamics, and assesses the role of public policies for spurring market entry. Section 2.4 looks at zombie firms, and Section 2.5 provides a snapshot of performance indicators industry by industry. The Annex contains details about the data and methodology.

2.1. Introduction

The global productivity slowdown is one of the most remarkable economic features of the recent decades. As the previous chapter showed, the deceleration in Belgium was even stronger than in many other OECD countries.

Designing adequate policy responses to the challenge of the productivity slowdown in Belgium requires understanding the nature of productivity developments. Aggregate productivity trends emerge from two underlying microeconomic processes: *i*) the productivity performance at the firm level, which is famously heterogeneous across firms, even within narrowly defined industries (Syverson, 2004^[1]); and *ii*) the process of creative destruction, which eases the productivity-enhancing reallocation of inputs by enabling new, productive firms to enter the market, grow and replace old, unproductive ones (Bartelsman, Haltiwanger and Scarpetta, 2013^[2]). These two processes underlie job creation and destruction, and ultimately aggregate job flows. Moreover, the process of creative destruction enables start-ups and young firms to grow and be the key source of job creation. This chapter provides an in-depth analysis of both processes in Belgium.

Given the substantial heterogeneity of economic performance across firms, the analysis ought to go beyond the representative firm paradigm. Indeed, comparable average productivity at the country or sector level may hide very different underlying distributions. For example, low average productivity may reflect the scarceness of firms at the top of the productivity distribution, which possibly points to a lack of innovation at the productivity frontier. However, it may also arise from the clustering of firms at the bottom of the distribution, which suggests the existence of impediments to technology diffusion from the frontier firms to the others or weak market selection (Andrews, Criscuolo and Gal, 2016^[3]; Berlingieri, Blanchenay and Criscuolo, 2017^[4]). Similarly, comparable aggregate employment flows hide the concomitant creation and destruction of jobs by firms of different age and size, and they do not disentangle the contributions of entry, exit and post-entry growth (Calvino, Criscuolo and Menon, 2015^[5]). Thus, similar averages at the country or sector level can have very different policy implications. This calls for studying the entire productivity distribution and examining job creation and destruction by firms of different types. In doing so, the analysis uncovers the micro-drivers of productivity and employment growth in Belgium, and informs the design of appropriate policies.

Scope exists for productivity-enhancing policy reforms in Belgium. Public spending on training is relatively low. Skills gained beyond formal qualifications foster labour productivity via lower mismatch (McGowan and Andrews, 2015^[6]), an issue that Chapter 3 discusses in depth. Moreover, employment protection legislations on collective dismissals and hiring restrictions for temporary work agency contracts are restrictive compared with other OECD economies. Stringent employment protection legislations are negatively associated with productivity in the European Union (Bartelsman, Perotti and Scarpetta, 2008^[7]), and discourage innovation and risky investments (Bartelsman, Gautier and De Wind, 2016^[8]).¹ Further, the administrative burden on start-ups is relatively high in Belgium. Overly stringent product market regulations discourage market entry (Djankov et al., 2002^[9]) and weaken firm growth (Klapper, Laeven and Rajan, 2006^[10]). Product

¹ On the other hand, stringent employment protection legislations could increase firm incentives to invest in firm-specific human capital, hence raise productivity. However, empirical evidence supporting this hypothesis is scarce (Andrews and Criscuolo, 2013^[72]). See below for more on the potentially non-linear relationship between employment protection legislations and productivity.

market regulations are especially stringent in the Belgian retail sector, which accounts for more than 25% of value added in market services. Finally, other candidates for productivity-friendly public policies include government-financed expenditure on research and development and an effective design of institutions to resolve corporate disputes.²

This chapter mostly relies on two distributed micro-data projects carried out at the OECD to reach the level of granularity required to look at these issues: MultiProd and DynEmp, which respectively focus on productivity and on employment and business dynamics (Box 2.1 and Box 2.5). As of February 2019, the version 1.1 of the MultiProd dataset covers 20 OECD countries from 1994 to 2015. The third wave of the DynEmp dataset covers 17 countries from 1997 to 2015. Since for most countries MultiProd and DynEmp are based on the full population of firms (or a representative re-weighted sample), they respectively describe the entire productivity distribution within industries and the channels of employment change in a comparative cross-country setting (Desnoyer-James, Calligaris and Calvino, 2019^[11]). When relevant, the analysis compares Belgium with a set of reference countries referred to as “other European OECD countries”. This benchmark comprises the member countries of the European Economic Area (EEA), conditional on availability in the dataset, plus Switzerland.

The analysis of productivity patterns at the firm level confirms that the productivity of the “average firm” has increased in manufacturing industries in Belgium between 2000 and 2014, while it has stagnated in service industries (see Figure 2.1). It also reveals large productivity disparities between the most and the least productive firms, in line with international evidence (see Figure 2.2). It further shows that these productivity differences have increased on average across industries (see Figure 2.3), and that the increase has mostly come from the bottom half of the distribution, with a worsening performance of firms at the very bottom of the distribution vis-à-vis the median firm (see Figure 2.4).³ The divergence in the bottom half of the distribution is especially marked in services after the Great Recession. Finally, the analysis provides evidence that the group of least productive firms is not only populated by unproductive firms that should exit the market, but also by young, small and dynamic firms that are yet to achieve their full potential (see Figure 2.5, Figure 2.6 and Figure 2.7).

The importance of the least productive firms for aggregate productivity trends in Belgium motivates a focus on “laggard” firms, i.e. the firms in the bottom 40% of the productivity distribution (see Figure 2.8).⁴ The analysis looks at the relationship between the

² The analysis in this chapter focuses on policies that shape aggregate productivity developments via three channels operating at the firm level: innovation, diffusion and reallocation (OECD, 2015^[18]). Policies that foster productivity because of their impact at the macro level or through other channels are either studied elsewhere in this review (e.g. skill imbalances) or beyond its scope (e.g. infrastructure quality and availability, performance of the education system, efficiency of the several administration levels, health of the labour force).

³ Although relevant given Belgium’s decentralised system, this chapter does not look at regional productivity disparities. The distributed micro-data approach used in this analysis would require the data to be aggregated at the region level, which raises confidentiality issues. Yet, the approach could be modified and extended to account for regional productivity differences, in case of interest by the relevant country’s authorities.

⁴ The distributed micro-data at hand do not allow exploring the degree of integration in global value chains, which harness productivity by facilitating the diffusion and replication of ideas (OECD, 2015^[18]). Belgium is very integrated in global value chains and evidence shows the existence of a

productivity growth of laggards and their distance to the national productivity frontier (the so-called “productivity gap”) – see also Griffith, Redding and Van Reenen (2004^[12]) and Bartelsman, Haskel and Martin (2008^[13]). It shows that surviving laggards catch up with the top of the productivity distribution in Belgium, in line with Neo-Schumpeterian growth models – see Table 2.1 and Acemoglu, Aghion and Zilibotti (2006^[14]). However, the productivity gap between the domestic frontier and the bottom 40% has increased in Belgium over the period 2000-14, and more so than in the benchmark countries (see Figure 2.9). This suggests that catch-up has slowed, and that it has slowed more in Belgium than elsewhere. Declining catch-up suggests that technology and knowledge diffusion from the domestic productivity frontier to the bottom has weakened (Berlingieri et al., 2018^[15]; Comin and Mestieri, 2018^[16]).

Given the potential of laggards for productivity growth, policies should aim at favouring their catch-up. While a number of policies favour productivity growth in general, the analysis specifically focuses on the ones that speed up the productivity convergence of laggards. It suggests that policies such as training and public research and development expenditure increase the speed of convergence of laggards by easing the diffusion of knowledge and reducing the cost of technology adoption.⁵ On the other hand, it indicates that rigid labour market institutions hinder the catch-up of laggards by hampering the reallocation of labour resources (see Table 2.2). Further, comparative statics exercises show that policy reforms that would align these policies with the average level observed in other countries could sizeably accelerate the catch-up of laggards. For example, raising public training expenditure could accelerate the catch-up of laggards by 7-8% (see Figure 2.10 and Figure 2.11).

Another factor that stands out in Belgium is low business dynamism. The rates of entry of firms in the market and the rate of job reallocation among incumbent firms have declined significantly in both manufacturing and services (Figure 2.12). The decline was particularly pronounced in services, where from 2000 to 2014 entry rates decreased by about four percentage points and job reallocation rates by about three percentage points. Moreover, the contribution of young firms to employment growth was lower in Belgium than in the other European countries (see Figure 2.13), while the contribution of firm entry and exit to job creation is subdued (see Figure 2.14) and dynamism among entrants is low (see Figure 2.15).

Business dynamism favours both productivity-enhancing reallocation and job creation and destruction. Firm entry and young firm dynamics are a key driver of the process of creative destruction underlying aggregate productivity growth. Therefore, policies should aim at fostering start-up dynamics. The analysis investigates the role of public policies for spurring entry rates, following previous OECD work (Calvino, Criscuolo and Menon, 2016^[17]). It shows that improved access to equity finance and venture capital, less strict product market regulations and more efficient judiciary systems are associated with higher entry rates (see Table 2.3). Further, a comparative statics exercise shows that business-friendly policy reforms could sizeably spur entry in Belgium. For example, improving

productivity premium that increases with closeness to foreign demand (Dhyne and Rubínová, 2016^[71]).

⁵ It further provides suggestive evidence that research and development tax credits do not contribute in a statistically significant way to accelerating the convergence of laggards. It does not come as a surprise, given that most of the expenses in research and development tax credits go to very productive manufacturing firms rather than to firms in the service sector, where the productivity gap is larger (De Mooij, Hebous and Hrdinkova, 2018^[36]).

economy-wide product market regulations could substantially increase the entry rate in Belgian industries (see Figure 2.16).

Another metric that reflects the low exit rates of firms and weak growth rates of laggards is the presence of “zombie firms”, firms that are in persistent financial difficulties. On several measures, the share of zombie firms is larger in Belgium than in other European countries (see Figure 2.17). Zombie firms weigh on aggregate productivity, as they tend to have low productivity and tie up workers and capital that could be employed in firms with greater growth prospects.⁶

Future work should analyse how to best harness the digital transformation to bring productivity growth across all firms. The analysis could focus on the role of policies for improving capabilities, and workers and managers’ skills in particular, while at the same time strengthening the incentives for firms to invest in digital technologies and guaranteeing a level playing field via regulation, the tax system, and the competitive environment. The analysis could highlight the importance of complementary investment in intangible assets, from innovative property to organisations and data. Last but not least, it could shed light on the role of policies to smooth the digital transition and lower its costs (OECD, 2015^[18]).

2.2. Productivity dispersion and technology diffusion

Evidence of productivity heterogeneity

Before highlighting the substantial within-industry heterogeneity in firm performance across the productivity distribution, this section first confirms that the productivity patterns observed in the micro-data are in line with the economy-wide picture in Chapter 1.⁷ Indeed, productivity analyses at the firm level and those at the aggregate level rest on fundamentally different data and methodologies, and are not necessarily comparable (Bajgar et al., 2019^[19]). Despite these differences, the picture that emerges from the firm-level data corroborates the analysis at the economy-wide level for Belgium.

⁶ Contrary to most of the rest of the chapter, the analysis of zombie firms relies on the commercial database Orbis.

⁷ For further reference, see Biatour and Kegels (2017^[29]) and NBB (2018^[25]).

Box 2.1. MultiProd

The MultiProd project gathers new evidence on cross-country productivity patterns over time based on firm-level micro-data. It extends productivity analyses beyond aggregate industry performances and focuses on the underlying dynamics and developments within industries, therefore enriching the policy debate on productivity. For example, MultiProd offers new insights on the evolution of “inequality in corporate performance” (measured by productivity dispersion within industries), and its structural and policy drivers. The MultiProd Database is harmonised across countries and over time, hence suitable for international comparisons to a cross-country benchmark. This provides policymakers with further insights into the relative strengths and weaknesses of the economy in terms of productivity.

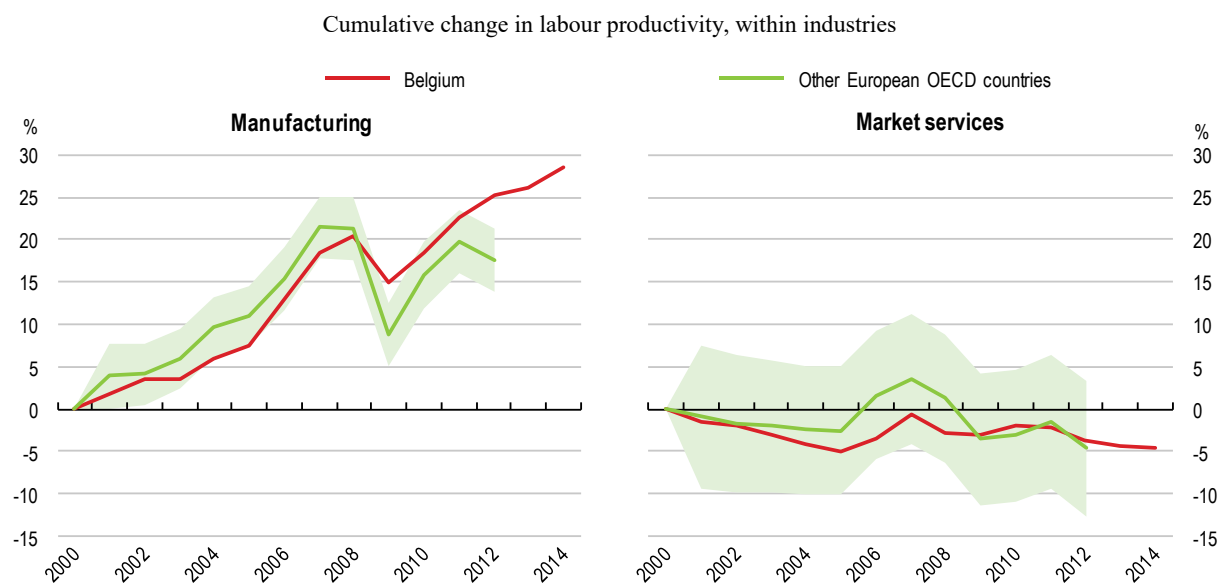
As of February 2019, Version 1.1 of the database spans the years 1994-2015 and comprises the following countries: Australia, Austria, Belgium, Canada, Chile, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, Luxembourg, Japan, the Netherlands, New Zealand, Norway, Portugal, Sweden and Switzerland. Due to limited data availability, the database only includes the following countries after 2012: Austria, Belgium, Chile, Finland (until 2013), France, Germany (until 2013), Ireland, Italy, Japan and the Netherlands.

This chapter focuses on the member countries of the European Economic Area, conditional on availability in the database, plus Switzerland, namely: Austria, Belgium, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, the Netherlands, Norway, Portugal, Sweden and Switzerland. The analysis focuses on manufacturing (excluding the manufacturing of coke and refined petroleum products) and non-financial market services (excluding real estate), namely ISIC Rev.4/NACE Rev.2 industries 10-18, 20-33, 45-63 and 69-82. See Berlingieri et al. (2017_[20]) for a more detailed presentation of the methodology used in the MultiProd project, and Desnoyers-James, Calligaris, and Calvino (2019_[11]) for more details on industry coverage and classification.

Productivity has increased strongly for the average manufacturing firm in Belgium between 2000 and 2014, while it has stagnated for the average service firm (Figure 2.1).⁸ Manufacturing firms’ productivity has grown at a sustained pace between 2000 and 2014, with the exception of the immediate aftermath of the 2008 financial crisis. Within manufacturing industries, the cumulative percent change in the productivity of the average firm over the entire period amounts to almost 30%, i.e. about 2% per year. This growth has been higher in Belgium than in the benchmark countries. However, the market service sector displays a radically different trend. Within service industries, the cumulative change in the productivity of the average firm has been slightly negative over the period. This stagnation within market services is comparable to the trend in the benchmark countries.⁹

⁸ This productivity measure also captures price effects, in particular mark-ups (see 0). Mark-ups have risen in Belgium since the mid-1980s (De Loecker, Fuss and Van Biesebroeck, 2018_[66]). Yet, they tend to be lower on average across industries in Belgium than in the benchmark countries (see Figure 2.20).

⁹ Even though labour productivity trends in Belgium are at par with the benchmark countries, unit labour costs increased relative to neighbouring economies over the period and the current account became negative, pointing to a worsening of international competitiveness – see De Loecker, Fuss and Van Biesebroeck (2014_[70]) and OECD (2017_[21]).

Figure 2.1. Productivity has increased in Belgian manufacturing but stagnated in services

Note: This figure reports the estimated year dummies of a panel data regression of average log labour productivity within industries in Belgium and within country-industry pairs in the set of benchmark countries. The first year is taken as the baseline. Results are estimated separately for manufacturing and non-financial market services based on detailed industries, following the SNA A38 classification (see Box 2.1 and Annex). Other European OECD countries are Austria, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, the Netherlands, Norway, Portugal, Sweden and Switzerland.

Source: MultiProd Database, February 2019.

The trends presented here rely on a methodology that abstracts from industrial composition effects to focus on productivity patterns within industries (Box 2.2). Therefore, the observed aggregate productivity slowdown in the Belgian market service sector has not arisen exclusively from an increasing weight of lower-productivity service industries, but reflects within-industry microeconomic factors.¹⁰ This is the same finding as in Chapter 1. Also, the negative trend is not solely the consequence of the implementation of the subsidized “service vouchers” program, which massively increased low-skill labour utilisation in the administrative and support industry, thereby depressing labour productivity due to its low productivity level (OECD, 2017_[21]).¹¹

¹⁰ A negative productivity growth at the macro-sector level could come from a simple increase of the weight of the industries with a lower productivity *level* even in the presence of zero (or even positive) productivity *growth* in all underlying industries. This case is ruled out by the methodology used in the analysis. However, the trends presented could reflect an increasing weight of industries with higher or lower productivity *growth*.

¹¹ The trend in the right panel of Figure 2.1 is robust to removing the “Administrative support and service industries” (ISIC Rev.4/NACE Rev.2 industries 77 to 82).

Box 2.2. Trends in a regression framework

The estimation of trends for the variables of interest relies on an econometric framework that abstracts from industrial composition effects to focus on the micro-drivers of economic performance within each industry and country. The trends are computed separately for manufacturing and non-financial market services and, in this chapter, separately for Belgium and the benchmark countries.

The implementation of this approach relies on an econometric method that estimates trends for each variable of interest within country-industry pairs. These trends accurately capture the evolution of each variable within industries in each country. The interpretation of the estimated coefficients associated with the year dummies is straightforward: they capture the average of the variable of interest in a given year, abstracting from industry-country specific shocks. Moreover, taking the first year as the baseline and normalising it to zero, the estimated coefficients report the average cumulative change in the variable of interest within industry-country pairs since the baseline. In case of a logarithmic regressand, the estimated coefficient reports the average cumulative growth of the variable. For example, an estimated coefficient of β from the regression of $\log$ 90-10 productivity ratio in this model indicates that, on average within each two-digit industry and country, the dispersion of productivity has increased by β percent since the baseline year.

The estimation regresses the variable of interest on year dummies while controlling for industry-country fixed effects. The model is:

$$P_{j,k,t} = \beta_t y_t + z_{j,k} + \varepsilon_{j,k,t}$$

where $P_{j,k,t}$ is the variable of interest in industry j and country k in year t , y_t are year dummies, and $z_{j,k}$ stand for industry (resp. industry-country) fixed effects in the regressions for Belgium (resp. for the benchmark). Since the data in MultiProd are micro-aggregated moments from firm-level data, each observation jkt is weighted by the number of firms reporting non-missing information for the relevant variable in a given country-industry-year. The weighting strategy implies that the estimates are equivalent to those hypothetically generated using the underlying micro-data samples.

See Berlingieri, Blanchenay and Criscuolo (2017^[4]) and Calvino, Criscuolo and Verlhac (2018^[22]) for applications of this methodology.

The micro-data further reveal sizeable differences in firm performance across productivity performance groups (Figure 2.3). On average across manufacturing industries in Belgium, the productivity level of the average firm at the top (firms in the top decile of the labour productivity distribution within each industry, see Box 2.3) was about eight times higher than the productivity level of the average firm at the bottom (firms in the lowest decile of the labour productivity distribution within each industry) over the period 2000-14. In other words, the top performing manufacturing firms were on average eight times as productive as the worse performing ones. In services, the productivity disparity between the average firm in the top decile and the average firm in the bottom decile was about 10:1. Belgian manufacturing firms were on average as productive as in the benchmark countries in every part of the productivity distribution. In services, Belgian firms were more productive across the entire distribution. Overall, there is no evidence of a lack of high-productivity firms in Belgium.

Box 2.3. Binning firms in performance groups

The joint description of firm characteristics and productivity requires the grouping of firms in different performance groups according to their productivity. The MultiProd Database contains statistics according to the following groups defined by percentiles of the labour productivity distribution.

Bottom decile: firms with productivity level comprised between the 0th and the 10th percentile of the distribution, i.e. the bottom 10% in terms of productivity performance.

Medium-low quantile: firms with productivity level comprised between the 10th and the 40th percentile, i.e. firms with a relatively low productivity level, yet higher than the least performing firms, and accounting for 30% of the population.

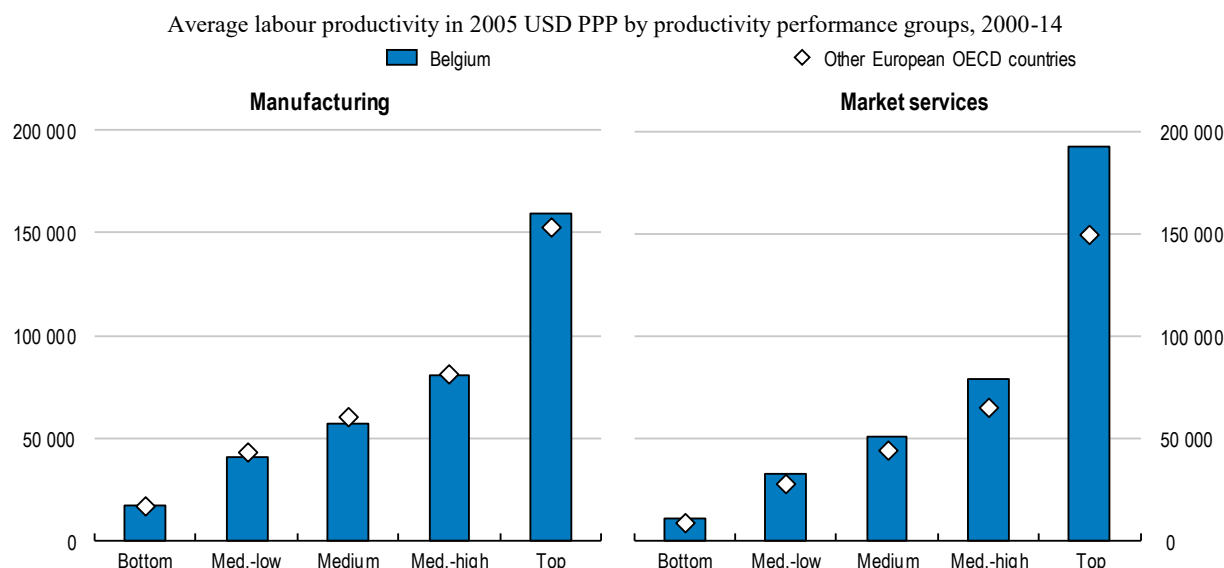
Medium quantile: firms with productivity level comprised between the 40th and the 60th percentile, i.e. firms located around the median productivity level and accounting for 20% of the population.

Medium-high quantile: firms with productivity level comprised between the 60th and the 90th percentile, i.e. firms with a relatively high productivity level, yet lower than the best performing firms, and accounting for 30% of the population.

Top decile: firms with productivity level comprised between the 90th and the 100th percentile of the distribution, i.e. the top 10% in terms of productivity performance.

“Laggards” comprise firms belonging to either the bottom decile or the medium-low quantile. Recent OECD work relies on this terminology – see e.g. Berlingieri et al. (2018_[15]).

Figure 2.2. The micro-data reveal sizeable differences in firm performance



Note: This figure plots the weighted average level of labour productivity measured in 2005 USD PPP across five productivity performance groups in Belgium and in the set of benchmark countries: bottom decile (0th-10th percentile of the productivity distribution), medium-low (10th-40th percentile), medium (40th-60th percentile), medium-high (60th-90th percentile) and top decile (90th-100th percentile). In each performance group, industrial data (SNA A38) are aggregated to sector level (manufacturing and non-financial market services) using weighted means (with weights equal to the number of firms in the industry), and then averaged (unweighted) over time for each country. Other European OECD countries are Austria, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, the Netherlands, Norway, Portugal, Sweden and Switzerland.

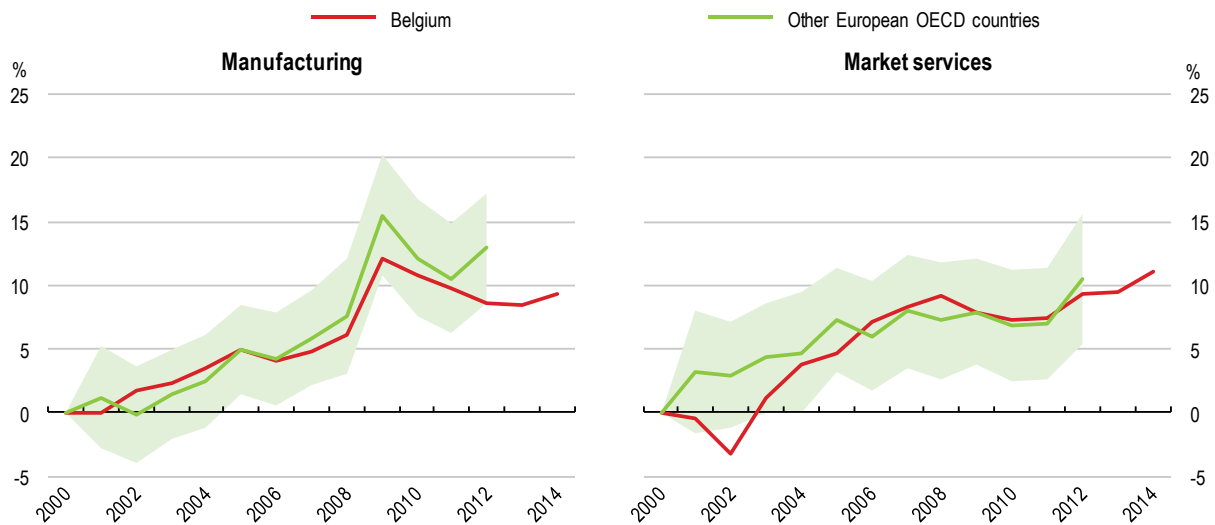
Source: MultiProd Database, February 2019.

The magnitude of these productivity differences is broadly in line with existing evidence for Belgium. The most productive firms (at the 90th percentile) of the multifactor productivity distribution of the entire private sector in Belgium in 2010 were about five times as productive as the least productive firms (at the 10th percentile) – see De Mulder and Godefroid (2018_[23]).¹² In line with international evidence, the MultiProd data indicate that multinational enterprises are more productive than non-multinational ones. Further evidence over the period 2004-13 suggests that differences in ICT investment per worker explain an important part of the productivity disparities across firms (Dhyne et al., 2018_[24]).

The productivity differences between the most and least productive firms have increased on average in Belgium between 2000 and 2014 (Figure 2.3). The analysis proxies such “inequality in corporate performance” by the ratio of the productivity level of firms located at the 90th percentile of the productivity distribution to the productivity level of firms located at the 10th percentile (Box 2.3). The measure of productivity dispersion has increased by about 10% over the period in both manufacturing and services. In other words, the cumulative change in labour productivity in Belgium between 2000 and 2014 has been about 10% higher for firms at the top of the productivity distribution (at the 90th percentile) than for firms at the bottom (at the 10th percentile). The increase in productivity dispersion in Belgium is broadly comparable to the one in the other European countries. Moreover, it is heterogeneous across industries (see Figure 2.24).

Figure 2.3. Inequality in corporate performance has increased in Belgium

Cumulative change in labour productivity dispersion, within industries



Note: This figure reports the estimated year dummies of a panel data regression of average log labour productivity dispersion within industries in Belgium and within country-industry pairs in the set of benchmark countries. Dispersion is measured as the ratio of the 90th to the 10th percentile of the productivity distribution. The first year is taken as the baseline. Results are estimated separately for manufacturing and non-financial market services based on detailed industries, following the SNA A38 classification (see Box 2.1 and Annex). Other European OECD countries are Austria, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, the Netherlands, Norway, Portugal, Sweden and Switzerland.

Source: MultiProd Database, February 2019.

¹² This is also similar to the within-industry dispersion of multifactor productivity found with MultiProd data.

The increase in dispersion in both manufacturing and services is consistent with the documented widening gap in multifactor productivity performance between frontier and non-frontier firms in Belgium (OECD, 2017^[21]; De Mulder and Godefroid, 2018^[23]). Aggregate productivity gains in Belgium have mostly come from the best performing firms since 1997 (NBB, 2018^[25]). This is also in line with international evidence showing that the productivity slowdown is taking place against the backdrop of an increased divergence in productivity between the most productive firms and the rest both at the global level (Andrews, Criscuolo and Gal, 2016^[3]) and within disaggregated country-industry pairs (Berlingieri, Blanchenay and Criscuolo, 2017^[4]).

The rising productivity gap between the top and the least performing firms in Belgium shown in Figure 2.3 may arise from several factors: *i*) an increased adoption by firms at the domestic productivity frontier of new technologies and knowledge developed at the global frontier (Andrews, Criscuolo and Gal, 2016^[3]); *ii*) a slower pace of technology and knowledge diffusion from the top to the bottom of the domestic productivity distribution (Berlingieri et al., 2018^[15]); *iii*) an increased survival of inefficient firms due to weakening market selection mechanisms (Alon et al., 2018^[26]); *iv*) changes in the misallocation of production factors across incumbent firms (Brown, Dinlersoz and Earle, 2016^[27]; Calligaris et al., 2018^[28]).

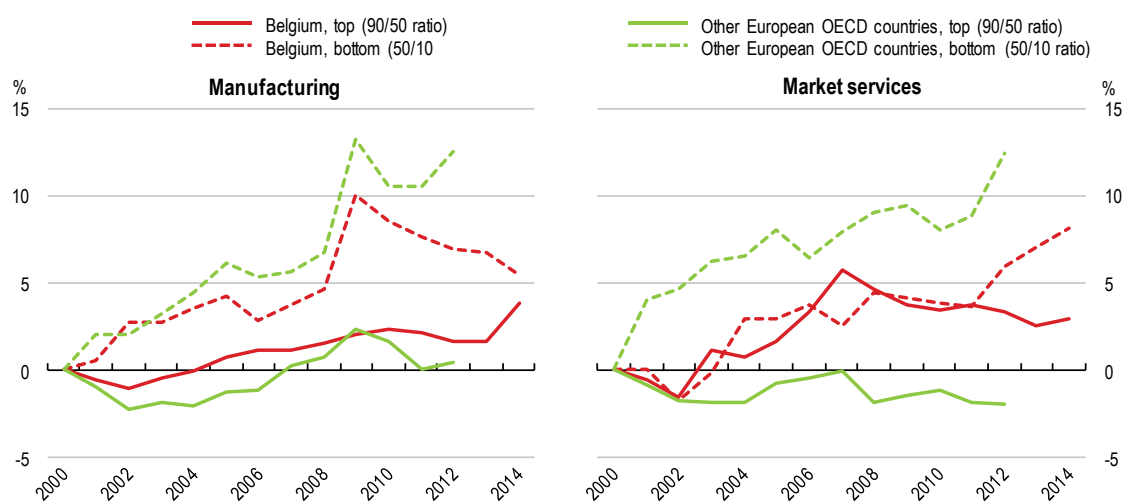
Although previous analysis based on the Orbis dataset suggested that poor performance at the domestic frontier was as much an issue as divergence between the top and the bottom in Belgium, these results relied on a sample of firms with 20 employees or more (OECD, 2017^[21]). Contrary to Orbis, the MultiProd dataset is representative for the full population of firms across countries, which allows studying the entire productivity distribution.¹³ MultiProd is therefore particularly suited for studying the impact of technology diffusion within country and industries, which is the main focus of this section. The analysis so far establishes that the Belgian economy exhibits a significant increase in the divergence between the top and the least performing firms. At the same time, technology and knowledge diffusion might affect firms along the productivity distribution differently. An interesting question is therefore whether an increase in productivity dispersion is driven by frontier firms pulling away or by firms at the bottom lagging behind relative to the median firm. To shed light on these issues, the analysis next looks at the respective contributions of the top and bottom half of the distribution to the overall rise of productivity dispersion.¹⁴

¹³ In the case of Belgium, Orbis relies on the balance sheet data from the National Bank of Belgium. However, SMEs file an abbreviated model of annual accounts with the National Bank, which does not include turnover, intermediate inputs or investment. Therefore, Orbis does not represent the SME population accurately. As Annex A explains, MultiProd solves the issue through the use of VAT data, which include the necessary information irrespective of firm size.

¹⁴ Section 2.3 will address market selection when analysing business dynamism and young firm activity. On the other hand, the chapter does not focus on static misallocation. Micro-data-based evidence from MultiProd indicates that aggregate misallocation in Belgium is comparable with that in other countries. In particular, the potential aggregate productivity gain from equalising marginal products across firms amounts to about 30% in manufacturing and 50% in services, a magnitude in line with the 30-43% potential gain in US manufacturing (Hsieh and Klenow, 2009^[62]). Moreover, the misallocation of labour inputs has not changed meaningfully over the period 2000-14 in Belgium. The misallocation of capital inputs has increased since the Great Recession. Mark-ups are also a source of misallocation – see De Loecker, Fuss and Van Biesebroeck (2018^[66]) on secular trends in aggregate mark-ups in Belgium.

The increase in productivity dispersion in Belgium has mostly arisen from the bottom half of the productivity distribution, i.e. a worsening performance of firms at the very bottom of the productivity distribution vis-à-vis the median firm (Figure 2.4). However, the evolution of dispersion at the bottom displays different patterns in manufacturing and services. In manufacturing, within-industry productivity dispersion in the bottom half of the productivity distribution increased by 10% from 2000 to the 2008 financial crisis, before decreasing by about 5% after the crisis. In services, within-industry dispersion in the top and the bottom half of the productivity distribution moved in parallel until they started diverging in the aftermath of the crisis, especially since 2011. In other words, the increase in productivity dispersion for the bottom 50% of Belgian firms in terms of productivity performance is particularly marked before the Great Recession in manufacturing, and after it in services. When looking at the entire period of analysis, the dispersion in productivity in the bottom half increased (relative to the top half) more in services than in manufacturing.¹⁵

Figure 2.4. The bottom of the productivity distribution has driven overall dispersion
Cumulative change in labour productivity dispersion in the top half and bottom half of the distribution



Note: This figure reports the estimated year dummies of a panel data regression of average log labour productivity dispersion in the top half and in the bottom half of the productivity distribution within industries in Belgium and within country-industry pairs in the set of benchmark countries. Dispersion in the top half of the distribution is measured as the ratio of the 90th to the 50th percentile of the distribution. Dispersion in the bottom half of the distribution is measured as the ratio of the 50th to the 10th percentile. The first year is taken as the baseline. Results are estimated separately for manufacturing and non-financial market services based on detailed industries, following the SNA A38 classification (see Box 2.1 and Annex). Other European OECD countries are Austria, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, the Netherlands, Norway, Portugal, Sweden and Switzerland.

Source: MultiProd Database, February 2019.

¹⁵ In this chapter, labour productivity is based on headcount employment for cross-country comparability purposes. The results may then be partially affected by a differential use of part-time work both across countries and across firms within the same country. Calculations from the Federal Planning Bureau based on data for the entire Belgian economy show that the use of part-time work is higher and seems to have increased more over time at the bottom of the productivity distribution. Headcount-based labour productivity thus may tend to underestimate the productivity of the least productive firms and overestimate the increase in dispersion. A robustness exercise based on a full-time equivalent measure of employment shows that labour productivity growth in Belgium is higher when part-time work is accounted for, except for frontier firms in services. However, the patterns of dispersion shown in Figure 2.3 and Figure 2.4 are robust. If anything, dispersion at the top in services is lower with productivity based on full time equivalents, which reinforces the conclusion that the bottom drives overall dispersion.

These evolutions in productivity dispersion in the bottom half of the productivity distribution take place in the context of an acceleration of aggregate labour productivity growth in manufacturing, and a concomitant slowdown in services in the aftermath of the crisis (Biatour and Kegels, 2017^[29]). It is consistent with international evidence showing that productivity divergence has generally been more pronounced in the lower tail of the distribution than at the top (Berlingieri, Blanchenay and Criscuolo, 2017^[4]). This suggests that the productivity divergence observed in Belgium may arise from a deceleration of technology and knowledge diffusion from the top to the bottom of the distribution, especially in services. Hence, further investigation into the bottom of the labour productivity distribution in Belgium is warranted.

Box 2.4. Measuring inequality in corporate performance

Productivity dispersion is a common measure of inequality in corporate performance. It quantifies the disparities in the productivity levels of firms located in different part of the productivity distribution.

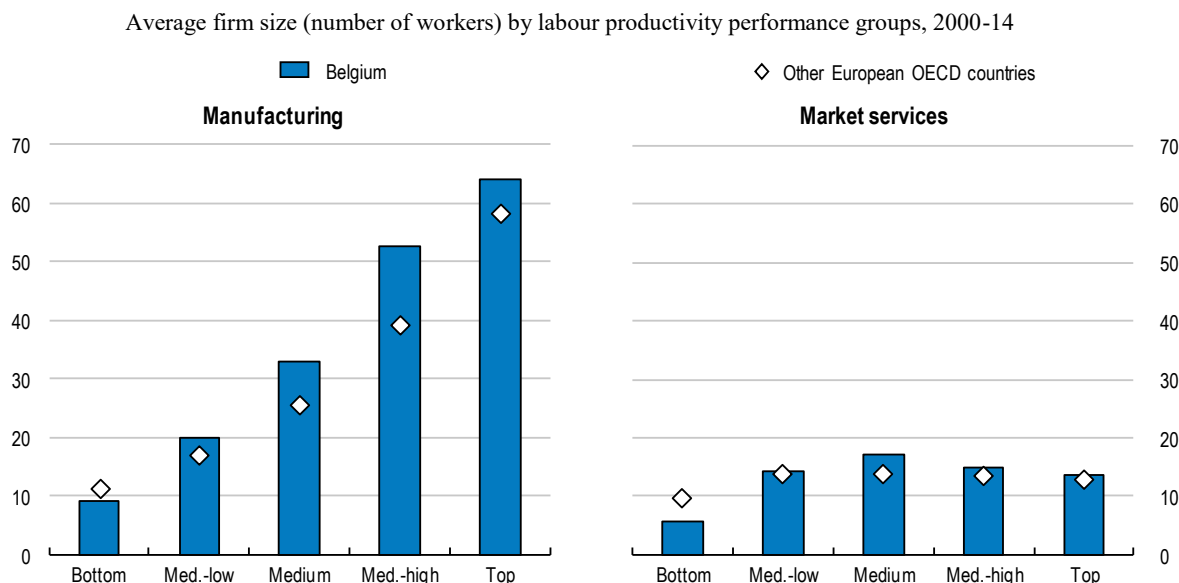
Productivity analyses typically use the 90-10 productivity ratio to describe the overall productivity dispersion. The 90-10 productivity ratio quantifies the productivity disparity between the best performing firms (the firms at “the top” of the distribution) and the worse performing ones (the ones at “the bottom”). It is defined as the ratio of the productivity level of firms located at the 90th percentile of the productivity distribution to the productivity level of firms located at the 10th percentile. It carries a straightforward interpretation: a ratio of X indicates that firms at the 90th percentile are X times as productive as firms at the 10th percentile.

The overall inequality in corporate performance can be further decomposed between the dispersion in the upper part of the distribution and the dispersion in the lower part. The 90-50 productivity ratio (that is, the ratio of the productivity level of firms at the 90th percentile to the productivity level of firms at the 50th percentile) quantifies dispersion in the top half of the distribution. The 50-10 productivity ratio (that is, the ratio of the 50th to the 10th percentile) quantifies dispersion in the bottom half.

See Syverson (2004^[11]) for a seminal contribution resting on such type of measure, and Berlingieri, Blanchenay and Criscuolo (2017^[4]) for a recent application.

The typical firm with the worst productivity performance tends to be small (in terms of number of employees) relative to firms in the other parts of the distribution, and smaller than in the benchmark (Figure 2.5).¹⁶ Firms in the bottom of the distribution employed nine workers on average over the period 2000-14, i.e. less than 15% of typical firm at the top. The employment difference between the top and the bottom firms is present but much less important in service industries. Previous OECD work documented the coexistence of a strongly increasing size-productivity relationship in manufacturing, and a much flatter relationship in services in a large number of countries (Berlingieri, Calligaris and Criscuolo, 2018^[30]).

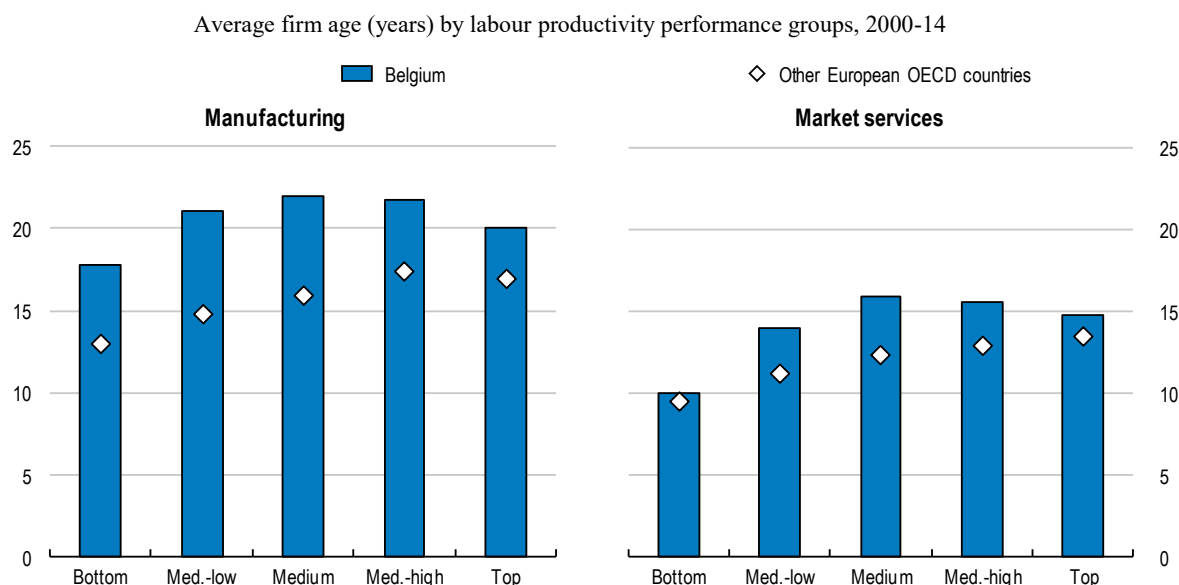
¹⁶ The typical firm with the worst productivity performance is defined as the average firm in the bottom 10% of the productivity distribution. Similarly, the typical firm at the top is the average firm in the top 10% of the distribution.

Figure 2.5. The average firm at the bottom of the productivity distribution is relatively small

Note: This figure plots the weighted average firm size measured by the number of workers across five productivity performance groups: bottom decile (0th-10th percentile of the productivity distribution), medium-low (10th-40th percentile), medium (40th-60th percentile), medium-high (60th-90th percentile) and top decile (90th-100th percentile). In each performance group, industrial data (SNA A38) are aggregated up to sectoral level (manufacturing and non-financial market services) using weighted means (with weights equal to the number of firms in the industry), and then averaged (unweighted) over time for each country. Other European OECD countries are Austria, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, the Netherlands, Norway, Portugal, Sweden and Switzerland.

Source: MultiProd Database, February 2019.

Furthermore, the typical firm at the bottom tends to be young relative to more productive firms in Belgium (Figure 2.6). The typical worst performing firm was two to three years younger than the typical best performing firm in manufacturing over the period 2000-14, and five years younger in services. This echoes earlier evidence showing that young firms generally have lower labour and multifactor productivity levels than old ones in Belgium (Dumont and Kegels, 2016^[31]; De Mulder and Godefroid, 2018^[23]). Yet Belgian firms are older on average than in the benchmark across all levels of productivity. Moreover, the productivity-age relationship is not monotonic, i.e. the oldest firms are located in the middle of the productivity distribution.

Figure 2.6. The average firm at the bottom of the distribution is relatively young

Note: This figure plots the weighted average firm age measured in years across five productivity performance groups: bottom decile (0th-10th percentile of the productivity distribution), medium-low (10th-40th percentile), medium (40th-60th percentile), medium-high (60th-90th percentile) and top decile (90th-100th percentile). In each performance group, industrial data (SNA A38) are aggregated up to sectoral level (manufacturing and non-financial market services) using weighted means (with weights equal to the number of firms in the industry), and then averaged (unweighted) over time for each country. Other European OECD countries are Austria, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, the Netherlands, Norway, Portugal, Sweden and Switzerland.

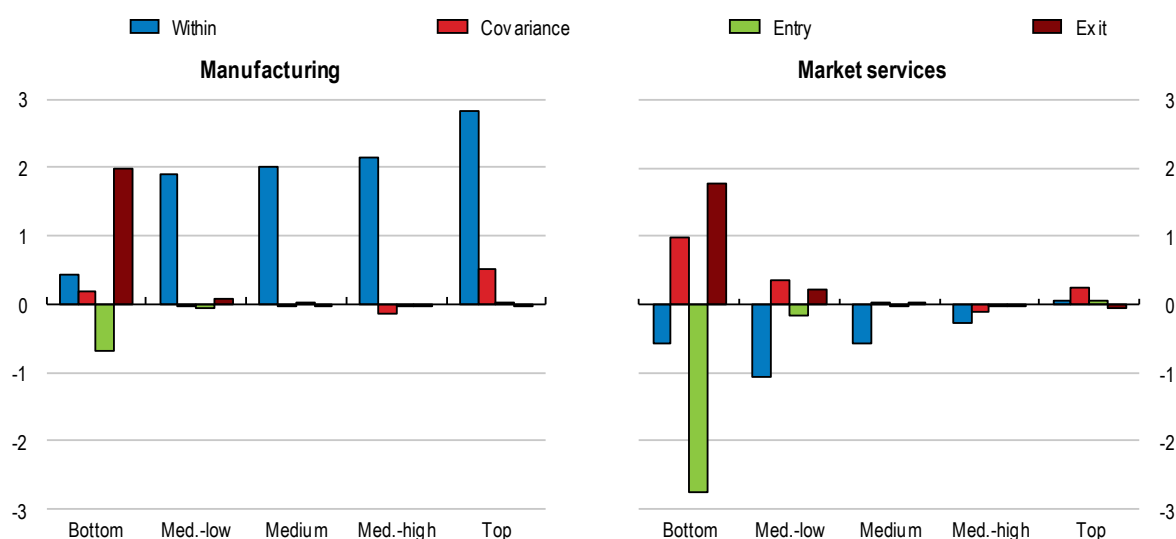
Source: MultiProd Database, February 2019.

Finally, the bottom of the distribution is substantially more dynamic than the top (Figure 2.7). A dynamic decomposition of aggregate labour productivity growth in different parts of the productivity distribution indicates that the contribution of firm entry and exit to productivity growth was substantially higher at the bottom than in other parts of the distribution over the period 2000-14, in both manufacturing and services.¹⁷ Although the rate of market entry by new firms is relatively low in Belgium (OECD, 2017^[21]), the contribution of entry and exit to the aggregate productivity growth of the bottom decile of the productivity distribution is sizeable, and significantly larger than in other productivity performance groups.

¹⁷ The decomposition isolates the contribution of within-firm growth, reallocation, entry and exit to aggregate labour productivity growth in each of the productivity bins – see Box 2.3 and Melitz and Polanec (2015^[61]).

Figure 2.7. The bottom of the productivity distribution is more dynamic than the top

Contribution to aggregate labour productivity growth (%) in Belgium by performance group, 2000-14



Note: The figure plots the Melitz and Polanec (2015) decomposition of aggregate labour productivity growth in each productivity performance group in Belgium: bottom decile (0th-10th percentile of the productivity distribution), medium-low (10th-40th percentile), medium (40th-60th percentile), medium-high (60th-90th percentile) and top decile (90th-100th percentile). Contributions at the industry-level (A38) are aggregated up to sectoral (manufacturing and non-financial market services) level within each productivity performance group using employment weights, and then averaged (unweighted) over time.

Source: MultiProd Database, February 2019.

Taken together, these elements show that young, small and dynamic firms populate the lower tail of the productivity distribution. Common economic wisdom tends to see firms in the lower tail of the productivity distribution as a drag on aggregate productivity, which survive because of weak market selection (Adalet McGowan, Andrews and Millot, 2018^[32]; Caballero, Hoshi and Kashyap, 2008^[33]). As Section 2.4 shows, relatively old “zombie firms” partly make up the low productivity performance groups. Yet, the analysis here suggests that another substantial share of low-productivity firms are businesses at an early stage of development and operating below efficiency level. This fact, combined with the increase in productivity dispersion, points to the importance of investigating the role of firms at the bottom of the productivity distribution (or “laggards”), their weight and contribution to aggregate productivity and growth, as well as the role of policy.

In this report, laggards are defined as firms belonging to the bottom 40% of the productivity distribution, drawing on the statistics by productivity performance groups collected in the MultiProd project (bottom and medium-low performance groups, see Box 2.3). These firms accounted for a sizeable share of employment over the period 2000-14 (Figure 2.8). Even though they are small on average, and account for a modest share of gross output and value added, laggards still represented 20% of employment in manufacturing, and more than 30% in services.

The considerable employment share of laggard firms has important implications for inclusive growth. Recent OECD work documented that lower productivity is associated with lower wages for workers across countries (Berlingieri, Calligaris and Criscuolo, 2018^[30]). It implies that a sizeable share of the labour force employed at laggards in service industries consists of low-income workers on average. Further, young small firms have a

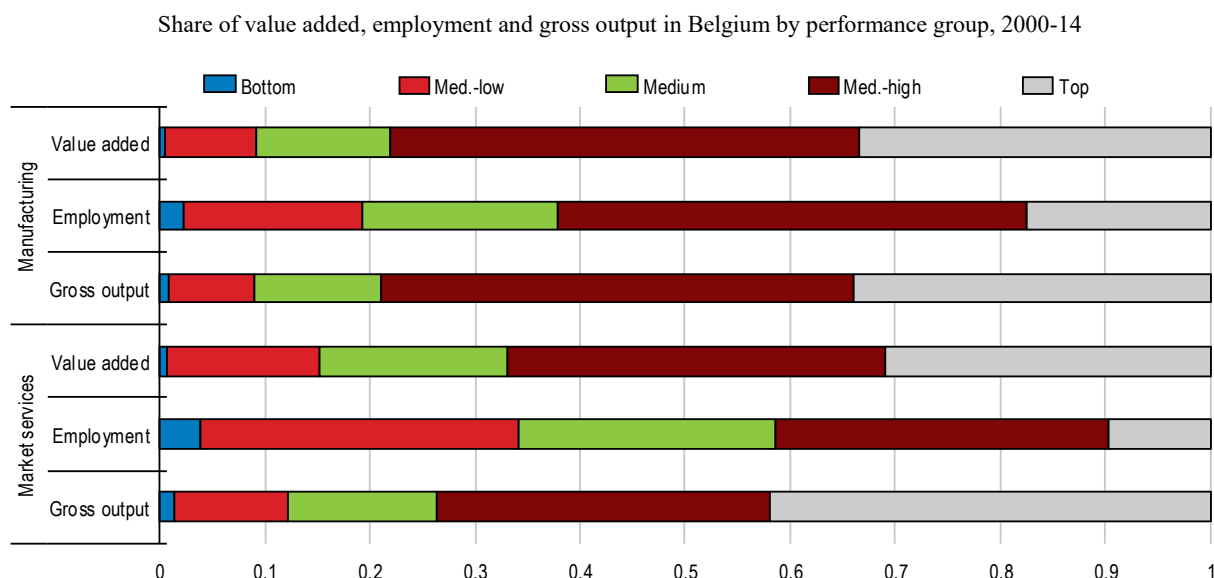
high potential to contribute to employment growth, as they are typically more responsive to productivity shocks (Decker et al., 2018^[34]). Therefore, although laggards do not necessarily represent a large portion of the economy from a static point of view, they are very relevant from a dynamic point of view. Indeed, laggards are not only declining firms likely to exit, but also young entrants, which exhibit a low productivity level because they are likely to produce below optimal size and/or charge lower prices than incumbent firms. These firms operating below efficient scale are the ones with the potential to contribute disproportionately to job creation and productivity growth. The next subsection explores in further depth the importance of laggards for aggregate productivity growth and the policies that can support their development.

Diffusion of productivity gains: Catch-up of laggard firms and the role of policy

The evidence so far shows that: *i*) productivity differences between the most and the least productive firms have increased on average in Belgium; *ii*) this increase mostly arises from the bottom half of the productivity distribution, i.e. a worsening performance of firms at the bottom of the productivity distribution vis-à-vis the median firm; and *iii*) young, small and dynamic firms populate the left tail of the productivity distribution, rather than only zombie firms that should exit the market. Such characterisation of productivity patterns in Belgium calls for a dynamic study of the least performing firms. The analysis focuses on the five-year labour productivity growth of firms located in the bottom 40% of the productivity distribution (i.e. laggard firms). Hence, it is restricted by construction to a subset of laggard firms that survive for at least five years.¹⁸

Neo-Schumpeterian growth models predict that productivity growth is a function of the growth at the technological frontier and the distance to that frontier (Acemoglu, Aghion and Zilibotti, 2006^[14]). The growth at the frontier accounts for technological progress, while the distance to the frontier (or productivity gap) reflects the potential spillovers to the rest of the distribution and captures the rate of diffusion from the frontier to the laggards. Therefore, the extent to which this productivity gap is associated with higher productivity growth (also known as the “catch-up” effect) is a proxy for the pace of diffusion of knowledge and innovation from the frontier. Such catch-up effect has been documented at the country, sector and firm level – for evidence at the firm level, see Griffith, Redding and Van Reenen (2004^[12]) and Bartelsman, Haskel and Martin (2008^[13]).

¹⁸ Relying on such a relatively long horizon (rather than year-to-year changes) offers several advantages, including the mitigation of productivity growth mismeasurement and of the influence of short-term shocks, and a time horizon that is long enough for the materialisation of market selection.

Figure 2.8. Laggards account for a sizeable share of employment

Note: The figure plots the share of gross output, value added and employment in each of the productivity performance groups in Belgium: bottom decile (0th-10th percentile of the productivity distribution), medium-low (10th-40th percentile), medium (40th-60th percentile), medium-high (60th-90th percentile) and top decile (90th-100th percentile). Shares at the sectoral (manufacturing and non-financial market services) level within each productivity performance group are averaged (unweighted) over time.

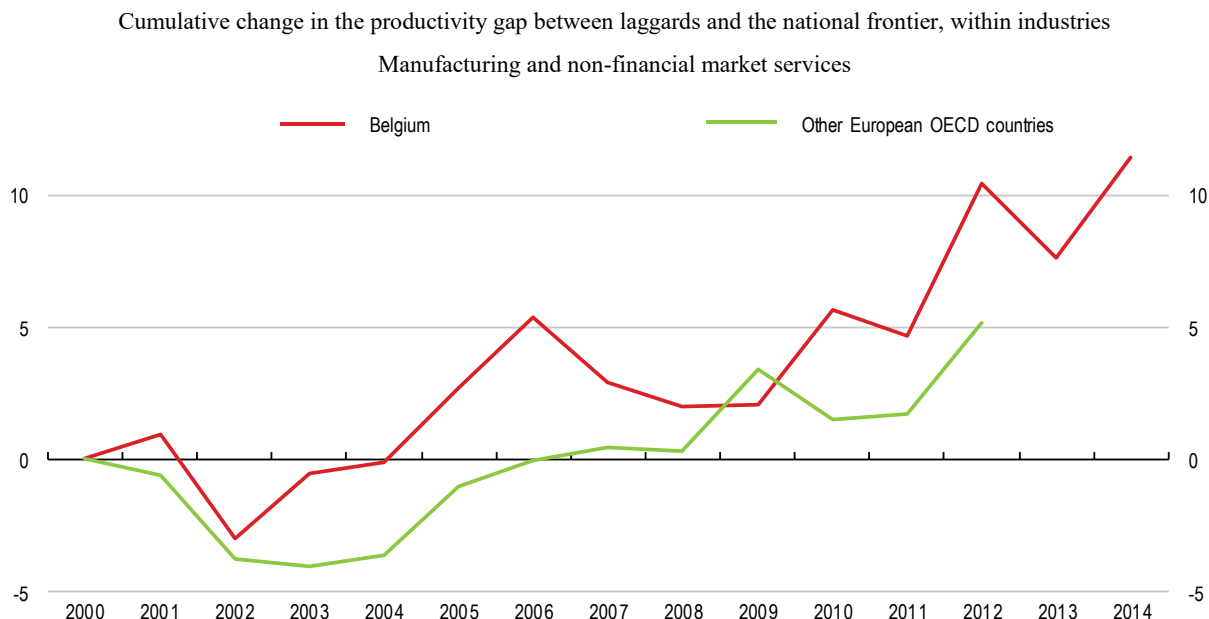
Source: MultiProd Database, February 2019.

The productivity gap between laggards and the top performing firms in Belgium (“the national frontier” firms) has increased in the last 15 years (Figure 2.9). On average, it has increased twice as much in Belgium as in the benchmark countries. This suggests that the catch-up process of laggard firms might have slowed down, and more so in Belgium than elsewhere.¹⁹ The increase in the productivity gap is consistent with the increase in dispersion documented above, and further shows that firms in the bottom 40% (the “laggards” group) have lost ground with respect to the domestic productivity frontier.²⁰ This constitutes suggestive evidence that the pace of technology and knowledge diffusion from the frontier to the “laggards” has slowed down (Comin and Mestieri, 2018_[16]).

¹⁹ In theory, this does not preclude Belgian laggards to catch up faster with the global frontier than their benchmark counterparts, to the extent that the Belgian national frontier is relatively close to the global frontier.

²⁰ Figure 2.9 presents the average productivity gap between “laggards” (firms in the bottom 40% of the productivity distribution) and the national frontier within the same industry (firms in the top 10% of the productivity distribution within the same country-industry-year). This is different from Figure 2.3 and Figure 2.4, which are based on productivity differences between firms located at given percentiles of the productivity distribution (see Box 2.4).

Figure 2.9. The productivity gap between laggards and the domestic frontier has increased more in Belgium than in the benchmark



Note: This figure reports the estimated year dummies of a panel data regression of the average labour productivity gap between laggards and the domestic productivity frontier within industry-productivity performance group pairs in Belgium, and within country-industry-productivity performance group triplets in the set of benchmark countries. Laggards are firms belonging either to the bottom decile of the productivity distribution (0th to 10th percentile) or to the medium-low performance group (10th to 40th percentile). The domestic productivity frontier is defined as the top 10% of the productivity distribution in each country-industry-year triplet. The labour productivity gap is defined as the distance between (log) labour productivity in each country-industry-productivity performance group-year among laggards and (log) LP of the domestic frontier in the corresponding country-industry-year. The first year is taken as the baseline. Results are estimated for manufacturing and non-financial market services based on detailed industries, following the SNA A38 classification (see Box 2.1 and Annex). Other European OECD countries are Denmark, Finland, France, Hungary, Ireland, Italy, Norway, Portugal and Sweden.

Source: MultiProd Database, February 2019.

This section investigates how laggards catch up with the top in their respective industry. Importantly, it assesses to what extent policies favour or hinder such catch-up in Belgium. To do so, it estimates an econometric model where the five-year annualised labour productivity growth of firms in the bottom 40% of the productivity distribution is assumed to depend on: *i*) the productivity gap relative to the domestic frontier; *ii*) variables of interest reflecting structural factors, policies and firm characteristics; and *iii*) the interaction between the productivity gap and these variables of interest (Berlingieri et al., 2018_[15]). This interaction term allows the pace of catch-up to vary according to firm characteristics, as well as the policy and business environment in which firms operate.²¹ The analysis

²¹ The estimated model comes from Berlingieri et al. (2018_[15]) and is specified as

$$\Delta P_{cj,q,t+5} = \beta_1 + \beta_2 gap_{cj,q,t} + \beta_3 (gap_{cj,q,t} \times X_{cj(q),t}) + \beta_4 X_{cj(q),t} + \beta_5 \Delta P_{cj,q,t+5}^F + \delta_{cj,q} + \tau_t + \varepsilon_{cj,q,t+5}$$

where the subscripts *c*, *j*, *q* and *t* indicate country, industry, group of firms defined according to their productivity level and year, respectively. Two performance groups are considered in the

focuses on catch-up and on the role of policies for catch-up.²² In particular, the coefficient estimated for the productivity gap captures the average speed of convergence of laggards to the domestic productivity frontier, i.e. the catch-up effect.²³ The coefficient estimated for the interaction term between the gap and the variable of interest captures the extent to which firm characteristics, structural factors or policies are associated with the speed of catch-up. The analysis examines these variables of interest in turn. The cross-country estimation includes the benchmark countries for which reliable data for the bottom of the productivity distribution are available. These countries are Belgium, Denmark, Finland, France, Hungary, Ireland, Italy, Norway, Portugal and Sweden.

regressions: firms belonging to the bottom decile and the medium-low quantile (see Box 2.3). $\Delta P_{cjq,t+5}$ is the five-year annualised labour productivity growth of the average firm in performance group g in year t , while $\Delta P_{cjq,t+5}^F$ is the growth at the frontier, defined as the top 10% of the productivity distribution in each country-industry-year triplet. $gap_{cjq,t}$ is the productivity gap in year t , modelled as the difference in level between log productivity in each country-industry-productivity group-year and log productivity in the corresponding country-industry-year in the top 10%. $X_{cj(q),t}$ stands for any of the variables of interest, reflecting structural factors, policies and firm characteristics possibly affecting the strength of the catch-up effect. The regressions include country-industry-productivity group fixed effects (δ_{cjq}), as well as year (τ_t) fixed effects, which absorb any possible structural determinant or shock affecting an industry j in country c in a specific productivity group q and macro-trends. Standard errors are clustered at the country-industry level. For details, see Berlingieri et al. (2018_[15]).

²² That is, the parameters of interest are the estimates of β_2 and β_3 from the econometric model.

²³ The productivity gap is measured relative to the domestic frontier, as the growth of laggard firms tends to depend on the productivity of the best domestic firms rather than on productivity levels at the global frontier (Bartelsman, Haskel and Martin, 2008_[13]).

Table 2.1. Labour productivity growth and catch-up of laggards: Firm and industry characteristics

Manufacturing and non-financial market services

Belgium and benchmark countries, 2000-14

	(1)	(2)	(3)	(4)	(5)
	Baseline	Firm size	Firm capital intensity	Manufacturing	Industry skill intensity
Productivity gap	0.0340*** (0.009)	0.0381*** (0.009)	0.0380*** (0.010)	0.0345*** (0.007)	0.0389*** (0.012)
Interaction term		0.0065* (0.004)	0.0103** (0.004)	-0.0007 (0.007)	-0.0129*** (0.005)
Adj. R-Square	0.823	0.831	0.826	0.823	0.830
Observations	3676	3676	3676	3676	3029
No. of countries	10	10	10	10	9
Co-ind-quant FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes

Note: Dependent variable: five-year annualised labour productivity growth (log difference) of laggards. Laggards are firms belonging either to the bottom decile of the productivity distribution (between the 0th and the 10th percentile) or to the medium-low performance group (between the 10th and the 40th percentile). Productivity gap: distance between (log) labour productivity in each country-industry-productivity performance group-year among laggards and (log) labour productivity of the domestic frontier in the corresponding country-industry-year. Domestic productivity frontier: top 10% of the productivity distribution in each country-industry-year. Standard errors clustered at the country-sector level in parentheses. Significance levels: * 10%, ** 5%, *** 1%. All regressions including an interaction term between the productivity gap and a given firm or industry characteristic also include the level of that characteristic. All regressions control for productivity growth at the domestic frontier (growth between t and $t + 5$ of firms in the top decile of the productivity distribution in year t). Countries included are Belgium, Denmark, Finland, France, Hungary, Ireland, Italy, Norway (not in Column 5), Portugal and Sweden.

The econometric analysis confirms that surviving laggards catch up with the domestic productivity frontier, as all regressions return a positive and significant relationship between the productivity gap and the productivity growth of laggards, irrespective of the other explanatory variables (Table 2.1). The estimated coefficients for the productivity gap indicates that, in the baseline specification, a 10% larger productivity gap is associated with a 0.34 percentage point premium in the five-year annualised productivity growth of surviving laggards.²⁴ In each country-industry-productivity performance group, firms that are further behind the domestic frontier experience a higher rate of productivity growth. In other words, those firms that start at the bottom of the distribution and manage to survive for five years do catch-up with the best performing firms.

The pace of catch-up depends on a number of firm and industry characteristics (Table 2.1).²⁵ This is shown by the estimated coefficient for the interaction term of the

²⁴ See coefficient β_2 in the model.

²⁵ See coefficient β_3 in the model. For expositional ease, the table omits the coefficient β_4 associated with the characteristic alone, which captures the conditional correlation with the characteristic when the gap is zero. Because the analysis focuses on laggards, the gap is positive by construction and this coefficient is uninformative. Yet, omitting it in the regressions would bias the estimates.

model, which reports the conditional correlation between the productivity growth of laggards and the joint realisation of the productivity gap and the characteristic under consideration. The regression results indicate that the catch-up of laggards with the rest of the distribution is faster in countries and industries where firms are larger and more capital-intensive, but does not depend on the macro-sector (manufacturing or non-financial market services) in which they operate.²⁶ This complements evidence showing that young high-growth firms can be found in a wide range of sectors in Belgium, and that they tend to be larger and to invest more than non-high-growth firms (De Mulder, Godefroid and Swartenbroekx, 2017^[35]).

The econometric estimates further suggest that the catch-up process is slower in industries with high average skill levels.²⁷ Indeed, the estimate indicates that, in a country-industry where the average skill level is one standard deviation higher than average (equal to a 13 percentage points change in the share of high-skilled workers), a 10% larger productivity gap is associated with a $(0.389 - 0.129 =)$ 0.260 percentage points premium in the productivity growth of laggards. That is, the catch-up rate in such skill-intensive industry is 0.129 points less than the baseline of 0.389 in a country-industry with average skill intensity. This is likely to arise in industries where skill shortages create upward pressure on wages, so that laggards are unable to afford the cost of high-skilled workers. Such shortages may exist in Belgium, where almost half of the firms that posted job offers for ICT specialists in 2015 experienced difficulties to fill them, and where the share of tertiary educated adults with science, technology, engineering and mathematics subjects (STEM) as their field of education is lower than in France or Germany (OECD, 2017^[21]).

Given the importance of young laggards for future productivity growth and their potential for employment creation, policies should aim at ensuring their catch-up. A number of policies favour productivity growth in general, by pushing out the global innovation frontier, enhancing the “diffusion machine” from the top to the bottom, and improving the allocation of workers and capital (OECD, 2015^[18]). Yet, the previous section shows that subdued firm-level performance at the bottom of the distribution is an important driver of productivity patterns in Belgium. Therefore, the analysis specifically focuses on policies that have the potential to speed up the productivity convergence of laggards.

Three possible areas of policy action for accelerating the catch-up of laggards are identified: training, research and development and labour market institutions (Table 2.2).²⁸ This is shown by the estimate associated with the interaction term between the productivity gap and the policy.²⁹ The analysis suggests that the pace of catch up depends also on the

²⁶ The size measure is the (log) average firm-level employment in the country-industry-productivity group, while the capital intensity measure is the (log) average capital-labour ratio in the country-industry-productivity group. The macro-sector variable is a dummy for manufacturing vs. non-financial market services.

²⁷ The measure of skill intensity is the industry share of high-skilled workers. The data are taken from the World Input-Output Database. They are available at the country-industry-year level.

²⁸ The overall OECD indicator of product market regulation is not significantly associated with the catch-up of laggards in the sample countries over the period under consideration.

²⁹ See coefficient β_3 in the model. See also Footnote 25.

value of the policy variable.³⁰ Columns 1-3 indicate that public expenditure on training and on research and development are associated with faster catch up. Columns 5-7 show that, on the contrary, rigid labour market institutions like strict dismissal regulations of regular contracts, stringent regulations of temporary contracts and a high minimum wage are correlated with slower catch up. The interpretation of the estimated coefficients is similar to the one laid out above: for example, countries where public research and development expenditure is one standard deviation higher than average enjoy an extra 0.111 percentage points of productivity growth on top of the baseline 0.313 percentage points associated with a 10% larger productivity gap.

Policy improvements could accelerate the catch-up of laggards in Belgium. A comparative statics exercise shows the change in laggard catch-up associated with policy reforms. It reports the change in the catch-up of laggards that would result from bringing policies in Belgium to the average level observed in the sample countries.³¹ It relies on the estimated coefficients of the econometric model to infer the *ceteris paribus* change in the impact of the productivity gap on the productivity growth of laggards.³² The remainder of this section describes these policies. Importantly, the comparative statics exercise only offers indications about the relative magnitude of the change in laggard catch up associated with each policy change in the case of a causal interpretation of the regression results. Even though the estimates are robust and based on a conservative estimation strategy, they are only conditional correlations.³³ Therefore, while not necessarily carrying a causal interpretation, they provide a useful indication of the economic significance of potential

³⁰ More precisely, deviations from the average level of the policy variable are associated with the pace of catch-up. Indeed, the analysis rests on demeaned-standardised values for the policy variables.

³¹ The average level is for the year 2012. This maximises the data availability regarding both policy variables and countries in the benchmark. Although some of the policy variables are available for later years, the exercise relies on conditional correlations estimated over the period 2000-14. A comparative statics exercise based on current values of the policy variables might be too demanding as it would imply out-of-sample predictions. In any case, for Belgium, the values of these policy variables have not changed significantly between 2012 and the last available year, hence the exercise is still informative for recent years. Public research and development decreased from 0.57% of GDP in 2012 to 0.55% in 2015 (last available year in the OECD Main Science and Technology Indicators Database). Training decreased from 0.16% of GDP in 2012 to 0.15% in 2016 (last available year in the OECD Labour Market Policy Expenditures and Participants Database).

³² Specifically, it computes the percent change in the catch-up effect associated with bringing a given policy in Belgium to the average level of the sample countries in the year 2012, i.e.

$$\Delta \text{CatchUp}_{BEL,2012} = \frac{X_{mean,2012} - X_{BEL,2012}}{\sigma_X} \frac{\hat{\beta}_3}{\hat{\beta}_2}$$

where X is the policy level, σ is the standard deviation of the policy level in the sample countries, and $\hat{\beta}_2$ and $\hat{\beta}_3$ are the estimated coefficients from the econometric model.

³³ The estimated coefficients are conditional on a very demanding set of fixed effects (see the description of the model in Footnote 21).

policy reforms. Furthermore, one should not interpret the estimated payoffs of policy reforms as additive given the high correlation between the policies.³⁴

Table 2.2. Labour productivity growth and catch-up of laggards: National policies³⁵

Manufacturing and non-financial market services							
Belgium and benchmark countries, 2000-14							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Training (all)	Institution. training	Public R&D	R&D tax credits	Dismissal regulation regular contracts	Hiring regulations temporary contracts	Hourly minimum wage
Productivity Gap	0.0337*** (0.009)	0.0390*** (0.011)	0.0313*** (0.008)	0.033*** (0.010)	0.0395*** (0.010)	0.0428*** (0.009)	0.0433*** (0.012)
Interaction term	0.0038** (0.002)	0.0059** (0.003)	0.0111*** (0.002)	-0.001 (0.001)	-0.0163*** (0.005)	-0.0182*** (0.004)	-0.0114*** (0.003)
Adj. R-Square	0.824	0.820	0.826	0.839	0.819	0.832	0.862
Observations	3676	3135	3676	2758	3299	3676	1667
Number of countries	10	10	10	10	10	10	5
C-ind-quant FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Dependent variable: five-year annualised productivity growth of laggards. Laggards are firms belonging either to the bottom decile of the productivity distribution (between the 0th and the 10th percentile) or to the medium-low performance group (between the 10th and the 40th percentile). Productivity gap: distance between (log) labour productivity in each country-industry-productivity performance group-year among laggards and (log) labour productivity of the domestic frontier in the corresponding country-industry-year. Domestic productivity frontier: top 10% of the productivity distribution in each country-industry-year. Standard errors clustered at the country-sector level in parentheses. Significance levels: * 10%, ** 5%, *** 1%. All regressions including an interaction term between the productivity gap and a given policy also include the level of that policy. All regressions control for productivity growth at the domestic frontier (growth between t and $t + 5$ of firms in the top decile of the productivity distribution in year t). Countries included in Columns 1-6 are Belgium, Denmark, Finland, France, Hungary, Ireland, Italy, Norway, Portugal and Sweden. Countries included in Column 7 are Belgium, France, Hungary, Ireland and Portugal.

Public spending on training as a share of GDP is about 40% lower in Belgium than in the average benchmark country (Figure 2.10).³⁶ Belgium spent 0.16% of GDP in training

³⁴ For example, if both training reforms are implemented, the aggregate payoff would not be the sum of the two individual reforms.

³⁵ The preferred approach is to run regressions separately on each policy because of differences in year coverage. However, the results are robust to including all policies in a single regression. In particular, regressions that include training, public research and development and the indicator on the stringency of dismissal of regular-contract workers return significant coefficients with a magnitude comparable with those obtained from separate regressions. The estimate for dismissal stringency becomes insignificant when further including the indicator of temporary contract regulation, suggesting that the two indicators are highly correlated.

³⁶ Active spending on training encompasses institutional training, workplace training, alternate/integrated training and special support for apprenticeship. It only includes spending on training that targets specific subgroups of the active population (as opposed to training generally

targeted at specific groups of the active population in 2012. For comparison, France spent 0.37% of GDP on training and Denmark (the country with the highest level of spending in the sample) spent 0.61% (OECD, 2018). Active training is especially relevant in Belgium. Indeed, the educational attainment of immigrants is low, both in international comparison and relative to non-immigrants (OECD, 2017^[21]). Skills gained beyond the formal education system would raise labour productivity among the immigrant population. Moreover, recent pension reforms are expected to raise labour market participation among people aged 55-64 (NBB, 2018^[25]). Increased public spending on training would help maintain and upgrade the skills of these older workers, and ultimately improve productivity by better matching labour market demand.³⁷ Chapter 3 provides further evidence by identifying an over-supply of low-skilled workers, which reduces their prospects of finding a job and earning a good salary. The econometric model suggests that overall public spending on training is associated with faster catch-up of laggards. The correlation is particularly strong for institutional training, as opposed to workplace training.³⁸ Indeed, small laggards likely lack the resources to organise in-house training and rely on outside training institutions.

Raising public training expenditure to the average level in the sample countries could accelerate the speed of catch-up of Belgian laggards by 7-8% of the baseline catch-up effect (Figure 2.11). Raising public expenditure on institutional training alone could make the catch-up effect about 4% faster. Further, the comparative statics exercise suggests that the pace of catch-up of laggards could increase by as much as 30% if the level of training expenditure in Belgium reached that of Denmark (the best performer in the sample).

The public funding of research and development (excluding tax incentives) is relatively low in Belgium (Figure 2.10).³⁹ Government-financed gross expenditure on research and development as a share of GDP was lower than in the average country in the sample in 2012. It accounts for about one-third of the gross domestic expenditure on research and development, while business expenditure on research and development accounts for the other two-thirds.⁴⁰ In Belgium, the latter tends to be highly concentrated in a few

available to the entire population). The data comes from the OECD Database on Labour Market Policy Expenditures and Participants and is available at the country-year level.

³⁷ The Employment Opportunity Plan for Older Workers, implemented in 2013 in the Collective Bargaining Agreement 104, encourages firms to provide older workers with permanent training opportunities, which should ultimately improve their productivity and participation in the job market. The Flexible and Workable Work Act, enacted in 2017, further obliges firms to provide all workers with adult education and training. See also the overview chapter.

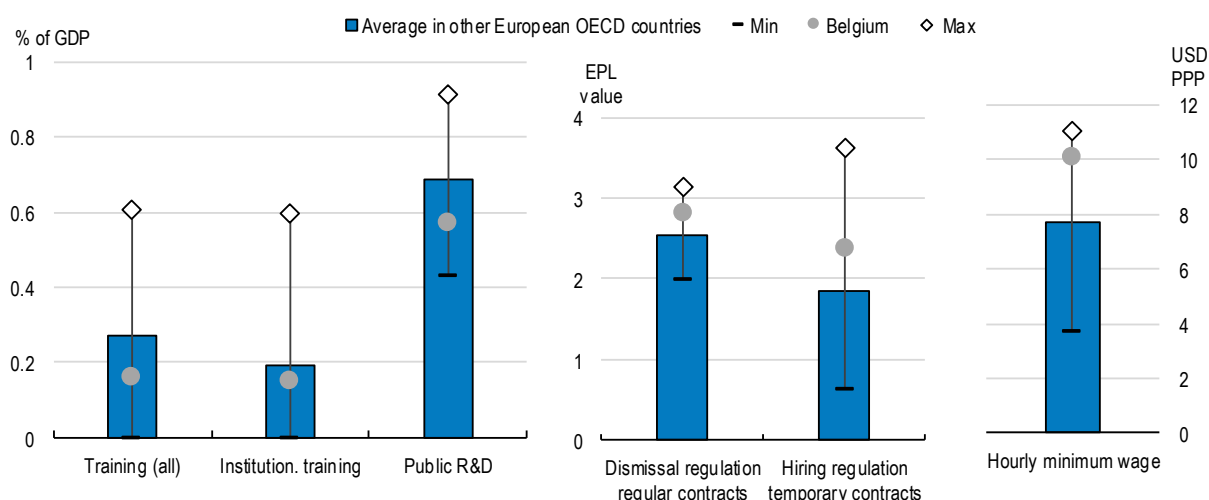
³⁸ Institutional training refers to programmes where 75% or more of the training time is spent in a training institution (school, training centre or similar). Workplace training refers to programmes where 75% or more of the training time is spent in the workplace.

³⁹ Government-financed gross expenditure on research and development does not include the cost of tax incentives for research and development. The data on government-financed research and development come from the OECD Main Science and Technology Indicators and are available at the country-year level.

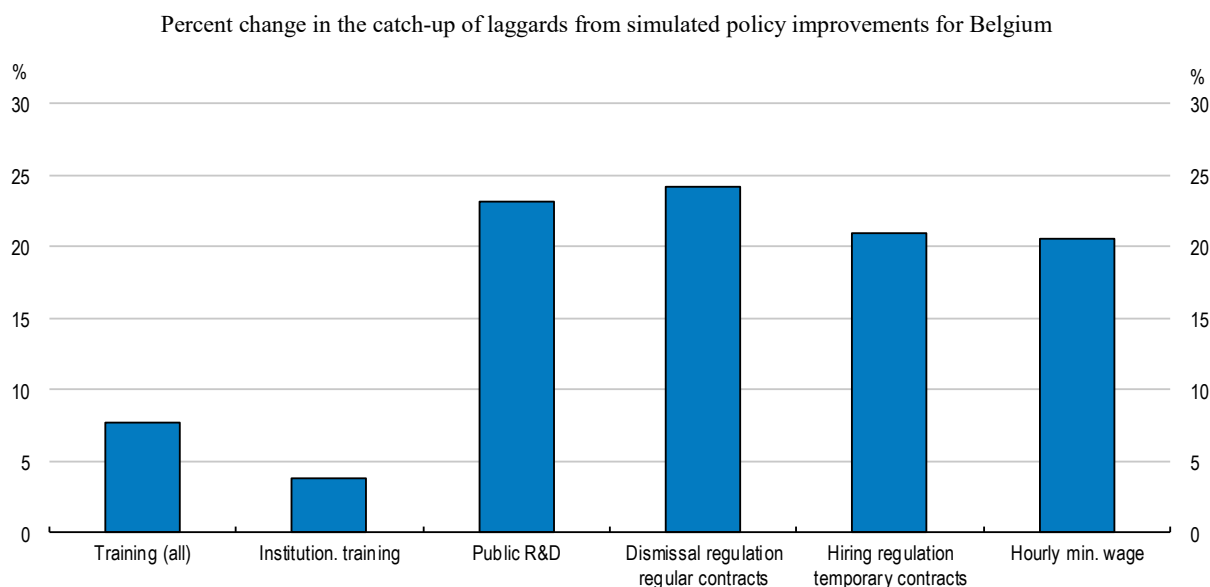
⁴⁰ Regional (as opposed to federal) authorities account for about 80% of total public research and development support (OECD, 2017^[21]). Current programmes include the Governing Agreement (2014-19) and Policy Note 2014-19 in Flanders, the Marshall Plan 4.0 (2015-19) in Wallonia, and the Regional Innovation Plan (2015-20) in the Brussels-Capital Region. The federal state supports research and development mainly through tax credits and incentives.

manufacturing industries and performed by foreign affiliates, notably in the pharmaceutical, chemical and biotech sectors. These characteristics of research and development expenditure may explain both the good average productivity performance in manufacturing, but also the limited spillover and weak diffusion to other firms and sectors, in particular services (OECD, 2017_[21]).

Figure 2.10. National policies in Belgium relative to other European OECD countries



Note: This figure reports the minimum, average and maximum values for measures of selected national policies, as well as the value for Belgium. The left panel reports overall public training expenditure (left bar), public expenditure on institutional training (middle bar) and public expenditure on research and development (right bar) as a percentage of GDP. The middle panel reports indicators of employment protection legislations regarding dismissals of regular-contract worker (left bar, left axis) and temporary employment (middle bar, left axis). The right panel reports hourly minimum wage (right bar, right axis). Countries included for all policies except the minimum wage are Belgium, Denmark, Finland, France, Hungary, Ireland, Italy, Norway, Portugal and Sweden. Countries included for the minimum wage are Belgium, France, Hungary, Ireland and Portugal. Values are for 2012.

Figure 2.11. Estimated change in laggard catch-up associated with policy reforms

Note: This figure reports the percent change in the catch-up effect of laggards associated with selected policy reforms that bring Belgium to the level of the average country in the sample. Percent change computed as the distance to the mean of the policy level in Belgium multiplied by the ratio of the estimated gap-policy interaction coefficient to the estimated gap coefficient (see the text for details). Countries included for all policies except the minimum wage are Belgium, Denmark, Finland, France, Hungary, Ireland, Italy, Norway, Portugal and Sweden. Countries included for the minimum wage are Belgium, France, Hungary, Ireland and Portugal. Values are for 2012.

Expenditure-based research and development tax incentives currently account for about $\frac{3}{4}$ of total government support for business expenditure on research and development in Belgium. They almost entirely explain the strong increase in business expenditure on research and development since 2005. Incentives include a tax credit for research and development, a tax exemption from the withholding payroll tax for researchers and an innovation box.⁴¹ Belgium is one of the top OECD performers in terms of total government support for business expenditure on research and development. However, this support tends to be extremely concentrated and to benefit mostly large and old firms in the manufacturing sector (De Mooij, Hebous and Hrdinkova, 2018^[36]). Furthermore, the combination of the different types of incentives may reduce their efficiency (Dumont, 2019^[37]). The econometric model complements previous analyses and suggests that there is no significant correlation between the generosity of research and development tax credits and the speed of catch-up of laggard firms.⁴²

⁴¹ The tax credit is equivalent to a 5-8% subsidy. The payroll tax exemption amounts to a 15-20% reduction in labour costs. Intellectual property income is liable for an 85% exemption from corporate income tax under the innovation box scheme (De Mooij, Hebous and Hrdinkova, 2018^[36]). The measure of tax credits for small firms comes from the OECD Research and Development Tax Incentives Database. The results are the same when using the measure of tax credits for large firms.

⁴² This result does not come as a surprise, as most of the expenses in research and development tax credits in Belgium do not go to laggards in the service sector, but rather to large manufacturing firms (De Mooij, Hebous and Hrdinkova, 2018^[36]). Moreover, there exist little evidence at the OECD level

Employment protection legislations are relatively stringent in Belgium (Figure 2.10).⁴³ The latest preliminary update of the OECD Indicators on Employment Protection indicators suggests that Belgium ranks similarly in 2018 as over the period of analysis. Among the sample countries, only Portugal and Italy had stricter rules regarding the individual and collective dismissal of workers on a regular contract in 2012.⁴⁴ The regulation of temporary contracts is also particularly rigid in Belgium, as only France and Norway have stricter temporary employment rules among the sample countries.⁴⁵ Moreover, employment protection legislations regarding temporary contracts have become relatively more stringent in Belgium compared with neighbouring countries such as Germany and the Netherlands over the period of analysis.

Employment protection legislations are desirable in labour markets characterised by frictions and asymmetric information, and can limit wage dispersion (Berlingieri, Blanchenay and Criscuolo, 2017^[4]). Moreover, appropriate regulations of temporary employment help reduce labour market asymmetries between temporary and permanent workers, hence favour the accumulation of firm-specific human capital (Bassanini, Nunziata and Venn, 2009^[38]; OECD, 2015^[18]). However, strict rules on temporary contracts may be particularly detrimental to firms at an early stage of development, which have a higher probability to appear in the group of laggards (Calvino, Criscuolo and Menon, 2016^[17]). Indeed, such firms likely cannot afford to offer permanent employment yet. Employment protection legislations thus constitute a clear example of trade-offs and nonlinearities in policies. On the one hand, less strict regulations on temporary employment may fuel the duality of the labour market, which has been shown to be detrimental to productivity; on the other, they reduce exit costs in case of business failure, hence increasing firm incentives to experiment and innovate, which enhances productivity growth.⁴⁶ In Belgium, evidence based on firm-level measures of exposure to employment protection legislations indicates that stricter legislation is associated with worse performance in the private sector over the 2000-09 period (Van Landuyt, Dewaelheyns and Van Hulle, 2017^[39]). Further, recent work suggests that Belgian firms facing quasi-fixed labour costs (which reflect firing costs, among others) tend to adjust labour inputs at the

that economies with more generous research and development tax incentives enjoy better diffusion from the global frontier (Saia, Andrews and Albrizio, 2015^[63]).

⁴³ The data come from the OECD Indicators on Employment Protection Database. The measure of the strictness of dismissal legislations is the EPRC indicator, which synthesises information regarding the individual and collective dismissal of workers on a regular contract. The measure of the strictness of temporary employment legislations is the EPT indicator. These measures are available at the country level from 1985 to 2013. The OECD is currently compiling the 2018 vintage of the indicators.

⁴⁴ This primarily comes from strict regulation of collective dismissals.

⁴⁵ This primarily comes from strict regulation of temporary work agencies.

⁴⁶ There exists evidence that the productivity impact of reforming employment protection legislations depends on the specificities of the reform (Cappellari, Dell'Aringa and Leonardi, 2012^[73]) and that temporary agency work has a non-linear impact on productivity (Hirsch and Mueller, 2012^[74]).

intensive margin (that is, adjusting working hours rather than the number of workers), which is negatively associated with productivity (Delmez and Vandenberghe, 2018^[40]).⁴⁷

The econometric model complements these findings and indicates that there exists a negative correlation between employment protection legislations and the pace of laggards' catch-up in the sample countries. Lowering the stringency of employment protection legislations to the average level in the sample countries could improve catch-up by 20-25% (Figure 2.11). The comparative statics exercise suggests that laggard firms would catch up about 24% faster if Belgium had dismissal regulations comparable to those in the country close to the average regulation value (as in Sweden). Similarly, aligning Belgium with average standards regarding the regulation of temporary employment (as in Finland) could accelerate catch-up by about 21%.^{48,49}

The minimum wage is relatively high in Belgium (Figure 2.10).⁵⁰ Only France had a higher hourly minimum wage among the sample countries in 2012.⁵¹ High minimum wages contribute to reducing wage and income inequalities, which are already relatively low in Belgium – see OECD (2017^[21]) and De Sloover and Saks (2018^[41]). This may imply that firms at an early stage of development cannot afford increasing their labour input to reach their optimal scale. The econometric model indicates that high minimum wages are correlated with a slower pace of catch-up among laggards in the sample countries.⁵²

2.3. Business dynamics and labour market outcomes

Trends in business dynamism

Like technology diffusion, the Schumpeterian process of creative destruction through firm turnover and the growth of incumbents is a key driver of aggregate productivity growth. It enables new, productive firms to enter the market, grow and replace old, unproductive ones. Business dynamism encompasses the processes of entry, exit and growth. It favours the productivity-enhancing reallocation of resources towards more productive use (Decker et al., 2014^[42]).

⁴⁷ That paper relies on micro-data from firms with at least 20 employees and does not offer insights into the extent to which its results apply to smaller firms.

⁴⁸ The empirical analysis in this chapter cannot disentangle the channels through which employment protection legislations are associated with the catch-up of laggards, as regular and temporary contracts' regulations are highly correlated. Yet, it provides strong evidence that such labour market institutions matter for laggards' productivity. See also Footnote 46.

⁴⁹ Such deregulation of temporary contracts would have to come mainly from fewer hiring restrictions for temporary work agency contracts, as hiring restrictions for fixed-term contracts are already low in Belgium.

⁵⁰ The minimum wage measure is the real PPP-adjusted hourly minimum wage and comes from the OECD Labour Force Statistics Database.

⁵¹ Recent reforms over the years 2014-16 have reduced labour income taxes, especially on the lowest wages. Moreover, social partners have been discussing derogations to the minimum wage regime (OECD, 2017^[21]).

⁵² Minimum wage data are only available for Belgium, France, Hungary, Ireland and Portugal over the period 2000-14.

Business dynamism is weak in Belgium. Both entry and exit rates are low, and net entry in the private sector is close to zero (Bijnens and Konings, 2018^[43]). Entry rates of employer firms in Belgium range from 2-4% in manufacturing industries, and from 5-10% in service industries (see Figure 2.21 below). Entry is lower in Belgium than in the benchmark countries for most industries. Moreover, figures from the DynEmp Database indicate that the job reallocation rates of incumbent firms are about one-third smaller than in the benchmark countries.

Box 2.5. DynEmp

The DynEmp project offers unique cross-country evidence on the dynamics of employment over time based on micro-data. It extends business dynamism analyses beyond aggregate measures of employment creation, and focuses on job creation and destruction by firms of different size and age, as well as depending on their entrant, exiting or incumbent status. The DynEmp Database is harmonised across countries and over time, hence suitable for international comparisons to a cross-country benchmark. This provides policy-makers with detailed insights into the dynamism of the economy and the relative health of the processes of firm entry, exit and creative destruction.

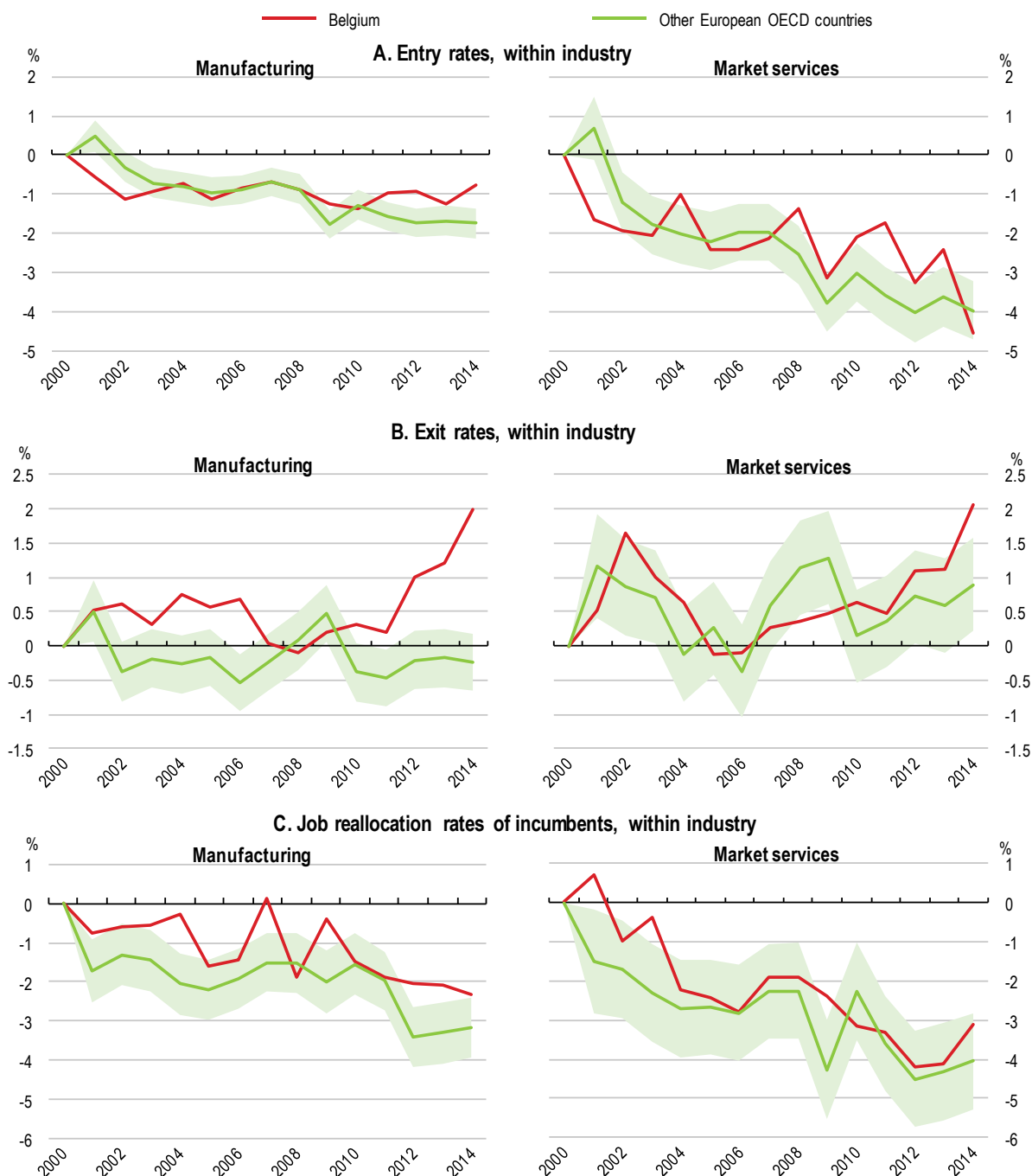
As of February 2019, the database spans the years 1997-2015 and comprises the following countries: Austria, Belgium, Brazil, Canada, Costa Rica, Finland, France, Hungary, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden and Turkey.

This chapter focuses on the member countries of the European Economic Area, conditional on availability in the database, namely: Austria, Belgium, Finland, France, Hungary, Italy, the Netherlands, Norway, Portugal, Spain and Sweden. The analysis focuses on manufacturing (excluding the manufacturing of coke and refined petroleum products) and non-financial market services, namely ISIC Rev.4/NACE Rev.2 industries 10-18, 20, 21 (for analyses at the sector level, not at the industry level), 22-33, 45-63 and 69-82.

See Criscuolo, Gal and Menon (2015^[44]) for a more detailed presentation of the methodology used in the DynEmp project, and Desnoyers-James, Calligaris, and Calvino (2019^[11]) for more details on industry coverage and classification.

Business dynamism has declined in Belgium between 2000 and 2014 in both manufacturing and services (Figure 2.12). Entry rates have decreased by one percentage point in the average manufacturing industry, while they have declined by four percentage points in services. The job reallocation rate among incumbents has declined by two percentage points in the manufacturing sector over the same period, and by three percentage points in the service sector. Exit rates seem to have increased towards the end of the period. Altogether, this is consistent with recent research pointing to a “secular decline” in the business dynamism of advanced economies (Decker et al., 2016^[45]; Calvino, Criscuolo and Verlhac, 2018^[22]; Criscuolo, Gal and Menon, 2014^[46]). In Belgium, entry rates in the entire private sector have declined by about ten percentage points since 1985 (Bijnens and Konings, 2018^[43]).

Figure 2.12. Business dynamism has declined



Note: These figures report the estimated year dummies of a panel data regression of entry rates, exit rates and job reallocation rates of incumbents within industry in Belgium, and within country-industry pairs in the set of benchmark countries. The first year is taken as the baseline. Results are estimated for manufacturing and non-financial market services based on detailed industries, following the SNA A38 classification (see Box 2.5 and Annex). Other European OECD countries are Austria, Finland, France, Hungary, Italy, the Netherlands, Norway, Portugal, Spain and Sweden. Owing to methodological differences, figures may deviate from officially published national statistics.

Source: DynEmp3 Database, February 2019.

Young firm activity

Creative destruction is also of primary importance for labour market outcomes. Young firms play a crucial role in the process of creative destruction that shapes aggregate productivity growth (Haltiwanger, Jarmin and Miranda, 2013^[47]). Their growth is characterised by up-or-out dynamics with high rates of gross job creation and destruction (Calvino, Criscuolo and Menon, 2015^[5]). Moreover, young firms disproportionately contribute to job creation in the OECD. Comparable patterns have been documented for Belgium (Dumont and Kegels, 2016^[31]; De Mulder, Godefroid and Swartenbroekx, 2017^[35]).

Box 2.6. Measures of employment dynamics

Most of the analysis of employment dynamics rests on the measures below. N and L refer to the number of firms and employment, respectively. Subscripts i , c and t stand for firm, cell and year.

Entry rate:

$$EntryR_{c,t} = 100 \times \frac{N_{c,t}^{entry}}{N_{c,t}^{entry} + N_{c,t}^{incumb}}$$

Exit rate:

$$ExitR_{c,t} = 100 \times \frac{N_{c,t}^{exit}}{N_{c,t}^{exit} + N_{c,t}^{incumb}}$$

Gross job creation:

$$JC_{c,t} = \sum_{i \in c} \Delta^+ L_{i,t}$$

where $\Delta^+ L_{i,t} \equiv 1_{(L_{i,t}-L_{i,t-1})>0} \cdot (L_{i,t} - L_{i,t-1})$ and $1_{(L_{i,t}-L_{i,t-1})>0}$ is a dummy variable equal to one when the firm-level change in employment is positive, and zero otherwise.

Gross job destruction:

$$JD_{c,t} = \left| \sum_{i \in c} \Delta^- L_{i,t} \right|$$

where $\Delta^- L_{i,t} \equiv 1_{(L_{i,t}-L_{i,t-1})<0} \cdot (L_{i,t} - L_{i,t-1})$ and $1_{(L_{i,t}-L_{i,t-1})<0}$ is a dummy variable equal to one when the firm-level change in employment is negative, and zero otherwise.

Net job creation rate:

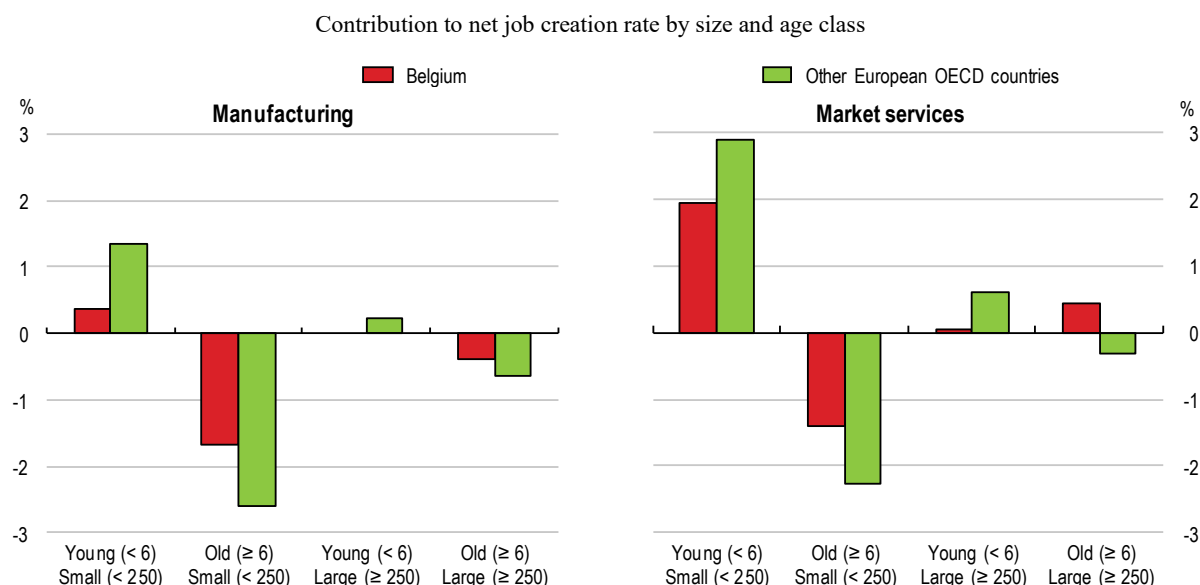
$$NJCR_{c,t} = 100 \times \frac{JC_{c,t} - JD_{c,t}}{0.5(L_{c,t} + L_{c,t-1})}$$

Job reallocation rate:

$$JRR_{c,t} = 100 \times \frac{JC_{c,t} + JD_{c,t}}{0.5(L_{c,t} + L_{c,t-1})}$$

Although the contribution of young small firms to net job creation in Belgium is high, especially in services, it is lower than in the other European OECD countries (Figure 2.13). Young firms accounted for about half a percentage point of the net job creation rate (see Box 2.6 for definitions) in Belgian manufacturing over the period 2004-14, versus almost 1.5 percentage points in the benchmark countries. In services, they accounted for almost two percentage points in Belgium, versus three percentage points in the benchmark countries.⁵³ In general, the contribution of each age-size class to net job creation is low (in absolute value) in Belgium relative to other countries. Moreover, old large firms in the service sector created jobs in Belgium over the period 2000-14, while they destroyed jobs on average in the benchmark countries.

Figure 2.13. Young firm activity is relatively low in Belgium



Note: This figure reports the average contribution to net job creation rate by size and age class by macro-sector in Belgium and in the benchmark over the period 2004-14. This is defined as net job creation by the particular group over total employment (on average between time t and $t - 1$) in the macro-sector. The first years are excluded due to censoring. Units with missing age are excluded. Other European OECD countries are Austria, Finland, France, Hungary, Italy, the Netherlands, Norway, Portugal, Spain and Sweden. Owing to methodological differences, figures may deviate from officially published national statistics.

Source: DynEmp3 Database, February 2019.

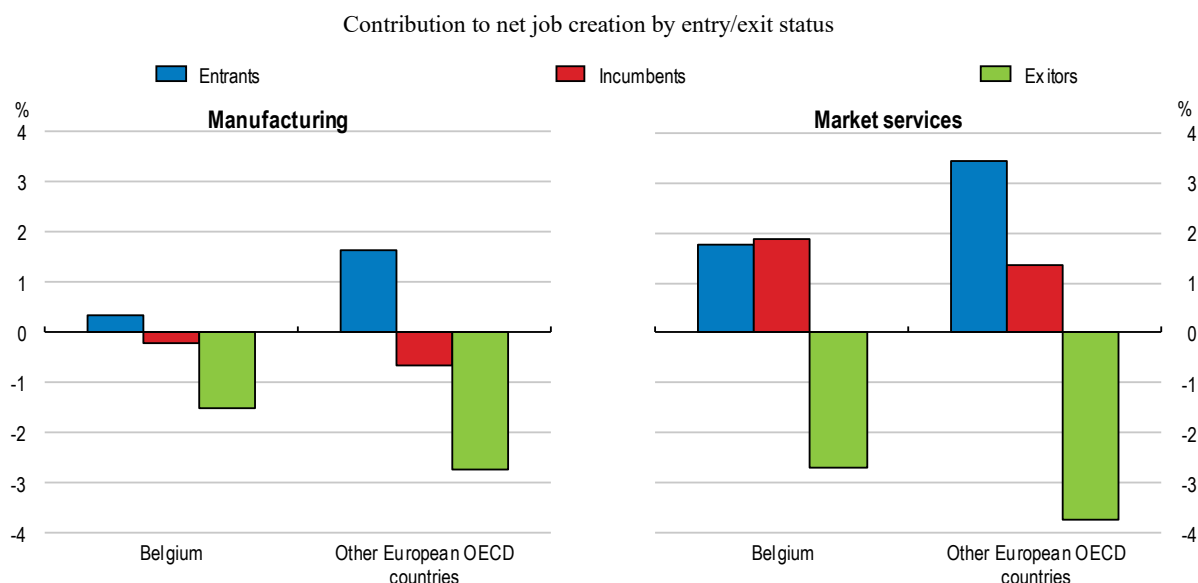
The contribution of firm entry and exit to net job creation is relatively low (Figure 2.14). Entrants contributed sizeably less to the net job creation rate in Belgium than in the benchmark countries over the period 2000-14, in both manufacturing and services (see Box 2.6 for definitions).⁵⁴ Exiting firms also show a lower job destruction rate. The

⁵³ Such pooled cross-sectional figures hide the cyclical nature of net job creation. The data show that young firm activity is rather stable in Belgium over the period, as old firms absorbed most of the cyclical changes in the net job creation rate. Yet, young firms have accounted for a decreasing share of total employment in Belgium over the period 2002-11 – see Dumont and Kegels (2016_[31]).

⁵⁴ Spurious entry partly contaminates the underlying firm-level data, leading to an overestimation of firm and employment dynamics (Geurts and Van Biesebroeck, 2016_[64]). The vast majority of micro-entrants are de novo entrants, hence focusing on them circumvents the issues related to spurious entrants.

contribution of incumbents to net job creation was higher in Belgium than in other countries over the period 2000-14, especially in services where they contributed even more than entrants.

Figure 2.14. The contribution of entry and exit to job creation is low

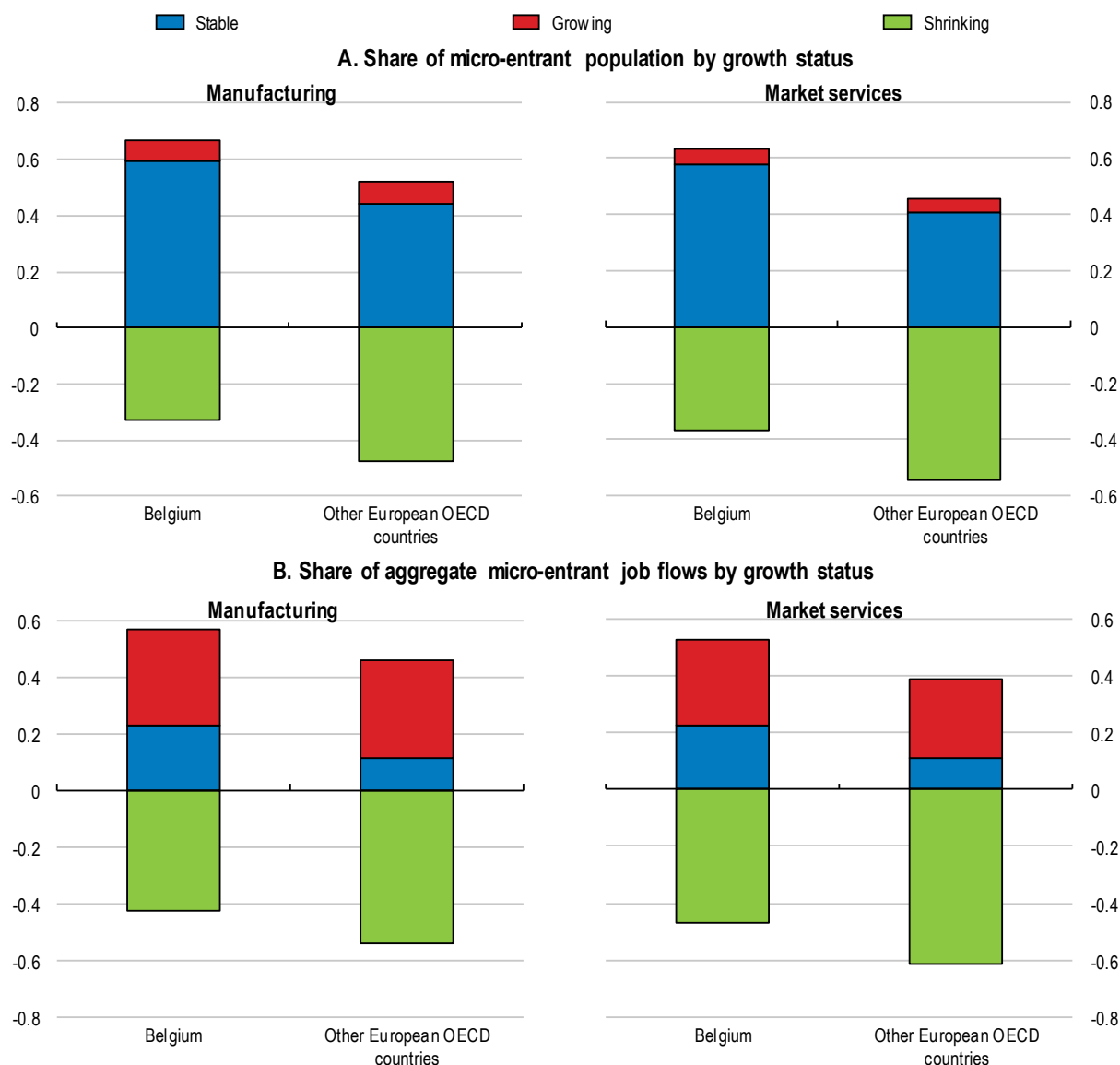


Note: This figure reports the average contribution of entrants, incumbents and exiting units to the net job creation rate by macro-sector in Belgium and in the benchmark over the period 2000-14. Benchmark countries include Austria, Finland, France, Hungary, Italy, the Netherlands, Norway, Portugal, Spain and Sweden. Owing to methodological differences, figures may deviate from officially published national statistics.

Source: DynEmp3 Database, February 2019.

Dynamism among micro-entrants is relatively low (Figure 2.15). Micro-entrants are businesses that enter the market with fewer than 10 workers. Most micro-entrants did not either grow or shrink over the period 2000-14 in Belgium, contrary to the pattern in the benchmark. The share of growing micro-entrants was comparable in Belgium and in the benchmark in both manufacturing and services, but the share of stable micro-entrants was larger in Belgium, and the share of shrinking (essentially exiting) micro-entrants was smaller. Moreover, while the typically disproportionate contribution of growing micro-entrants to job creation was comparable in Belgium and in the benchmark, the contribution of stable micro-entrants was higher in Belgium over the period 2000-14.

Figure 2.15. Dynamism among micro-entrants is low



Note: Panel A reports the average share of units in all micro-entrants (2-9 workers) that are stable, growing or shrinking/exiting by macro-sector for Belgium and in the benchmark over the period 2000-14. Panel B reports the average net contribution to aggregate flows by micro-entrants that are stable, growing or shrinking/exiting by macro-sector for Belgium and in the benchmark over the period 2000-14. This is defined as net job creation by the group over the sum of the net job variations by all groups in absolute values. Shrinking shares are reported with a negative sign. Cohorts of micro-entrants can start in 2001, 2004, 2007 and 2010, and are followed for five years, conditional on the availability of data. Other European OECD countries are Austria, Finland, France, Hungary, Italy, the Netherlands, Norway, Portugal, Spain and Sweden. Owing to methodological differences, figures may deviate from officially published national statistics.

Source: DynEmp3 Database, February 2019.

Policy and start-up dynamics

The descriptive section above highlights the weak and declining business dynamism in Belgium. It further shows that young firm activity is relatively muted. Firm creation and young firm dynamics are a key driver of the process of creative destruction underlying

aggregate productivity growth. Recent OECD work has highlighted the importance of national policies and framework conditions for start-up dynamics across a large sample of OECD and non-OECD countries mainly between 2002 and 2011 (Calvino, Criscuolo and Menon, 2016^[17]). Therefore, this section studies how policies that are relevant for Belgium are associated with start-up dynamics. It focuses on market entry rates.

The empirical analysis rests on the intuition that some industries are more exposed to the effects of policies than others. The identification of the correlation between entry rates and the policy comes from the interaction between policies and exposure, once other country-year-specific and industry-specific factors are accounted for (Rajan and Zingales, 1998^[48]).⁵⁵ To do so, the analysis relies on an econometric model where the entry rate in a given industry-country-year triplet depends on: *i*) country-year specific factors; *ii*) industry-specific factors; and *iii*) a term that captures the interaction between the policy measure at the country level and the exposure to the policy at the industry level (Calvino, Criscuolo and Menon, 2016^[17]).⁵⁶ The exposure measure is the average rate of job reallocation in the United States at the industry level between 2000 and 2013. This measure is a proxy for industry-specific reallocation needs and captures industry exposure to policies that spur entry rates. The coefficients are estimated from the entire set of countries available in DynEmp3, but results are robust to restricting it to the benchmark countries.

The analysis identifies three types of policies that are correlated with the rate of market entry: product market regulations, the efficiency of institutional processes regarding the business environment and access to venture capital (Table 2.3). Indeed, regressions based on the model described above return significant coefficients for the term representing the interaction between the policy and the industry exposure. These estimates capture the differential impact of the policies in sectors with high reallocation needs compared to sectors with lower needs. They show that the correlation between the policy and entry rates is stronger in industries with higher exposure to the policy, i.e. industries with higher reallocation needs. The negative coefficients reported in Columns 1-4 indicate that product market regulations and institutional features that delay the resolving of business failure or the enforcement of contracts are negatively associated with entry. The positive coefficient in Column 5 shows that the availability of venture capital favours entry.

⁵⁵ The identification is possible because there are two dimensions along which the effect of a given policy varies: across industries within country (due to variation in exposure) and across countries within industry (due to policy differences).

⁵⁶ The model comes from Calvino, Criscuolo and Menon (2016^[17]) and is specified as

$$Entry_{cs,t} = \alpha + \beta * Pol_{c,t} * Exp_s + \theta_s + \kappa_{c,t} + \varepsilon_{cs,t}$$

where *c*, *s* and *t* index countries, industries and time, respectively. $Pol_{c,t}$ is the national policy variable and Exp_{st} is the sectoral exposure variable. θ_s and κ_{ct} stand for industry and country-year fixed effects, respectively.

Table 2.3. Firm entry and national policies

Manufacturing and non-financial market services

Belgium and benchmark countries, 2000-14

	(1)	(2)	(3)	(4)	(5)
	Product market regulation	Cost of starting a firm	Contract enforcement	Resolving insolvency	Venture capital
Policy x Exposure	-0.0109** (0.00533)	-0.000761*** (0.000131)	-2.61e-05*** (0.0000036)	-0.00647*** (0.00143)	0.280*** (0.0402)
R-squared	0.81	0.801	0.801	0.799	0.804
Observations	814	3331	3094	3094	3673
No. of countries	16	17	17	17	14
Country-year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes

Note: Dependent variable: entry rate. Significance levels: * 10%, ** 5%, *** 1%. Regressions based on the entire set of countries available in DynEmp3. Results are robust to restricting countries to the European Economic Area countries.

Policy improvements could foster market entry in Belgium (Figure 2.16). To quantify the magnitude of the estimated coefficients, a comparative statics exercise shows the estimated change in entry associated with policy-improving reforms in Belgium if one interprets the coefficients from the econometric model causally.⁵⁷ It reports the change in the entry rate that would result from bringing policies in Belgium to the level of the most business-friendly country in the sample.⁵⁸ It relies on the estimated coefficients to infer the change in the entry rate of the industry with the median level of exposure to the policy.^{59,60} The comparative statics exercise offers insights into the magnitude of the change in entry rates

⁵⁷ The results should be interpreted as robust correlations that might be suggestive of potential underlying causal linkages, which however cannot be verified with certitude in the present econometric setting.

⁵⁸ The difference in policy levels between Belgium and the top performing country in the sample relies on the last year of the period 2000-14 for which the policy measure is available in Belgium. Although some of the policy variables are available for later years, the exercise relies on correlations estimated over the period 2000-14. In principle, these should not be used for comparative statics based on current values of the policy variables.

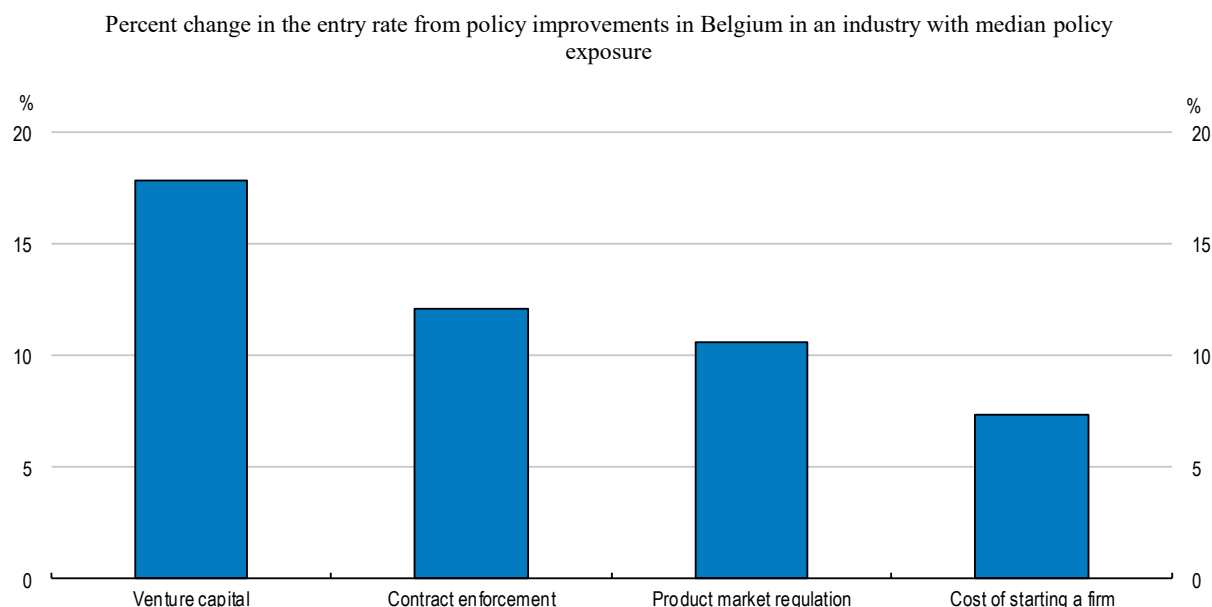
⁵⁹ The unit of observation in the empirical model is the country-industry-year. Indeed, policies vary at the country level while exposure varies at the industry level. Therefore, it is possible to infer changes in entry rates for each industry in Belgium. For the sake of brevity, the analysis focuses on the change in the industry with the median level of exposure in Belgium. This industry is the wood, paper production & printing sector (ISIC Rev.4/NACE Rev.2 industries 16 to 18). When relevant, it also refers to an industry with high policy exposure, as defined by reallocation needs at the 90th percentile of the distribution. This industry is the accommodation & food service sector (ISIC Rev.4/NACE Rev.2 industries 55 to 56).

⁶⁰ The change in the entry rate following the reform is expressed in percent of the baseline entry rate and calculated as

$$\Delta Entry_{cst} = \beta * (Pol_{TOP,t} - Pol_{BEL,t}) * Exp_{st}$$

associated with policy reforms only in the case of a causal interpretation of the estimated correlations.

Figure 2.16. Estimated change in entry rates associated with policy reforms



Note: This figure reports the percent change in the entry rate associated with selected policy reforms that bring Belgium to the level of the most business-friendly country in the sample. Change is for an industry with median exposure to the policy. For example, product market regulation reform is associated with a 10% increase in the entry rate of the median industry, i.e. an increase from 2.75% to about 3.03%. The percent change is calculated as the distance between the policy level in Belgium and the most business-friendly country in the sample times the exposure, then multiplied by the estimated policy-exposure interaction coefficient (see the text for details). Values are for 2013 for product market regulation and 2014 for the other policies.

Source: OECD DynEmp3 database, February 2019.

Product market regulations are relatively restrictive in Belgium compared to the other European OECD countries in the dataset. This was the case over the period of analysis, and is confirmed by the 2018 vintage of the OECD product market regulation indicators (see the overview chapter).⁶¹ Economy-wide barriers to entrepreneurship are high, especially regarding the administrative burden on start-ups. Such barriers typically increase the cost of entrepreneurship, hence they reduce market entry. In Belgium, the burden even increased between 1998 and 2013, while it decreased in almost all other countries, including countries with an initially similar level such as France, Italy and the Netherlands. At the sectoral

⁶¹ The data come from the OECD Indicators of Product Market Regulation Database. At the time of writing, the 2018 version of the indicators was about to be released. However, it is not directly comparable with previous vintages, so the analysis cannot include it. Some policy reforms meant at improving the business environment for start-ups have been implemented since 2014. Besides the “SME plan” from February 2015, the federal government substantially reformed corporate law, as well as economic and liquidation law. Regional authorities also eased the administrative burden by creating single contact points for all procedures. Yet, the 2018 vintage of the indicators suggests that Belgium’s position relative to the OECD average has worsened. In particular, only Turkey, Canada and Luxembourg have more restrictive overall product market regulations than Belgium. The same is true regarding the indicator on the administrative burden for start-ups, for which only Turkey, Canada and the Slovak Republic perform less well. See also Footnote 58.

level, regulations regarding the retail sector in Belgium are the most stringent among the sample countries, and barely improved over the period 1998-2013. In particular, specific regulations for large outlets protect incumbents. Moreover, night work restrictions constitute an impediment to on-time delivery, a critical feature of the e-commerce sector, which is underdeveloped in Belgium (NBB, 2018_[25]).⁶² In professional services, regulations in the legal and accounting industries are relatively high, and they have not improved either. For example, professional association membership is compulsory (OECD, 2017_[21]). Stringent product market regulations may be associated with lower competition and higher prices. Even though they do not affect all industries directly, they indirectly raise input prices in the entire economy. Belgium is among the OECD countries that would benefit the most from reducing product market regulations to best practices in terms of GDP growth (Bouis and Duval, 2011_[49]). Simulations of the impact of reforming non-manufacturing regulations suggest that even budgetary-neutral reforms would increase GDP by 0.15-0.3% a year (Ingelbrecht, Kegels and Verwerft, 2018_[50]).⁶³

The comparative statics exercise suggests that improving product market regulation (as measured by the main economy-wide indicator) to the level of the most business-friendly country (the Netherlands) would increase the entry rate in the median industry by about 10% (Figure 2.16).⁶⁴ However, this effect is heterogeneous across industries given the structure of the empirical model (see Footnote 59). An industry with high policy exposure would experience an increase of about 15%. The same exercise based on an indicator that explicitly measures the cost of starting a business returns very similar results.⁶⁵

Entrepreneurship tends to be negatively correlated with inefficient institutional processes regarding the business environment, such as weak contract enforcement or lengthy bankruptcy procedures.⁶⁶ Belgium performs relatively poorly in terms of enforcing contracts and resolving disputes in a timely manner (Calvino, Criscuolo and Menon, 2016_[17]). Contract enforcement reflects the efficiency of the judicial system rather than the specific content of contract law.

The comparative statics exercise suggests that reducing the time to enforce contracts to the level of the most business-friendly country in the sample could increase entry rates by about 12% (Figure 2.16). If the average number of days necessary to enforce contracts in Belgium was reduced from 505 to 280 days as in Norway, entry rates in an industry with a median exposure to the effect of such policy would rise by that magnitude. In an industry with high policy exposure, entry rates could increase by as much as 17%. Court automation and case management could strengthen contract enforcement (OECD, 2017_[21]).

⁶² These legislations were recently softened (NBB, 2018_[25]).

⁶³ The simulations include the abolition of the advertising ban in professional services, the removal of restrictions regarding the legal form of professional service providers, and the abolition of the ban on the exercise of other activities in combination with the regulated activity.

⁶⁴ This is a percent change in the entry rate. The 10% increase in the median entry rate corresponds to an increase from 2.75% to about 3.03%. This applies to all simulations in this section. See details in Footnote 60.

⁶⁵ The cost of starting a business is available from the World Bank Doing Business Indicators.

⁶⁶ The bankruptcy law reform enacted in May 2018 is expected to further ease the venture of new enterprises by failed entrepreneurs. Yet, there remains a stigma associated with bankruptcy in Belgium (Becue, 2018_[65]).

Young innovative firms face financing constraints in Belgium, especially for scaling up. Start-ups heavily depend on banks for financing their development, but the majority of loan applications in Belgium are not approved (OECD, 2017^[21]). Venture capital markets are underdeveloped in Belgium.⁶⁷ Indeed, venture capital activity is among the lowest in OECD countries. Limited access to equity finance is one of the main impediment to entrepreneurship.

In this context, the simulations reported above suggest that increasing venture capital availability to the level observed in the sample country where it is the most developed (Sweden) would increase entry rates by 18% in the case of a median exposure to the policy, and by as much as 25% in case of high exposure (Figure 2.16).

2.4. Firm exit and zombie firms

Besides young firms, another class of firms that have low productivity are so-called “zombie firms”, firms that experience persistent financial difficulties and would typically exit in a competitive market. As discussed below, there is no unique way to define them, but zombie firms have been shown to have lower labour and multifactor productivity than non-zombie firms. For Belgium, NBB (2017^[51]) estimates that 65% of zombie firms have productivity levels below the median. Low productivity of zombie firms is not a Belgium-specific phenomenon. Using data for 14 advanced countries, Banerjee and Hofmann (2018^[52]) show that labour productivity of zombie firms tends to be lower than that of non-zombie firms and that this is even more the case for multifactor productivity.

Zombie firms also have an indirect productivity drag by diverting resources away from productive and successful firms. In particular, a higher share of capital sunk in zombie firms is shown to be correlated with less investment and hiring of workers by non-zombie firms (Hallak, Harasztosi and Schich, 2018^[53]). Evidence also shows that the prevalence of zombie firms is linked with lower access to credit by healthy firms, with banks’ balance sheets weakened by zombie exposure (Andrews and Petroulakis, 2017^[54]).

Building on earlier work by Caballero, Hoshi and Kashyap (2008^[55]) and Adalet McGowan, Andrews and Millot (2017^[56]), the analysis in this section quantifies the number and size of zombie firms in Belgium compared with other countries in Europe. The data source used is Orbis, a commercial database by the electronic publishing firm Bureau Van Dijk. While Orbis covers many countries, the final sample of countries in the benchmark Belgium is compared with is determined by the availability of data necessary to construct zombie firm measures. The sample is restricted to business sectors, excluding agriculture, utilities, construction, finance and insurance and real estate activities.

Zombie firms are defined as firms that are at least ten years old and that have had negative profits before tax for three consecutive years.⁶⁸ This definition is more restrictive than the one in Adalet McGowan, Andrews and Millot (2017^[56]), who define zombies as firms with an interest coverage ratio of less than one (which is equivalent to negative profits before tax excluding financial revenues) for three consecutive years. Both definitions are

⁶⁷ In 2015, the federal government introduced a tax credit for individuals who invest in start-up. The tax credit was extended to young companies in 2017. Regional authorities supplement these efforts with financial assistance. In particular, Wallonia specifically targets young firms.

⁶⁸ The ten-year restriction is aimed to distinguish zombie firms from young start-ups which can take several years before making profits. Profits before tax equal: EBIT + financial revenues – financial expenses, with EBIT referring to earnings before interest and tax.

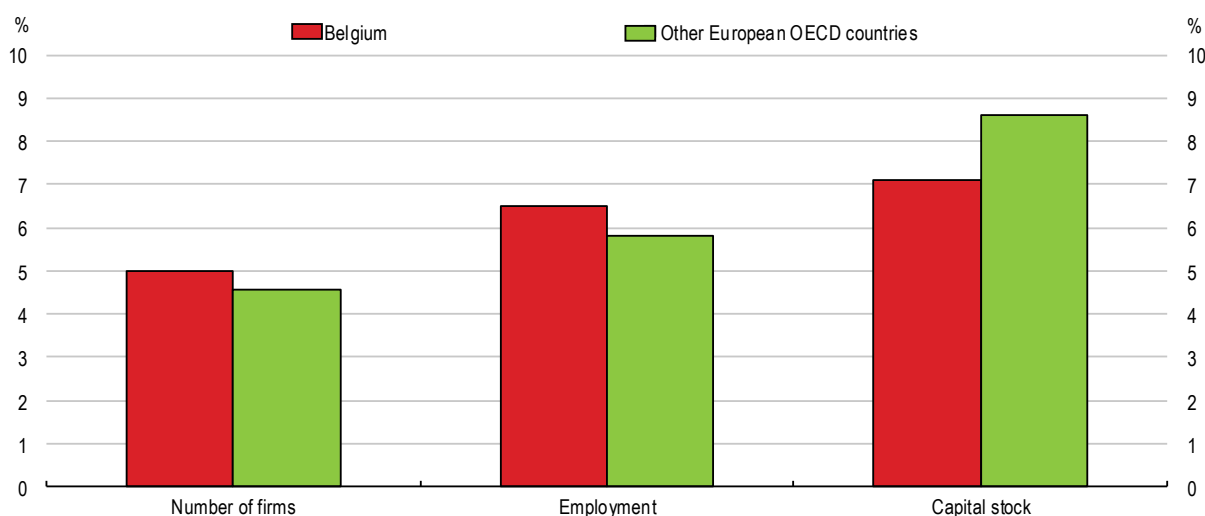
potentially relevant, and the choice made in this section is mainly driven by data availability issues, since the share of zombie firms can be calculated for many more Belgian firms using the definition in this chapter.

Robustness checks have been performed with the definition of Adalet McGowan, Andrews and Millot (2017^[56]) on the sub-sample of firms for which it can be computed. They give an overall consistent picture with the one presented in this chapter, with overall higher zombie shares (due to the wider definition) but the same cross-country and cross-industry patterns. Overall patterns are also broadly the same when excluding firms belonging to multinational groups (where tax planning operations may in some cases distort zombie measures) from the sample.

Cross-country comparisons of the number and size of zombie firms need to be considered with caution, since the coverage of firms in Orbis varies from country to country. The analysis focuses on countries with relatively comparable coverage. With this caveat in mind, the main results are as follows. The share of zombie firms and the share of employment sunk in zombie firms have been higher in Belgium during the period 2007-15 than in a European benchmark group of countries (Figure 2.17). Based on the firm count measure, of the countries in the benchmark, only Spain and Portugal have higher shares than Belgium (Figure 2.18). By contrast, the share of capital sunk in zombie firms has been lower in Belgium than in the benchmark, even though in 2015 it was higher than in Finland, France, Ireland, Slovenia and Sweden.

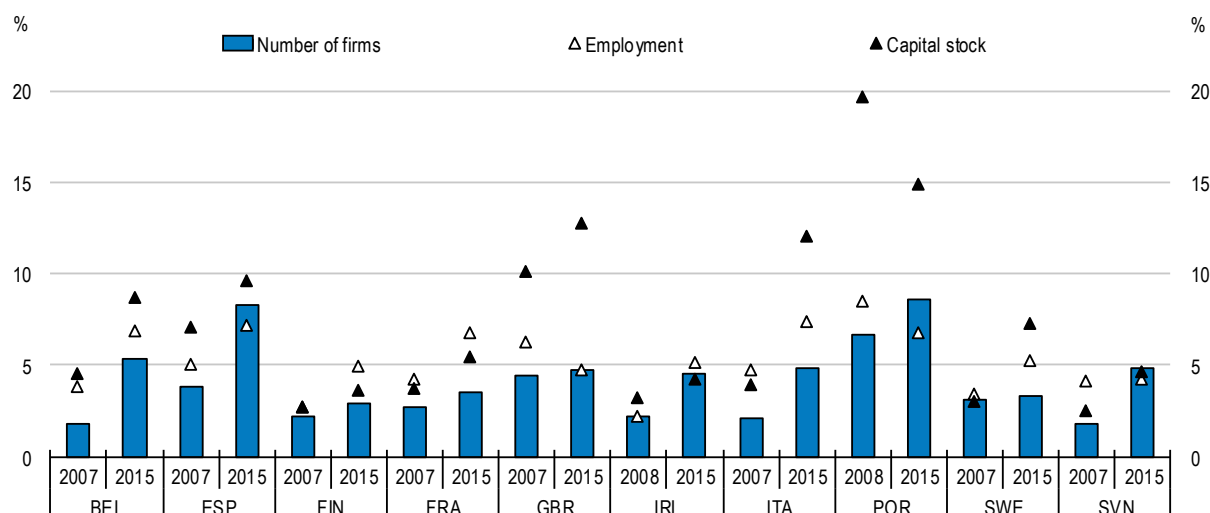
The three measures for zombie shares increased from 2007 to 2015 in Belgium, as in most countries included in the benchmark, possibly in relation with the effect of the global financial crisis and its aftermath. Based on this definition of zombie firms, about 5% of firms were zombie firms, and 7% of employment and 9% of capital in Belgium were sunk in zombie firms in 2015.

Figure 2.17. Share of zombie firms: Belgium vs. other European OECD countries (2007-15)



Note: This figure reports the average of the share of zombie firms and employment and capital sunk in zombie firms over the period 2007-15. Zombie firms are defined as firms that are at least ten years old and that have had negative profits before tax for three consecutive years. Other European OECD countries are Finland, France, Ireland, Italy, Portugal, Slovenia, Spain, Sweden and the United Kingdom.

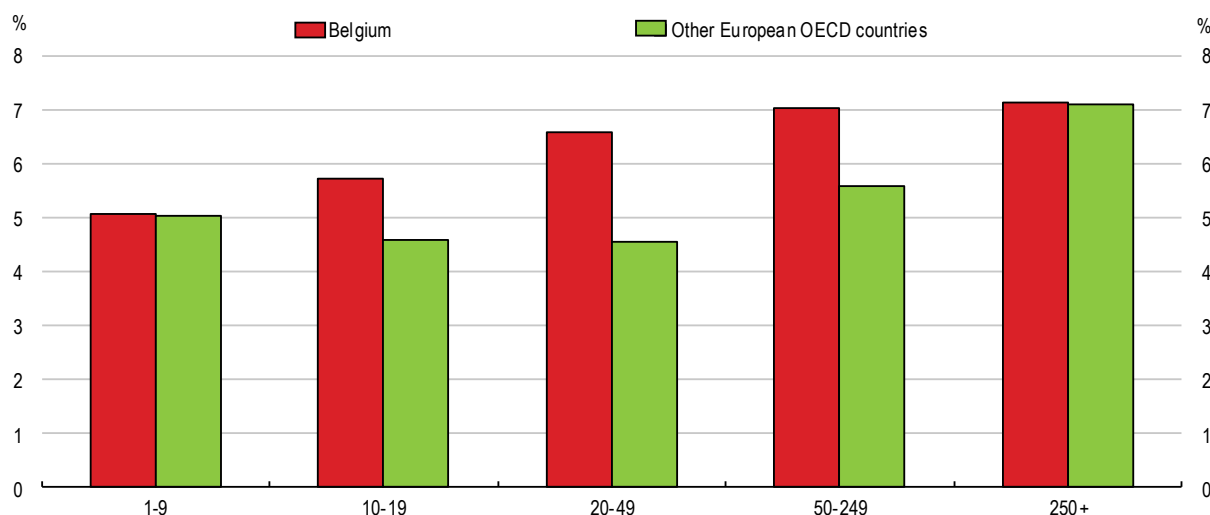
Source: OECD estimates based on Orbis.

Figure 2.18. Share of zombie firms: Country details (2007 and 2015)

Note: Zombie firms are defined as firms that are at least ten years old and that have had negative profits before tax for three consecutive years.

Source: OECD estimates based on Orbis.

The likelihood of being a zombie firm in Belgium tends to increase with size. In 2015, 7-8% of Belgian large companies (with 250 or more employees) for which data are available were zombie firms, compared with 5% and 6½ per cent for smaller firms (with between 1 and 49 persons employed). A similar pattern can be observed in other OECD countries (Figure 2.19) which could be partly due to the fact that large firms are more likely to receive government subsidies to limit the employment loss linked with the exit of large firms. Furthermore, banks might have incentives to keep large firms alive due to either relationship banking or bank forbearance. In 2015, 16% of identified zombie firms had been in that position for at least five years without any interruption.

Figure 2.19. Share of zombie firms by firm size class

Note: Zombie firms are defined as firms that are at least ten years old and that have had negative profits before tax for three consecutive years. Firm size classes are defined by the number of employees. Other European OECD countries are Finland, France, Ireland, Italy, Portugal, Slovenia, Spain, Sweden and the United Kingdom. The data are for 2015.

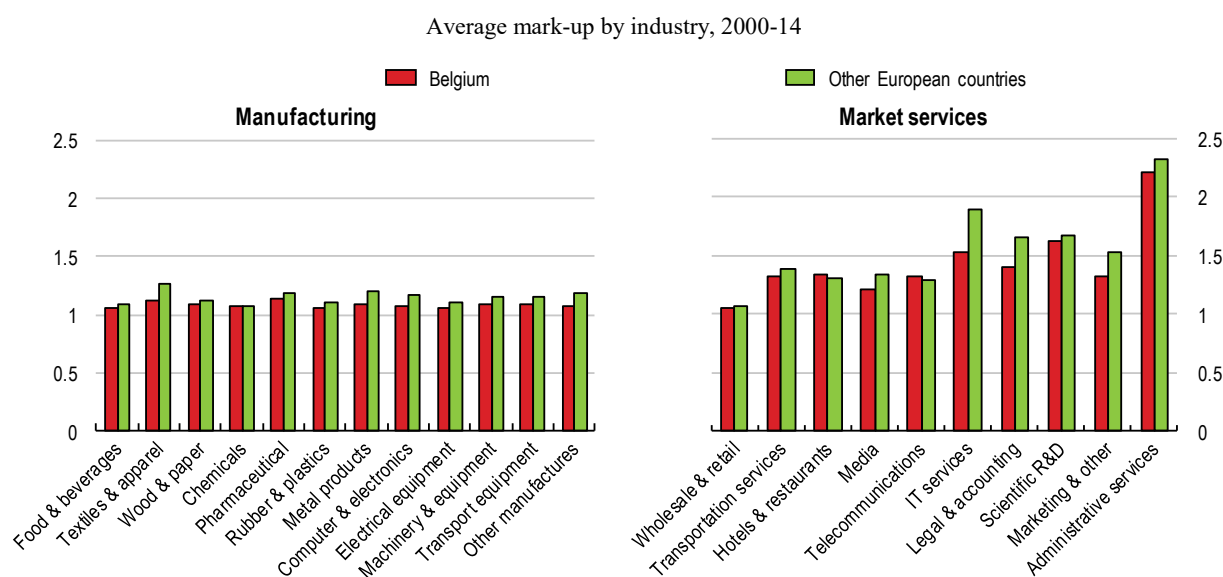
Source: OECD estimates based on Orbis.

2.5. An industry snapshot of performance indicators

Indicator 1: Mark-ups

Mark-ups are a commonly used measure of market power. They measure the wedge between the price paid by the consumer for a certain good and the unit cost paid by the producer to produce the same good. More specifically, they are defined as the ratio of unit price over marginal cost. Therefore, mark-ups different from unity indicate that markets are not perfectly competitive, e.g. products are differentiated or there are barriers to entry. According to the recent OECD analysis by Calligaris, Criscuolo and Marcolin (2018^[57]), mark-ups have significantly increased over the period 2001-14 in both manufacturing and non-financial market services, but especially in the latter.⁶⁹ On average, mark-ups are higher in the non-financial market services than in manufacturing, both in Belgium and in the benchmark countries (Figure 2.20). Moreover, in Belgium mark-ups are on average slightly lower than in the other countries in all industries except “Hotels & restaurants” and “Telecommunications”. This indicator complements the horizontal screening of sectors performed by the Price Observatory (FPS Economy, 2017^[58]).

Figure 2.20. Mark-ups are generally lower in Belgium than in other countries



Note: This figure reports the average mark-up by SNA A38 industries over the period 2000-14. Other European countries include Austria, Bulgaria, Denmark, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Romania, Slovenia, Spain, Sweden and the United Kingdom.

Source: OECD estimates based on Orbis.

The mark-up indicator presented here comes from firm-level data (Orbis Database). Firm-level mark-ups have been estimated as proposed in the work of De Loecker and Warzynski (2012^[59]). In this framework, the mark-up is derived from the first-order condition of the firm's profit maximisation problem with respect to a flexible input – intermediate inputs in this case – and corresponds to the ratio between the elasticity of output with respect to the

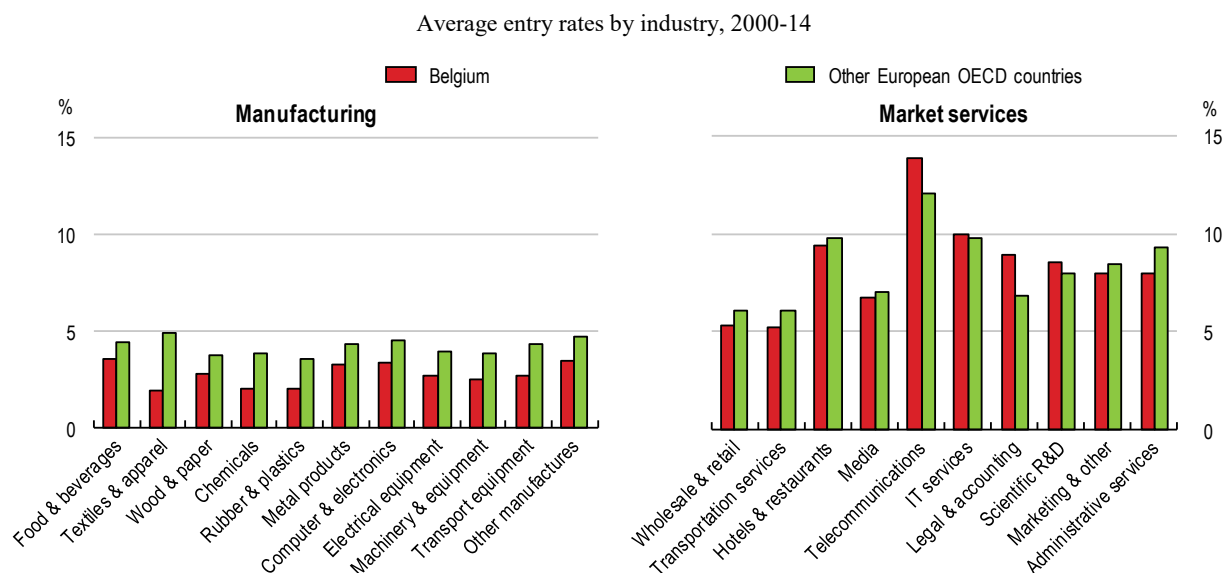
⁶⁹ De Loecker, Fuss and Van Biesebroeck (2018^[66]) find that mark-ups in Belgium remained relatively stable over the period 2000-14.

flexible input (i.e. the percentage increase in output when the variable input increases by 1%) and the cost of the variable input as a share of the firm's revenue. The estimation of the elasticity of output with respect to the flexible input requires estimating a production function: in this case, a Cobb-Douglas production function based on gross output and three inputs (labour, capital, and intermediates) has been used.

Indicator 2: Entry rates

Entry is relatively low in most industries in Belgium (Figure 2.21). In all manufacturing industries, entry rates were lower in Belgium than in other countries on average over the period 2000-14. In service industries, entry was generally lower in Belgium, except in “Telecommunications”, “Legal & accounting activities”, and “Scientific research and development”.

Figure 2.21. Entry is relatively low in most industries

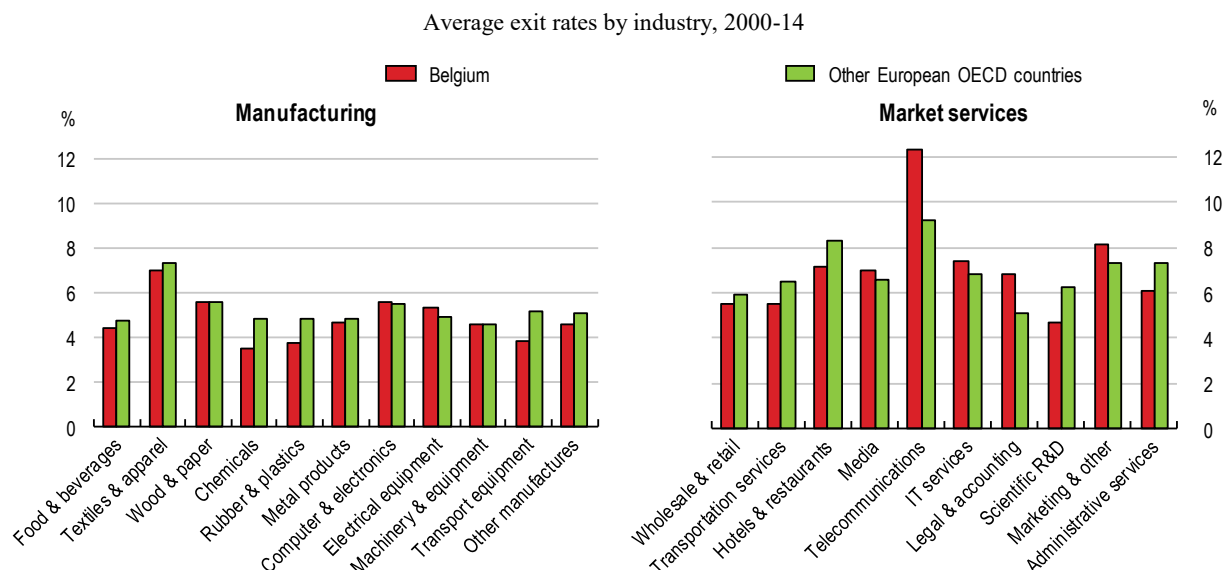


Note: This figure reports the average entry rate by STAN A38 industries over the period 2000-14. Other European OECD countries are Austria, Finland, France, Hungary, Italy, the Netherlands, Norway, Portugal, Spain and Sweden. Owing to methodological differences, figures may deviate from officially published national statistics.

Source: DynEmp3 Database, February 2019.

Indicator 3: Exit rates

Exit is relatively low in many industries in Belgium (Figure 2.22). In all manufacturing industries, entry rates were lower in Belgium than in benchmark countries on average over the period 2000-14, except in “Computer & Electronics” and “Electrical Equipment”. In service industries, the picture is less clear-cut. The relatively high exit rates in “Telecommunications”, “Legal & accounting activities” compensated the relatively high entry rates in these industries. This is not the case for “Scientific research and development”, which had a relatively high entry rate and a relatively low exit rate.

Figure 2.22. Exit is relatively low in many industries

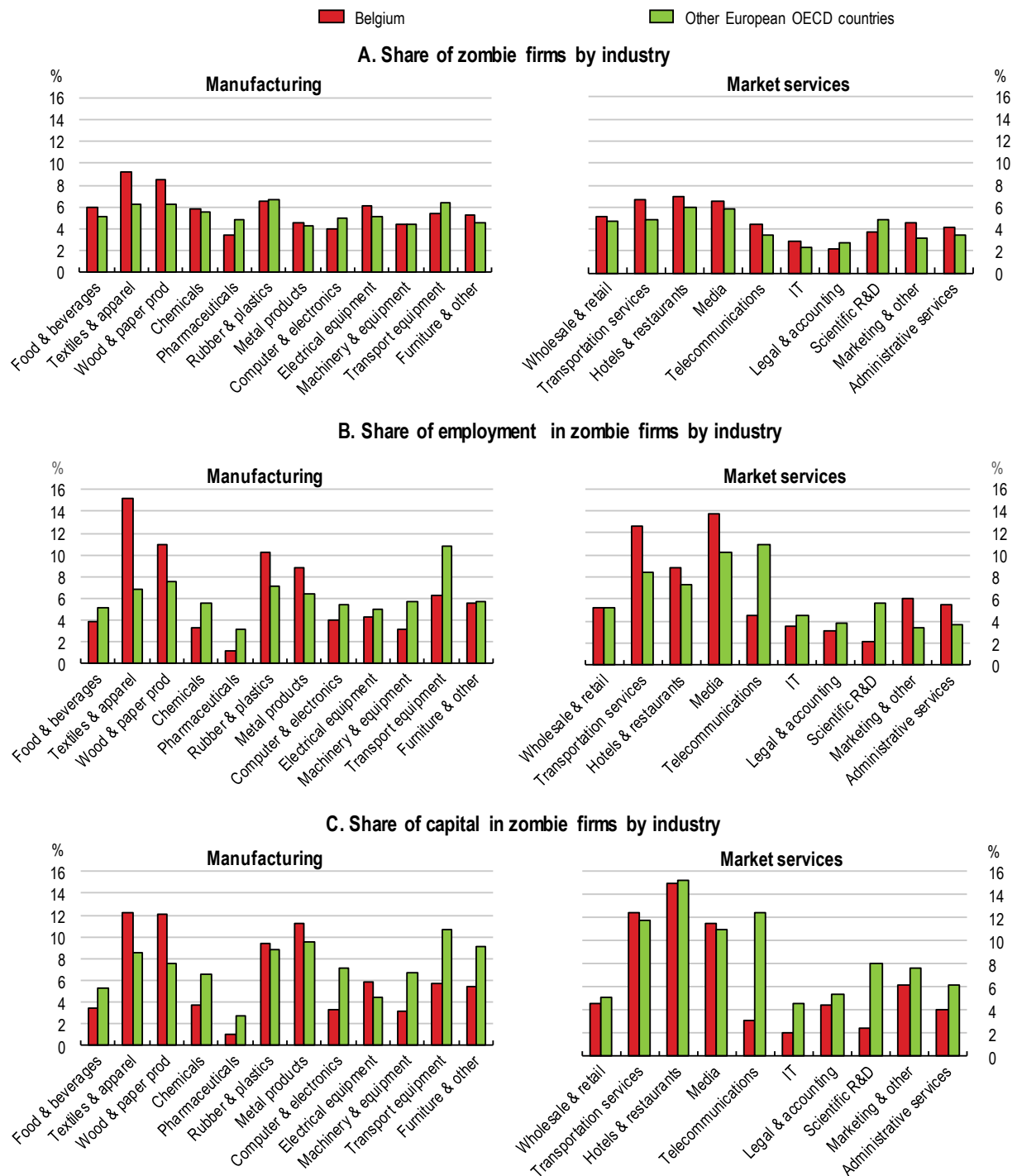
Note: This figure reports the average exit rate by STAN A38 industries over the period 2000-14. Other European OECD countries are Austria, Finland, France, Hungary, Italy, the Netherlands, Norway, Portugal, Spain and Sweden. Owing to methodological differences, figures may deviate from officially published national statistics.

Source: DynEmp3 Database, February 2019.

Indicator 4: Zombie firms

The prevalence of zombie firms in 2015, as defined in Section 2.4, varies across industries and depends on the measures used (Figure 2.23). The share of zombie firms is slightly higher in manufacturing (6%) than in market services (5%), but the share of employment and capital sunk in zombie firms is significantly higher in market services (7% and 10% respectively) than in manufacturing (6% and 5% respectively). The share of zombie firms and of employment and capital sunk in zombie firms in some sectors is much higher in Belgium than in other countries. This is particularly the case for textiles and apparel, wood and paper products, transportation and storage, hotels and restaurants, marketing and administrative services.

Figure 2.23. Zombie firms by industry



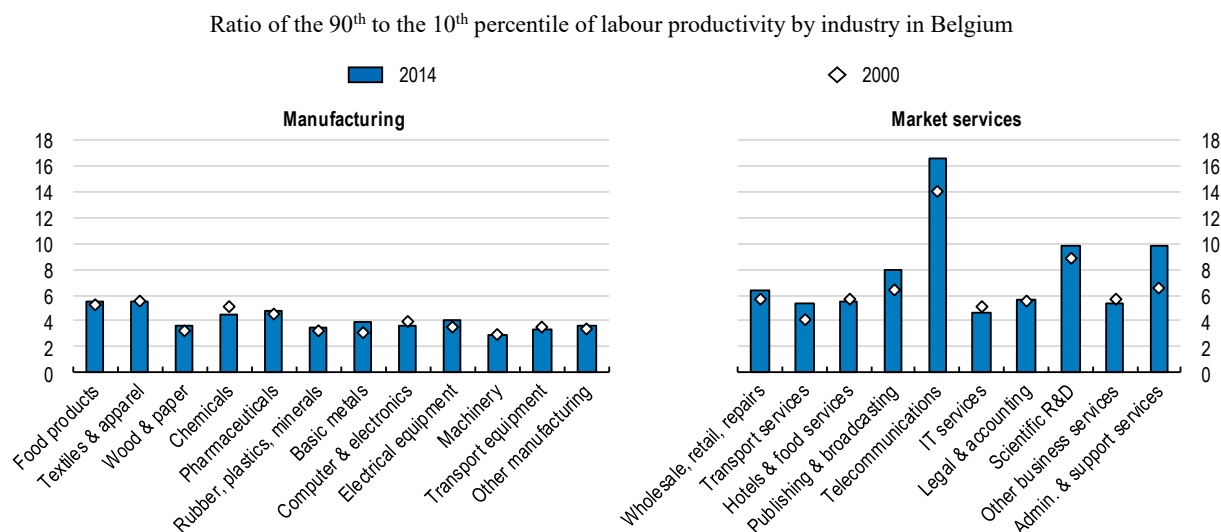
Note: Zombie firms are defined as firms that are at least ten years old and that have had negative profits before tax for three consecutive years. Other European OECD countries are Finland, France, Ireland, Italy, Portugal, Slovenia, Spain, Sweden and the United Kingdom. The data are for 2015.

Source: OECD estimates based on Orbis.

Indicator 5: Productivity dispersion

Productivity dispersion is heterogeneous across industries (Figure 2.24). It is generally larger in services than in manufacturing. For example, in the chemical industry or in the pharmaceutical industry, firms at the 90th percentile of the labour productivity distribution are about four to five times as productive as firms at the 10th percentile, while that ratio is close to seven in trade, and close to ten in administrative and support services.

Figure 2.24. Productivity dispersion



Note: This figure plots the ratio of the 90th to the 10th percentile of the labour productivity distribution across industries in Belgium following the SNA A38 industrial classification.

Source: MultiProd Database, February 2019.

References

- Acemoglu, D., P. Aghion and F. Zilibotti (2006), “Distance to Frontier, Selection, and Economic Growth”, *Journal of the European Economic Association*, Vol. 4/1, pp. 37-74, <http://dx.doi.org/10.1162/jeea.2006.4.1.37>. [14]
- Adalet McGowan, M., D. Andrews and V. Millot (2018), “The walking dead? Zombie firms and productivity performance in OECD countries”, *Economic Policy*, Vol. 33/96, pp. 685-736, <http://dx.doi.org/10.1093/epolic/eiy012>. [32]
- Adalet McGowan, M., D. Andrews and V. Millot (2017), “The Walking Dead? Zombie Firms and Productivity Performance in OECD Countries”, *OECD Economics Department Working Papers*, No. 1372, OECD, <http://dx.doi.org/10.1787/18151973>. [56]
- Alon, T. et al. (2018), “Older and slower: The startup deficit’s lasting effects on aggregate productivity growth”, *Journal of Monetary Economics*, Vol. 93, pp. 68-85, <http://dx.doi.org/10.1016/J.JMONECO.2017.10.004>. [26]
- Andrews, D. and C. Criscuolo (2013), “Knowledge-Based Capital, Innovation and Resource Allocation”, *OECD Economics Department Working Papers*, No. 1046, OECD, Paris, <http://dx.doi.org/10.1787/18151973>. [72]
- Andrews, D., C. Criscuolo and P. Gal (2016), “The Best versus the Rest: The Global Productivity Slowdown, Divergence across Firms and the Role of Public Policy”, *OECD Productivity Working Papers*, No. 5, OECD, Paris, <http://dx.doi.org/10.1787/24139424>. [3]
- Andrews, D. and F. Petroulakis (2017), “Breaking the Shackles: Zombie Firms, Weak Banks and Depressed Restructuring in Europe”, *OECD Economics Department Working Papers*, No. 1433, OECD Publishing, Paris, <https://dx.doi.org/10.1787/0815ce0c-en>. [54]
- Atkin, D., A. Khandelwal and A. Osman (2019), “Measuring Productivity: Lessons from Tailored Surveys and Productivity Benchmarking”, *NBER Working Papers*, No. 25471, National Bureau of Economic Research, Cambridge, MA, <http://dx.doi.org/10.3386/w25471>. [69]
- Bajgar, M. et al. (2019), “Can microdata match macro trends? Comparing MultiProd and STAN”, *Science, Technology and Industry Working Papers*, No. forthcoming, Organisation for Economic Co-operation and Development. [19]
- Banerjee, R. and B. Hofmann (2018), “The rise of zombie firms: causes and consequences”, Vol. BIS Quarterly Review/September 2018, https://www.bis.org/publ/qtrpdf/r_qt1809g.htm. [52]
- Bartelsman, E., P. Gautier and J. De Wind (2016), “Employment protection, technology choice, and worker allocation”, *International Economic Review*, Vol. 57/3, pp. 787-826, <http://dx.doi.org/10.1111/iere.12176>. [8]
- Bartelsman, E., J. Haltiwanger and S. Scarpetta (2013), “Cross-country differences in productivity: The role of allocation and selection”, *American Economic Review*, <http://dx.doi.org/10.1257/aer.103.1.305>. [2]

- Bartelsman, E., J. Haskel and R. Martin (2008), “Distance to Which Frontier? Evidence on Productivity Convergence from International Firm-level Data”, *CEPR Discussion Papers*, No. 7032, Centre for Economic Policy Research, https://cepr.org/active/publications/discussion_papers/dp.php?dpno=7032. [13]
- Bartelsman, E., E. Perotti and S. Scarpetta (2008), “Barriers to Exit, Experimentation and Comparative Advantage”, *Mimeo*, <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.537.1579&rep=rep1&type=pdf>. [7]
- Bassanini, A., L. Nunziata and D. Venn (2009), “Job protection legislation and productivity growth in OECD countries”, *Economic Policy*, Vol. 24/58, pp. 349–402, <https://academic.oup.com/economicpolicy/article-abstract/24/58/349/2926026>. [38]
- Becue, P. (2018), *La faillite : une leçon pour réussir*, <https://www.skribis.be/nl/la-faillite-une-lecon-pour-reussir.html>. [65]
- Berlingieri, G. et al. (2017), “The Multiprod project: A comprehensive overview”, *OECD Science, Technology and Industry Working Papers*, No. 2017/04, Organisation for Economic Co-operation and Development, <https://ideas.repec.org/p/oec/stiaaa/2017-04-en.html>. [20]
- Berlingieri, G., P. Blanchenay and C. Criscuolo (2017), “The Great Divergence(s)”, *OECD Science, Technology and Innovation Policy Papers*, No. 39, Organisation for Economic Co-operation and Development, Paris, https://www.oecd-ilibrary.org/science-and-technology/the-great-divergence-s_953f3853-en. [4]
- Berlingieri, G., S. Calligaris and C. Criscuolo (2018), “The Productivity-Wage Premium: does size still matter in a service economy?”, *AEA Papers and Proceedings*, Vol. 108, pp. 328–33, <https://pubs.aeaweb.org/doi/pdf/10.1257/pandp.20181068>. [30]
- Berlingieri, G. et al. (2018), *Last but not least: laggard firms, technology diffusion and its structural and policy determinants*, OECD Directorate for Science, Technology and Innovation, [https://one.oecd.org/document/DSTI/CIIE\(2018\)11/en/pdf](https://one.oecd.org/document/DSTI/CIIE(2018)11/en/pdf). [15]
- Biatour, B. and C. Kegels (2017), “Growth and Productivity in Belgium”, *Working Papers*, No. 11-17, Federal Planning Bureau, Brussels, <https://ideas.repec.org/p/fpb/wpaper/1711.html>. [29]
- Bijnens, G. and J. Konings (2018), “Declining Business Dynamism”, *Discussion Paper*, No. 12615, Centre for Economic Policy Research, https://cepr.org/active/publications/discussion_papers/dp.php?dpno=12615#. [43]
- Bouis, R. and R. Duval (2011), “Raising Potential Growth After the Crisis: A Quantitative Assessment of the Potential Gains from Various Structural Reforms in the OECD Area and Beyond”, *OECD Economics Department Working Papers*, No. 835, Organisation for Economic Co-operation and Development, https://www.oecd-ilibrary.org/economics/raising-potential-growth-after-the-crisis_5kgk9qj18s8n-en. [49]
- Brown, J., E. Dinlersoz and J. Earle (2016), “Does Higher Productivity Dispersion Imply Greater Misallocation? A Theoretical and Empirical Analysis”, *CES Discussion Papers*, No. 16-42, U.S. Census Bureau, <http://www.census.gov/ces>. [27]

- Caballero, R., T. Hoshi and A. Kashyap (2008), “Zombie Lending and Depressed Restructuring in Japan”, *American Economic Review*, Vol. 98/5, pp. 1943-1977, <http://dx.doi.org/10.1257/aer.98.5.1943>. [55]
- Caballero, R., T. Hoshi and A. Kashyap (2008), “Zombie Lending and Depressed Restructuring in Japan”, *American Economic Review*, Vol. 98/5, pp. 1943-77, <http://dx.doi.org/10.1257/aer.98.5.1943>. [33]
- Calligaris, S., C. Criscuolo and L. Marcolin (2018), “Mark-ups in the digital era”, *OECD Science, Technology and Industry Working Papers*, No. 2018/10, OECD Publishing, Paris, <https://dx.doi.org/10.1787/4efe2d25-en>. [57]
- Calligaris, S. et al. (2018), “The productivity puzzle and misallocation: an Italian perspective”, *Economic Policy*, Vol. 33/96, pp. 635-84, <http://dx.doi.org/10.1093/epolic/eiy014>. [28]
- Calvino, F., C. Criscuolo and C. Menon (2016), “No Country for Young Firms?: Start-up Dynamics and National Policies”, *OECD Science, Technology and Industry Policy Papers*, No. 29, Organisation for Economic Co-operation and Development, <https://ideas.repec.org/p/oec/stiaac/29-en.html>. [17]
- Calvino, F., C. Criscuolo and C. Menon (2015), “Cross-country evidence on start-up dynamics”, *OECD Science, Technology and Industry Working Papers*, No. 2015/6, OECD Publishing, Paris, <https://dx.doi.org/10.1787/5jrxtkb9mxtb-en>. [5]
- Calvino, F., C. Criscuolo and R. Verlhac (2018), *Declining business dynamism: evidence and causes*, OECD, [https://one.oecd.org/document/DSTI/CIE/WPIA\(2018\)6/en/pdf](https://one.oecd.org/document/DSTI/CIE/WPIA(2018)6/en/pdf) (accessed on 12 November 2018). [22]
- Cappellari, L., C. Dell’Arlinga and M. Leonardi (2012), “Temporary Employment, Job Flows and Productivity: A Tale of Two Reforms”, *The Economic Journal*, Vol. 122/562, pp. F188-F215, <https://onlinelibrary.wiley.com/doi/full/10.1111/j.1468-0297.2012.02535.x>. [73]
- Comin, D. and M. Mestieri (2018), “If Technology Has Arrived Everywhere, Why Has Income Diverged?”, *American Economic Journal: Macroeconomics*, Vol. 10/3, pp. 137-178, <http://dx.doi.org/10.1257/mac.20150175>. [16]
- Criscuolo, C., P. Gal and C. Menon (2015), “dynemp: A routine for distributed microdata analysis of business dynamics”, *Stata Journal*, Vol. 15/1, <https://journals.sagepub.com/doi/pdf/10.1177/1536867X1501500115>. [44]
- Criscuolo, C., P. Gal and C. Menon (2014), “The Dynamics of Employment Growth: New Evidence from 18 Countries”, *OECD Science, Technology and Industry Policy Papers*, No. 14, OECD Publishing, Paris, <https://dx.doi.org/10.1787/5jz417hj6hg6-en>. [46]
- De Loecker, J. and J. Eeckhout (2018), “Global Market Power”, *NBER Working Paper*, No. 24768, <http://www.nber.org/papers/w24768.pdf>. [68]
- De Loecker, J., C. Fuss and J. Van Biesebroeck (2018), “Markup and price dynamics: linking micro to macro”, *Working Paper Research*, No. 357, National Bank of Belgium, Brussels, <https://ideas.repec.org/p/nbb/reswpp/201810-357.html>. [66]

- De Loecker, J., C. Fuss and J. Van Biesebroeck (2014), “International competition and firm performance : Evidence from Belgium”, *Working Paper Research*, No. 269, National Bank of Belgium, Brussels, <https://ideas.repec.org/p/nbb/reswpp/201410-269.html>. [70]
- De Loecker, J. and F. Warzynski (2012), *Markups and firm-level export status*, [59]
<http://dx.doi.org/10.1257/aer.102.6.2437>.
- De Mooij, R., S. Hebous and M. Hrdinkova (2018), “Growth-Enhancing Corporate Tax Reform in Belgium”, *Nordic Tax Journal*, Vol. 2018/1, pp. 1-17, <http://dx.doi.org/10.1515/ntaxj-2018-0004>. [36]
- De Mulder, J. and H. Godefroid (2018), “Productivity slowdown: findings and tentative explanations”, Vol. 2018/3, pp. 51-66, [23]
https://www.nbb.be/doc/ts/publications/economicreview/2018/ecoreviv2018_h3.pdf.
- De Mulder, J., H. Godefroid and C. Swartenbroekx (2017), “Up or out ? Portrait of young high-growth firms in Belgium”, *NBB Economic Review*, Vol. 2017/3, pp. 94-113, [35]
https://www.nbb.be/doc/ts/publications/economicreview/2017/ecoreviii2017_h5.pdf.
- De Sloover, F. and Y. Saks (2018), “Does job polarisation imply wage polarisation ?”, *NBB Economic Review*, Vol. 2018/2, [41]
https://www.nbb.be/doc/ts/publications/economicreview/2018/ecoreviii2018_h4.pdf.
- Decker, R. et al. (2018), “Changing Business Dynamism and Productivity: Shocks vs. Responsiveness”, *Finance and Economics Discussion Series*, No. 2018-007, : Board of Governors of the Federal Reserve System, Washington D.C., [34]
<http://dx.doi.org/10.17016/FEDS.2018.007>.
- Decker, R. et al. (2016), “Where has all the skewness gone? The decline in high-growth (young) firms in the U.S.”, *European Economic Review*, Vol. 86, pp. 4-23, [45]
<http://dx.doi.org/10.1016/j.euroecorev.2015.12.013>.
- Decker, R. et al. (2014), “The Role of Entrepreneurship in US Job Creation and Economic Dynamism”, *Journal of Economic Perspectives*, Vol. 28/3, [42]
<http://dx.doi.org/10.1257/jep.28.3.3>.
- Delmez, F. and V. Vandenberghe (2018), “Long Working Hours Make Us Less Productive but Also Less Costly”, *Labour*, Vol. 32/4, pp. 259-87, <http://dx.doi.org/10.1111/labr.12128>. [40]
- Desnoyer-James, I., S. Calligaris and F. Calvino (2019), “DynEmp and MultiProd: Metadata”, [11]
OECD Science, Technology and Innovation Working Papers, No. forthcoming, Organisation for Economic Co-operation and Development.
- Dhyne, E. et al. (2018), “IT and productivity : A firm level analysis”, *Working Paper Research*, No. 346, National Bank of Belgium, <https://www.nbb.be/doc/oc/repec/reswpp/wp346en.pdf>. [24]
- Dhyne, E. and S. Rubínová (2016), “The supplier network of exporters : Connecting the dots”, [71]
Working Papers Research, No. 269.

- Djankov, S. et al. (2002), “The Regulation of Entry”, *Quarterly Journal of Economics*, Vol. 117/1, pp. 1-37, <https://www.jstor.org/stable/pdf/2696481.pdf?refreqid=excelsior%3A168c03d66a98e806e6d5ecff627b42fe>. [9]
- Dumont, M. (2019), “Tax incentives for business R&D in Belgium: third evaluation”, *Working Papers*, No. 4-19, Federal Planning Bureau, <http://www.plan.be>. [37]
- Dumont, M. and C. Kegels (2016), “Young Firms and Industry Dynamics in Belgium”, No. 6-16, Federal Planning Bureau, <https://biblio.ugent.be/publication/8507280/file/8507281>. [31]
- Foster, L., J. Haltiwanger and C. Syverson (2008), “Reallocation, Firm Turnover, and Efficiency: Selection on Productivity or Profitability?”, *American Economic Review*, Vol. 98/1, pp. 394-425, <http://dx.doi.org/10.1257/aer.98.1.394>. [67]
- FPS Economy (2017), *Market Functioning in Belgium : Horizontal Screening of the Sectors*, Institute of National Accounts, Brussels, <https://economie.fgov.be/en/publication/market-functioning-belgium>. [58]
- Gal, P. (2013), “Measuring Total Factor Productivity at the Firm Level using OECD-ORBIS”, *OECD Economics Department Working Papers*, No. 1049, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5k46dsb25ls6-en>. [60]
- Geurts, K. and J. Van Biesebroeck (2016), “Firm creation and post-entry dynamics of de novo entrants”, *International Journal of Industrial Organization*, Vol. 49/3, pp. 59-104, <http://dx.doi.org/10.1016/j.ijindorg.2016.08.002>. [64]
- Griffith, R., S. Redding and J. Van Reenen (2004), “Mapping the Two Faces of R&D: Productivity Growth in a Panel of OECD Industries”, *Review of Economics and Statistics*, Vol. 86/4, pp. 883-895, <http://dx.doi.org/10.1162/0034653043125194>. [12]
- Hallak, I., P. Harasztosi and S. Schich (2018), *Fear the Walking Dead? Incidence and Effects of Zombie Firms in Europe*, European Commission Joint Research Centre Technical Reports, <http://dx.doi.org/10.2760/314636>. [53]
- Haltiwanger, J., R. Jarmin and J. Miranda (2013), “Who Creates Jobs? Small versus Large versus Young”, *Review of Economics and Statistics*, Vol. 95/2, pp. 347-61, http://dx.doi.org/10.1162/REST_a_00288. [47]
- Hirsch, B. and S. Mueller (2012), “The Productivity Effect of Temporary Agency Work: Evidence from German Panel Data”, *The Economic Journal*, Vol. 122/562, pp. F216-F235, <https://onlinelibrary.wiley.com/doi/full/10.1111/j.1468-0297.2012.02536.x>. [74]
- Hsieh, C. and P. Klenow (2009), “Misallocation and Manufacturing TFP in China and India”, *Quarterly Journal of Economics*, Vol. 124/4, pp. 1403-48, <https://www.jstor.org/stable/pdf/40506263.pdf?refreqid=excelsior%3Ae0aa25b8c2359d64bf2b5e77ed269a60>. [62]

- Ingelbrecht, M., C. Kegels and D. Verwerft (2018), *Economic impact of professional services reform in Belgium*, Federal Planning Bureau, https://www.plan.be/admin/uploaded/201807050841450.WP_1809_11737.pdf. [50]
- Klapper, L., L. Laeven and R. Rajan (2006), “Entry regulation as a barrier to entrepreneurship”, *Journal of Financial Economics*, Vol. 82/3, pp. 591-629, <http://dx.doi.org/10.1016/J.JFINECO.2005.09.006>. [10]
- McGowan, M. and D. Andrews (2015), “Labour market mismatch and labour productivity: evidence from PIAAC data”, *Economics Department Working Papers*, No. 1209, Organisation for Economic Co-operation and Development, <https://doi.org/10.1787/18151973>. [6]
- Melitz, M. and S. Polanec (2015), “Dynamic Olley-Pakes productivity decomposition with entry and exit”, *RAND Journal of Economics*, Vol. 46/2, <http://dx.doi.org/10.1111/1756-2171.12088>. [61]
- NBB (2018), *Report 2018*, National Bank of Belgium, Brussels, https://www.nbb.be/doc/ts/publications/nbbreport/2018/fr/t1/rapport2018_complete.pdf. [25]
- NBB (2017), *NBB Report 2017*, https://www.nbb.be/doc/ts/publications/nbbreport/2017/en/t1/report2017_complete.pdf. [51]
- OECD (2017), *OECD Economic Surveys: Belgium 2017*, OECD Publishing, Paris, https://dx.doi.org/10.1787/eco_surveys-bel-2017-en. [21]
- OECD (2015), *The Future of Productivity*, OECD, Paris, <https://www.oecd.org/eco/OECD-2015-The-future-of-productivity-book.pdf>. [18]
- Rajan, R. and L. Zingales (1998), “Financial Dependence and Growth”, *American Economic Review*, Vol. 88/3, pp. 559-86, <https://ideas.repec.org/a/aea/aecrev/v88y1998i3p559-86.html>. [48]
- Saia, A., D. Andrews and S. Albrizio (2015), “Productivity Spillovers from the Global Frontier and Public Policy: Industry-Level Evidence”, *OECD Economics Department Working Papers*, No. 1238, OECD Publishing, Paris, <https://dx.doi.org/10.1787/5js03hkvxhmr-en>. [63]
- Syverson, C. (2004), “Product Substitutability and Productivity Dispersion”, *Review of Economics and Statistics*, <http://dx.doi.org/10.1162/003465304323031094>. [1]
- Van Landuyt, Y., N. Dewaelheyns and C. Van Hulle (2017), “Employment protection legislation and SME performance”, *International Small Business Journal: Researching Entrepreneurship*, Vol. 35/3, pp. 306-26, <http://dx.doi.org/10.1177/0266242616672293>. [39]

Annex 2.A. Data

Researchers and policy analysts increasingly recognise the importance of micro-data for understanding the complexity of economic dynamics and the heterogeneity in economic outcomes across firms. Yet, confidentiality concerns and other administrative issues constitute cumbersome obstacles to the transnational access to official micro-data.

One possibility to circumvent these obstacles is the so-called “distributed micro-data approach”. This decentralized method consists in collecting statistical moments of the distribution of firm characteristics (employment, output, productivity, wages, age, etc.) by a centrally written, but locally executed routine that is flexible and automated enough to run across different micro-data sources in different countries. The advantages of this data collection methodology are manifold. It puts a lower burden on national statistical agencies and limits running costs for such endeavours. Importantly, it also overcomes the confidentiality constraints of directly using national micro-level databases. At the same time, it achieves a high degree of harmonisation and comparability across countries, sectors and over time.

The OECD carries out two distributed micro-data projects of particular interest for this chapter: MultiProd and DynEmp.⁷⁰ The MultiProd project provides a comprehensive picture of productivity patterns across a large set of countries over the past two decades. The DynEmp project presents a complete picture of the dynamics of employment across firms with different characteristics such as size and age, as well as with respect to the entry, exit or incumbent status of firms. These two harmonised databases allow for the comparative analysis of productivity and employment patterns across countries and over time in a comparable fashion.

The MultiProd project typically relies on administrative data that cover the universe of firms with positive employment. When administrative data are not available, it exploits two main other data sources: *i*) production surveys, which report firm-level usage of factors and intermediated inputs, but may only cover a sample of the population of firms; and *ii*) business registers, which typically contain less information, but cover the entire population. The programme then re-weights production surveys based on the population structure from business registers to improve representativeness and comparability across countries. The MultiProd routine collects statistical moments for a set of firm-level performance variables such as labour and multifactor productivity, as well as decompositions of aggregate productivity growth and measures of allocative efficiency. It also gathers statistics of the joint distribution of the productivity variables with age, size, ownership (domestic or foreign) and demographics (entrant, exiting, incumbent) – see Box 2.1 and Berlingieri et al. (2017_[20]).

MultiProd collects data for all sectors in the economy, when available. However, the analysis in this chapter focuses on manufacturing and non-financial market services (referred to as “services” for brevity) to enhance cross-country comparability. Macro-sectors (i.e. manufacturing and non-financial market services, referred to as “sectors” for

⁷⁰ See Berlingieri et al. (2017_[20]) and Criscuolo, Gal and Menon (2015_[44]) for a more detailed presentation of the respective methodologies of the MultiProd and DynEmp projects, as well as Desnoyers-James, Calligaris, and Calvino (2019_[11]) for information on the underlying data at the country level.

brevity) are defined according to a customised seven-sector aggregation of ISIC Rev.4/NACE Rev.2 industries. Detailed industries follow the SNA A38 classification (referred to as “industries” for brevity). The analysis excludes the industries “Coke and refined petroleum” and “Real estate” because of data availability and comparability issues.

The DynEmp project relies on data sources that comprise the universe of firms in a country, typically from business registers, social security records or tax records. It collects different aggregations of annual job flows data at the industry level for different types of firms (young and old, small and large). It also gathers information on the transition dynamics (growing, stable, shrinking) of firms based on their demographic status (entrant, exiting, incumbent) – see Box 2.5 and Criscuolo, Gal and Menon (2015^[44]).

The DynEmp3 database (third wave of the DynEmp project) covers most sectors of the economy, but the analysis is restricted to manufacturing and non-financial market services to enhance cross-country comparability. The industry classification is the same as for MultiProd. The analysis by macro-sector excludes the industries “Coke and refined petroleum” and “Real estate”, and the analysis by A38 industry further excludes “Basic pharmaceuticals” because of data availability and comparability issues.⁷¹

The Belgium-specific part of MultiProd and DynEmp relies on a fruitful collaboration with experts at the Federal Planning Bureau and delegates for the OECD Working Party on Industry Analysis. The micro-data sources for Belgium consist of: *i*) balance sheet data from the Central Balance Sheet Office of the National Bank of Belgium; *ii*) VAT data from the Federal Public Service Economy for turnover, intermediate inputs and investment of SMEs; and *iii*) records of the National Social Security Office for employment data – see Desnoyers-James, Calligaris, and Calvino (2019^[11]).⁷² The analysis focuses on the years 2000-14.⁷³

A set of European OECD countries serves as comparison group. This benchmark comprises the member countries of the European Economic Area, conditional on availability in the datasets, plus Switzerland. For MultiProd, the benchmark includes Austria, Denmark, Finland, France, Germany, Hungary, Ireland, Italy, the Netherlands, Norway, Portugal, Sweden and Switzerland.⁷⁴ However, the policy analysis relies on a smaller set of

⁷¹ The pharmaceutical industry is a major manufacturing sector in Belgium. It accounts for about 10% of manufacturing value added and 18% of the manufacturing capital stock at the end of the period under consideration. Moreover, it is the only manufacturing industry in which labour utilization has increased over the period in Belgium (Biatour and Kegels, 2017^[29]).

⁷² The balance sheet data cover the universe of firms with at least one employee. Yet, the VAT data are necessary to complement the National Bank data. Indeed, SMEs file an abbreviated model of annual accounts at the National Bank, which does not include turnover, intermediate inputs or investment. This information is available for all firms irrespective of their size in the VAT data. Employment refers to the number of employees and does not account for part-time work. In the data, a firm is a legal entity with a unique tax identifier.

⁷³ Although data are available for the year 2015, the analysis excludes it, as a substantial part of entrants is missing from the balance sheet data in this year.

⁷⁴ The MultiProd dataset only covers a limited number of countries after 2012, so the last year for the benchmark is 2012 (see Box 2.1).

countries.⁷⁵ For DynEmp, the benchmark includes Austria, Finland, France, Hungary, Italy, the Netherlands, Norway, Portugal, Spain and Sweden.

⁷⁵ The policy analysis investigates catch-up in the bottom part of the productivity distribution. Therefore, it rests on a subset of countries for which data are representative of this part of the productivity distribution. These countries are Belgium, Denmark, Finland, France, Hungary, Ireland, Italy, Norway, Portugal and Sweden.

Annex 2.B. Methodology

Several measures can proxy the efficiency with which firms turn inputs into outputs. This chapter focuses on labour productivity, measured as the ratio of value added to the number of employees. In other words, labour productivity is the amount of real value added produced by each worker in a year.⁷⁶ When not specified otherwise, “productivity” refers to labour productivity. Labour productivity is generally highly correlated with multifactor productivity – see e.g. Gal (2013_[60]).⁷⁷ Trends in labour productivity and multifactor productivity are fairly correlated in Belgium (De Mulder and Godefroid, 2018_[23]).

This study investigates productivity dispersion to capture the heterogeneity across firms within industries. Productivity dispersion can be thought of as a measure of “inequality in corporate performance” (see Box 2.4). It quantifies differences in productivity levels of firms that are located in different parts of the productivity distribution. Productivity analyses typically rely on the 90-10 productivity ratio to measure overall productivity dispersion. The overall productivity dispersion may hide an asymmetry between the top and the bottom of the distribution. An interesting question is whether an increase in productivity dispersion is driven by frontier firms pulling away or by firms at the bottom lagging behind relative to the median firm. To answer this question, this chapter also looks at the productivity dispersion within the top half and within the bottom half of the productivity distribution. These measures are referred to as 90-50 productivity ratio and 50-10 productivity ratio, respectively.

Measuring employment dynamics requires quantifying the creation and destruction of jobs by entering and exiting firms, as well as gross job flows among incumbents. The analysis focuses on firms with at least one employee, and therefore excludes self-employment.⁷⁸ The analysis breaks down employment dynamics measures by firm-level characteristics, including age, size, industry, and demographic status (entrant, exiting, incumbent). It also looks at these breakdowns jointly, e.g. by age and size classes. The breakdowns are referred to as cells – see Calvino, Criscuolo and Verlhac (2018_[22]).

⁷⁶ The firm-level productivity concept in this chapter is a measure of *revenue* productivity, as opposed to *physical* productivity (Foster, Haltiwanger and Syverson, 2008_[67]). One cannot back physical productivity from the data given the absence of firm-level price information. On top of physical productivity, revenue productivity also captures price effects due to factors ranging from differences in product quality to features of the market structure, in particular mark-ups (De Loecker and Eeckhout, 2018_[68]). Although it confounds several forces, revenue productivity is a better measure of overall firm performance since it also captures quality and firm’s capabilities (Atkin, Khandelwal and Osman, 2019_[69]).

⁷⁷ The MultiProd Database includes several productivity measures, including measures of multifactor productivity. When relevant, the analysis complements labour productivity with a multifactor productivity estimate. Multifactor productivity is measured as the residuals of the regression of a production function which corrects for simultaneity bias – for details see Berlingieri et al. (2017_[20]). Labour productivity statistics are typically more stable than multifactor productivity statistics, as multifactor productivity relies on an estimate for the capital stock.

⁷⁸ Removing non-employment businesses maximises cross-country comparability, as information on self-employment is not systematically available across countries. Moreover, changes in the tax treatment of the self-employed worsen comparability by generating spurious entry.

The basic measures of entry and exit dynamics are entry and exit rates. The entry rate is the ratio of entering firms to active firms in any given year; specifically, it is computed as the number of entering firms in a cell over the sum of entering and incumbent firms in that cell. The exit rate is the ratio of exiting firms to active firms in any given year; specifically, it is calculated as the number of exiting firms in a cell over the sum of exiting and incumbent firms (see Box 2.6).

The analysis quantifies gross job flows in order to assess employment dynamics. Gross job creation is the sum of positive employment changes across firms in a given cell from one year to the next. Similarly, gross job destruction is the absolute value of the sum of negative employment changes across firms. The difference between job creation and job destruction from one year to the next is defined as net job creation. The net job creation rate is then computed as net job creation from one year to the next over average employment across these two years. Finally, the job reallocation rate is defined as the ratio of the sum of job creation and job destruction to average employment across the two years (see Box 2.6).⁷⁹

The trends over time presented in this chapter are measured within-industry and hence abstract from the kind of sectoral composition effects that are analysed in Chapter 1. They are typically displayed at the macro-sector level and can be interpreted as the average trend across industries. For example, a positive labour productivity trend in manufacturing means that labour productivity increases on average across manufacturing industries. This approach abstracts from sectoral shifts in employment or value added and concentrates on the micro-drivers of economic performance within industries – see Box 2.2 as well as Berlingieri, Blanchenay and Criscuolo (2017^[4]) and Calvino, Criscuolo and Verlhac (2018^[22]).

⁷⁹ The analysis sometimes restricts the measures of job flows to some specific subgroup of firms, e.g. incumbents.

Chapter 3:

The worker dimension of productivity: The role of wages and skills

A well-performing labour market is important to achieve strong productivity growth. This chapter studies the role of wages and skills for productivity. The centralisation of Belgium's wage-setting system contributes to wage equality and social cohesion. But it also restrains the extent to which high-performing firms can offer higher wages and attract skilled workers. The wage-setting system is thus likely to affect firms' ability to innovate and grow. The evidence shows that wages are more similar across firms with very different productivity levels in Belgium than in other advanced countries. In other advanced countries, high-productivity firms pay higher wages and low-productivity firms pay lower wages, but this is much less the case in Belgium. Moreover, wage differentiation appears to be stronger in those sectors in Belgium where collective bargaining is more decentralised. The analysis shows that when wages in firms are out of line with the productivity of these firms, as is the case in Belgium, employment growth at high-productivity firms and hence overall productivity growth are weaker. The second part of the chapter studies skill imbalances, finding that overall they exhibit similar levels as in other countries. Shortages of workers arise mainly in high-skilled jobs and surpluses in low- and medium-skilled jobs. Without further improvements in skills, automation is likely to exacerbate the problems for workers at the lower end of the skill spectrum.

The state and functioning of the labour market are important for productivity. The previous chapter showed how changes in the job-to-job mobility of workers may have played a role for productivity developments in Belgium. But other features of the labour market can be important as well. These are in particular wage setting and the level of skills. How much a worker earns at the job and her or his potential earnings at another firm may affect her or his incentives to work hard, propose innovations or move to a better-fit job. Similarly, if firms do not find people with the right skills or ineffectively use the skills that their workers have, productivity is not as high as it could be.

A bird's eye view of the Belgian labour market suggests that wages and skills are candidates worthwhile being explored as potential contributing factors to the productivity slowdown. Differences in wages among workers are small in international comparison, which has the benefit of low inequality, but may come at the cost of reduced incentives and dynamism. News frequently report about the challenges companies face to recruit high-skilled workers, while public employment services express difficulty at finding jobs for the lower-skilled due to a lack of job offers. The first section of this chapter focuses on the role of wages for productivity and the second on the role of skills.

The collective wage bargaining system in Belgium is characterised by a high degree of both wage co-ordination across sectors and wage centralisation across firms (OECD, 2017^[1]). While both institutional features can bring advantages, they may at the same time impede achieving higher productivity growth. This chapter finds that in Belgium, compared with other countries, wage differences across sectors reflect well productivity differences between sectors. Hence, no evidence is detected that wage co-ordination poses problems in terms of productivity. But wage differences across firms that are in the same sector reflect much less well productivity differences between these firms. The analysis shows that, if wages in all firms are similar (rather than higher in highly productive than less productive firms), labour reallocation to high-productivity firms is weaker. Thus, Belgium stands out with unusually strong sector-level centralisation of wage negotiations and unusually low wage flexibility at the level of the individual firm. Insofar as the two are connected, which seems plausible, the results suggest that wage centralisation comes at the expense of lower wage flexibility, lower reallocation of workers to high-productivity firms and hence lower productivity growth. This conclusion, which relies on novel micro-data firm-level analyses, is in line with that in OECD (2018^[2]) which uses more aggregate sector-level data.¹

In the area of skills, Belgium displays the kind of symptoms one would expect in a high-productivity country. Taken together, shortages for certain types of jobs and surpluses for other types of jobs are around the OECD average, hence not excessively high; otherwise it would be difficult to achieve such high levels of productivity. Nevertheless, differences emerge across skill groups. Suitable workers for high-skilled occupations tend to be in short

¹ The focus of the analysis is on productivity growth, rather than the level of productivity, as this is where Belgium's performance has been weak (see Chapter 1). It is possible that, over a limited time horizon, high wage costs for all firms make it more difficult for less productive firms to stay in the market, forcing them to exit and lifting the level of productivity. However, a wage policy of this kind comes with a number of drawbacks: it does not allow firms to recover from a temporary period of economic difficulty (by lowering the wage bill), makes it more difficult for new firms to enter the market (by requiring them to pay high wages) and prevents high-productivity firms from expanding (by not allowing wages to exceed the wage norm). It thus goes against some of the typical channels of strong productivity growth. These factors appear relevant in Belgium where, for example, the share of "zombie firms", i.e. financially distressed firms, is high (see Chapter 2) and firm entry rates are very low and declining (see the overview chapter).

supply, while demand for workers in low- and medium-skilled occupations is relatively weak. With no change to the skill composition of the workforce, these imbalances are likely to intensify, as increased automation through robotics and artificial intelligence is projected to raise the demand for skilled and reduce the demand for less skilled labour.

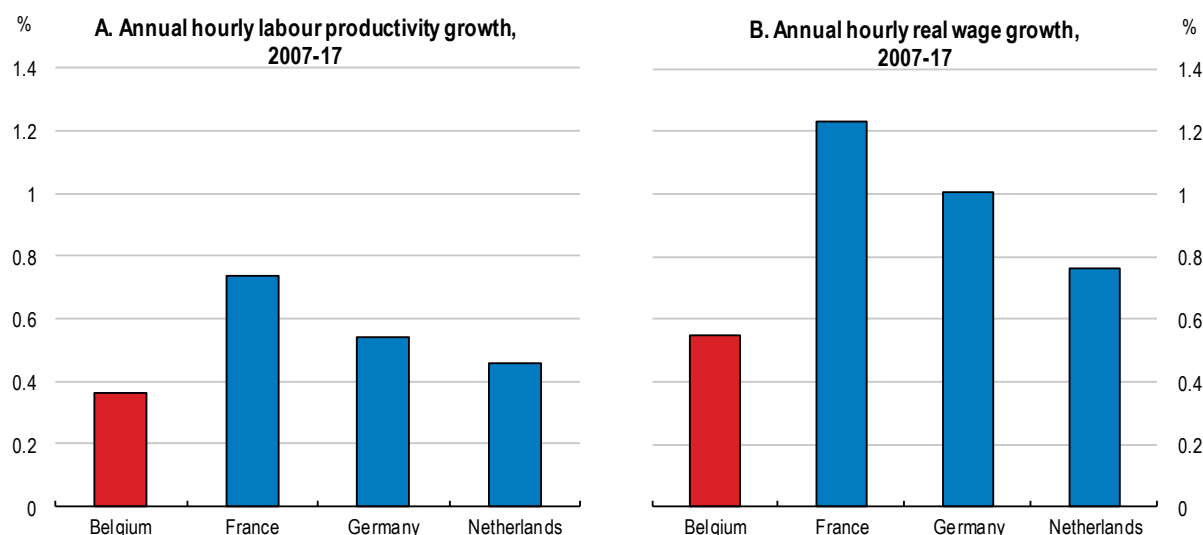
3.1. Wages and productivity

Why productivity matters for wages and wages matter for productivity

Productivity gains matter for wages, since over long horizons wage growth tends to follow productivity growth. Well-being generally improves with productivity: workers can expect higher wages and benefit recipients, including retirees, higher incomes. That said, wages do not follow productivity one to one. Since 1995, in two-thirds of OECD countries wages have grown less than productivity, in one-third they have grown faster. In Belgium, wages have grown somewhat less than productivity between 1995 and 2007, a reverse pattern to the one seen during the period 2007-17. Those countries that have had faster productivity growth have also had faster wage growth (OECD, 2018^[3]).

Productivity is thus an essential ingredient to attain higher wages, living standards and well-being. In an open economy, growing productivity is also important so that higher wages do not undermine external competitiveness relative to trading partners. Over the past decade, hourly labour productivity growth in Belgium was below that in France, Germany and the Netherlands, its main trading partners (Figure 1, Panel A). Even though real wages have only grown by ½ per cent per year (Figure 1, Panel B), competitiveness has not improved much since the weak wage growth has to some extent been “eroded” by weak productivity growth. Put differently, weak wage growth ensured that even weaker productivity growth did not result in a deterioration in external competitiveness.

Figure 3.1. Productivity growth and wage growth have both been low in Belgium



Note: Wages are measured as compensation and thus include employers’ and employees’ social contributions. Both productivity and compensation are deflated by the GDP deflator. The wage growth numbers exclude the self-employed and assume that average hours worked are the same for the employed and self-employed. Wage subsidies are not accounted for.

Source: OECD estimates based on OECD Annual National Accounts Database and OECD Productivity Statistics Database.

On the basis of this analysis, Belgium's collective bargaining system has over the last ten years delivered on one of its central objectives, to preserve or regain competitiveness relative to the main neighbouring countries, after losses in the late 1990s and early 2000s. Several initiatives of the Michel Government contributed to keep wage growth down: the reform of the Law of 1996 on the Safeguarding of Competitiveness, the non-application of the wage indexation mechanism and the "tax shift" operation.

A decline in international competitiveness, brought about by weak productivity growth and comparatively high wage growth, may hamper productivity as exporting firms miss out on opportunities to increase scale and acquire knowledge through trading relationships (Haugh et al., 2016^[4]). This does not seem to have been the case over the recent past. Nevertheless, in the current environment of weak productivity growth in Belgium it remains a potential issue, also as the wage-setting system accounts for price and wage, but not productivity developments in neighbouring countries (beyond the effect that productivity in the other countries may have on their wages).

Wages affect productivity not only by improving or reducing international competitiveness. Potentially even more importantly, wages can also influence productivity through the various wage levels that are set in different sectors and firms. In particular, a centralised wage-setting system of the kind that Belgium has, which tends to compress wage differences between firms and workers, may make it more difficult for high-performing companies to offer higher wages, attract skilled workers, innovate and expand. A large body of literature has investigated the relationship between wages and productivity at the aggregate level and its implications for international competitiveness. However, much less is known about the relationship between wages and productivity at the firm level. For evidence based on data pooled across countries in the MultiProd Database that Chapter 2 uses, see Berlingieri, Blanchenay and Criscuolo (2017^[5]) and Berlingieri, Calligaris and Criscuolo (2018^[6]).

Conceptually, a greater flexibility of firms to set wages may increase productivity growth through two mechanisms: first, higher within-firm productivity growth because employees have stronger incentives to work hard and innovate; and second, productivity-enhancing reallocation of workers to more productive firms. In the data, the degree of wage flexibility is not directly observable. The empirical analysis will therefore examine the extent to which high-productivity firms and sectors pay higher wages than low-productivity firms and sectors. It will then investigate whether stronger wage-productivity alignment is linked with a better allocation of workers and higher within-firm productivity growth. It should be kept in mind that, besides wage-setting, other factors (such as the demography of the workforce) and policies (such as job protection) matter for the allocation of workers across firms and sectors, as discussed in the overview chapter.

The analysis in the rest of this section looks at wage-productivity alignments across sectors and firms. The sector-level investigations use publicly available data on 24 private sectors in 28 OECD countries. The firm-level data for private, non-financial sectors in 12 OECD countries are taken from Orbis, the coverage of which varies markedly by country; so only countries with at least 35 000 observations are included.² The MultiProd Database used in

² The sample of countries is almost the same as in Section 2.4 of Chapter 2, which is also based on Orbis. The differences are that Ireland enters the sample of Chapter 2, while Germany, Hungary and Korea enter the sample of this chapter. This is due to different variables being relevant for the analyses in the two chapters. In neither of the two chapters, country composition is an issue for the conclusions, as the main results are presented for each country individually.

Chapter 2 would have ensured better representativeness for Belgium and other countries, but it was not available for this chapter. Given the unavailability of MultiProd, Orbis is the best dataset that could be used for the analysis. Belgian data in Orbis are good, as small firms are also included, while this is less the case for other countries. The firm-level data are not used for the sectoral analysis, given their limitations in terms of country coverage and representativeness.

The figures report estimates from a regression of the log wage on log labour productivity, run separately for each country in the sample. Wages and productivity are defined by hour worked in the sector-level data and by worker in the firm-level data. The regressions include year (with sector-level data) or interacted sector-year fixed effects (with firm-level data). In the sector-level analysis, wages include all payments in cash and in kind by the employer to the employee, excluding employers' social contributions. In the firm-level analysis, wages equal cash labour costs and so include all payments in cash by the employer to the employee, including employers' and employees' social contributions.

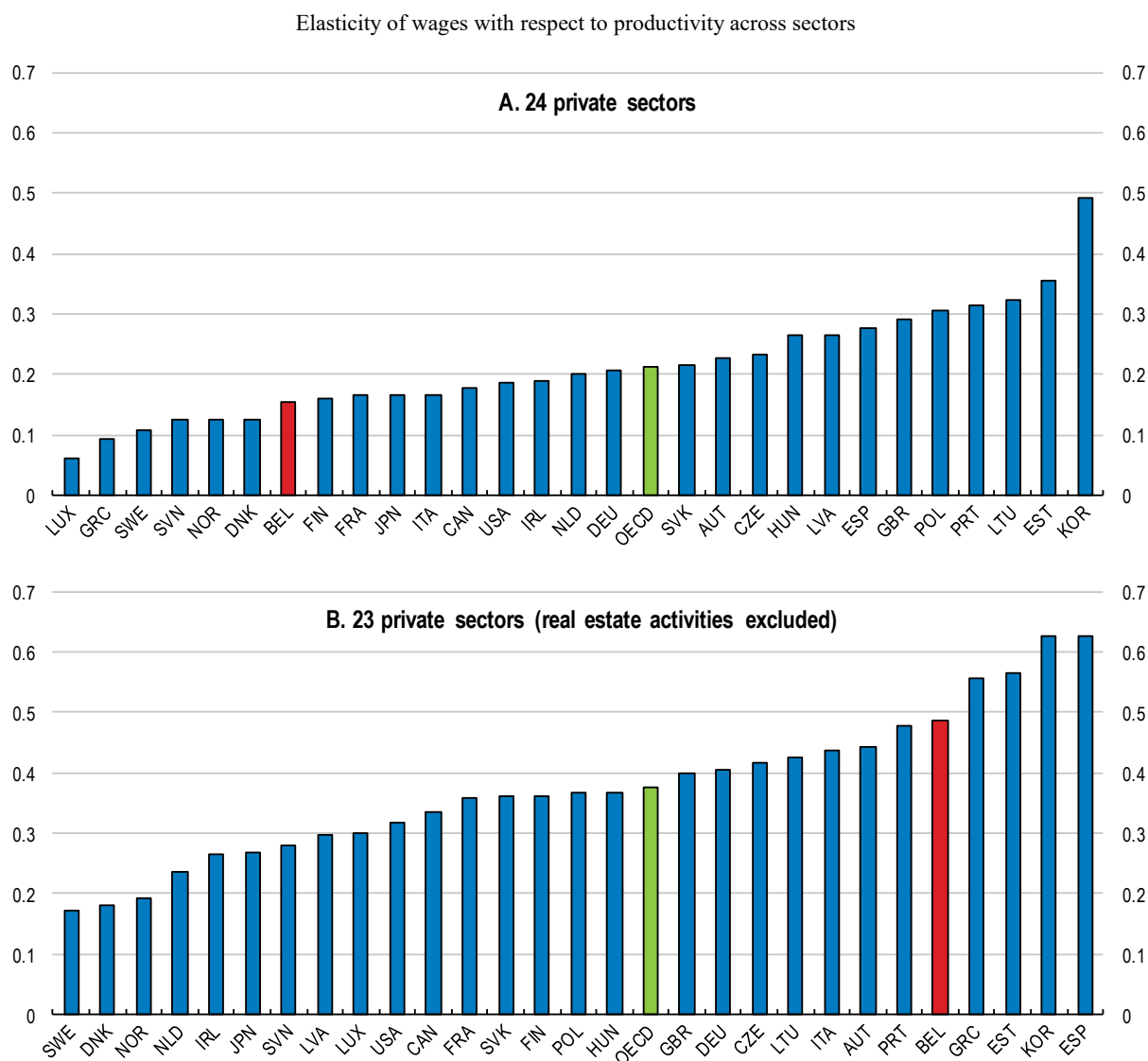
The nature of the two analyses is entirely different. The sector-level analysis looks at how the average wage in a sector corresponds to the average productivity in the sector, when comparing different sectors in the economy. The firm-level analysis looks at how a firm's average wage corresponds to the firm's productivity, when comparing different firms that are all in the same sector. Insofar as collective bargaining institutions play a role for these relationships, national-level wage co-ordination should be mainly relevant for sector-level differences in wages and productivity and sector-level centralisation mainly for firm-level differences.

Wage-productivity alignment: A look at sectors

This subsection examines the correlation between wages and productivity across sectors. It extends earlier investigations in OECD (2018_[2]) by focusing in more depth on Belgium. Sector-level data have the advantage that they cover the same number of units (i.e. sectors) for many countries over a long period of time (since 1980). The results report the elasticity of the average hourly wage with respect to hourly productivity across sectors. This elasticity is expected to be greater than zero, as higher-productivity sectors should pay higher wages. To take an example, an estimate of 0.2 would indicate that wages in a sector which is 10% more productive are 2% higher.

In all countries, high-productivity sectors pay more than low-productivity sectors (Figure 3.2, Panel A). The estimated elasticity lies between 0 and 0.5 everywhere; hence, although wages are higher in high-productivity sectors, the relationship is not one to one. Belgium ranks in the lowest quarter among all countries, with an elasticity of 0.15. With heteroskedasticity-robust standard errors, and bearing in mind that the samples are repeated cross-sections of 24 sectors, the coefficients are for all countries statistically significant at the 1% level, except for Luxembourg for which the estimate is significant at the 10% level.

Real estate activities is the sector that reduces the estimated correlation the most, as wages tend to be disproportionately low compared with productivity in many countries, including Belgium. When the real estate sector is excluded from the analysis, the average elasticity increases from 0.21 to 0.38 (Figure 3.2, Panel B). In Belgium, where the real estate sector is a particularly strong outlier, the elasticity increases to 0.49, placing Belgium in the top quarter among all countries. The estimated coefficients are now statistically significant at the 1% level for all countries.

Figure 3.2. Wages and productivity are well aligned across sectors (excluding real estate)

Note: Results are based on country-by-country OLS regressions of the log hourly wage on log hourly labour productivity across sectors. The regressions include year fixed effects. OECD is the unweighted average of the OECD countries with available data.

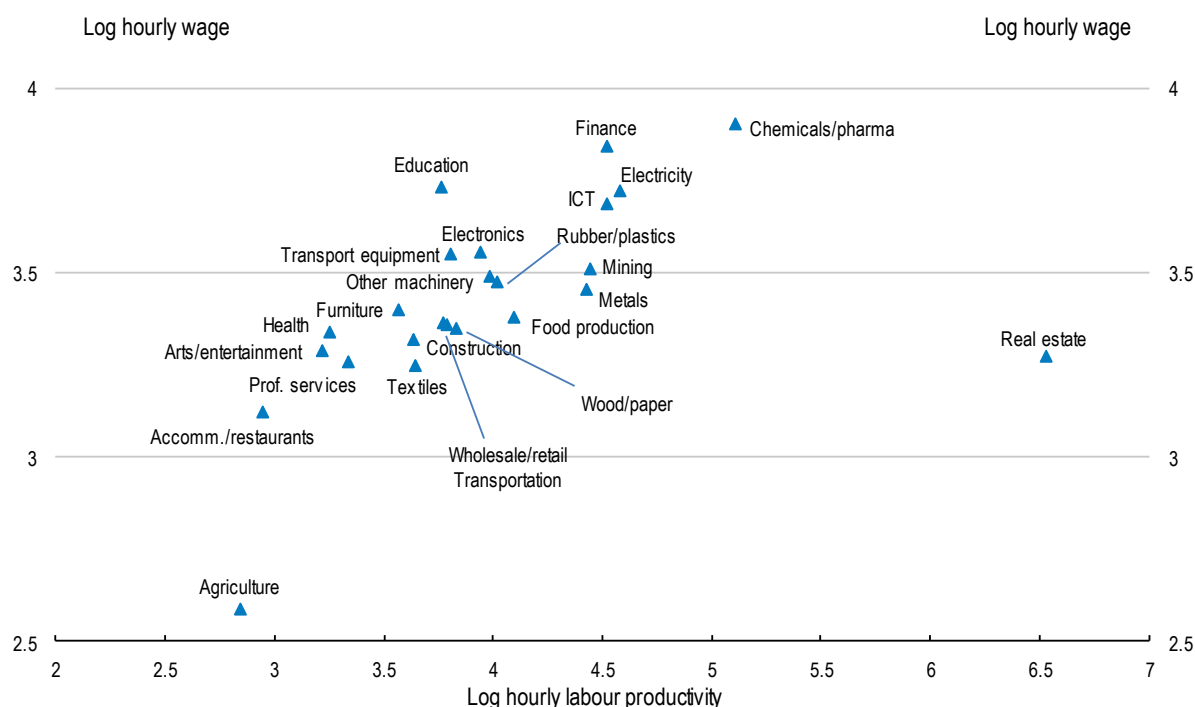
Source: OECD estimates based on OECD Annual National Accounts Database and OECD Productivity Statistics Database, complemented with OECD Structural Analysis (STAN) Database and EU-level analysis of capital, labour, energy, materials and service (EU-KLEMS) inputs data.

About half the sample countries had a high level of wage co-ordination during the sample period, the other half no or low co-ordination. Remarkably, wage co-ordination is high in each of the seven countries where alignment of wages with productivity is the weakest (Sweden, Denmark, Norway, the Netherlands, Ireland, Japan and Slovenia). Hence, across countries wage co-ordination is negatively correlated with cross-sector wage-productivity alignment. However, this certainly does not seem to be the case in Belgium, where sector-to-sector wage differentiation appears to be high.

Overall, the results therefore suggest that wage-productivity alignment across sectors is, compared with other advanced countries, not a particular issue in Belgium. The low wage-productivity correlation is solely due to the real estate sector, a sector that is small and for which measuring value added is arguably difficult. This sector combines the highest productivity level with a below-average wage. Cross-sector wage co-ordination, which has a prominent role in Belgium, may in principle influence wage differences across sectors. However, no evidence is found that this would come at a disproportionate cost in the form of weaker productivity growth. The result is in line with the analysis in OECD (2018^[2]) which did not find adverse effects of co-ordination on productivity.

Low-productivity sectors, such as agriculture as well as accommodation and food services, pay below average, and high-productivity sectors, such as the pharmaceutical, chemical and ICT industries, pay above average (Figure 3.3). The figure illustrates how much the real estate sector is an outlier. Overall, with an elasticity of wages with respect to productivity of less than one, high-productivity sectors in Belgium do not pay as much more as their productivity is higher. In other words, a sector's labour share is negatively associated with its level of productivity, i.e. the higher is a sector's productivity, the lower is its labour share. But an analogous pattern is found for other countries as well when the same analysis is conducted on their data.

Figure 3.3. Wages tend to be higher in more productive sectors in Belgium



Note: The data refer to 2016.

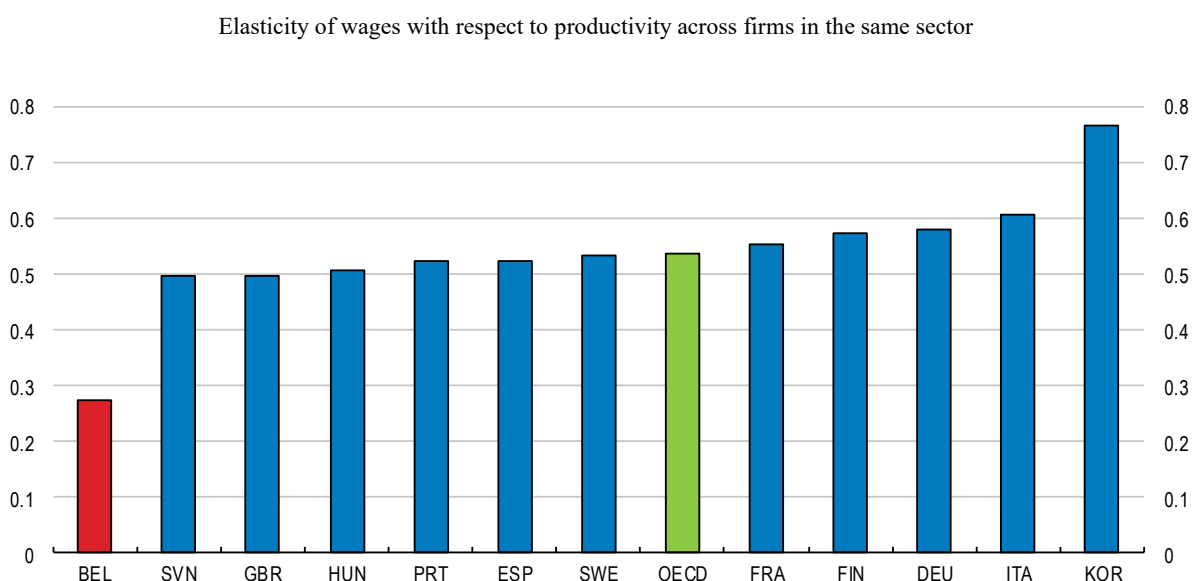
Source: OECD estimates based on OECD Annual National Accounts Database and OECD Productivity Statistics Database.

Wage-productivity alignment: A look at firms

This subsection presents new evidence using firm-level data and examining wage and productivity differences within 60 sectors. In all countries, high-productivity firms pay higher wages than low-productivity firms, but this is much less the case in Belgium than in other countries with available data (Figure 3.4). In Belgium, firms that are 10% more productive pay an average wage that is 2.7% higher. Elsewhere, they pay on average a wage that is 5.4% higher. In this analysis, Belgium (at the lower end) and Korea (at the top end) are the two countries that stand out. With standard errors clustered at the firm level, the coefficients are statistically significant at the 1% level for all countries.³ They are virtually unchanged when age and size of the firm are included as explanatory variables as well, which is to be expected given that the firm's productivity is already controlled for.

While these results do not directly examine the role of collective bargaining, they are indicative that Belgium's high degree of sector-level centralisation of wage negotiations constrains firms' flexibility to set wages. When excluding Belgium and Korea, the degree of centralisation is, however, not correlated with the ranking of countries in terms of wage-productivity correlations. Another consideration is that coverage in the dataset in the other countries is not as representative as in Belgium. However, the wage-productivity alignment is much weaker in Belgium than in all other countries, including those for which coverage is also good.

Figure 3.4. Across firms wages are less aligned with productivity in Belgium than elsewhere



Note: Results are based on country-by-country OLS regressions of the log wage on log labour productivity across firms. The regressions include interacted sector-year fixed effects. OECD is the unweighted average of the OECD countries with available data except Belgium.

Source: OECD estimates based on Orbis.

³ These correlations, which are within-sector estimates, are not comparable with the ones in the last subsection, which are between-sector estimates.

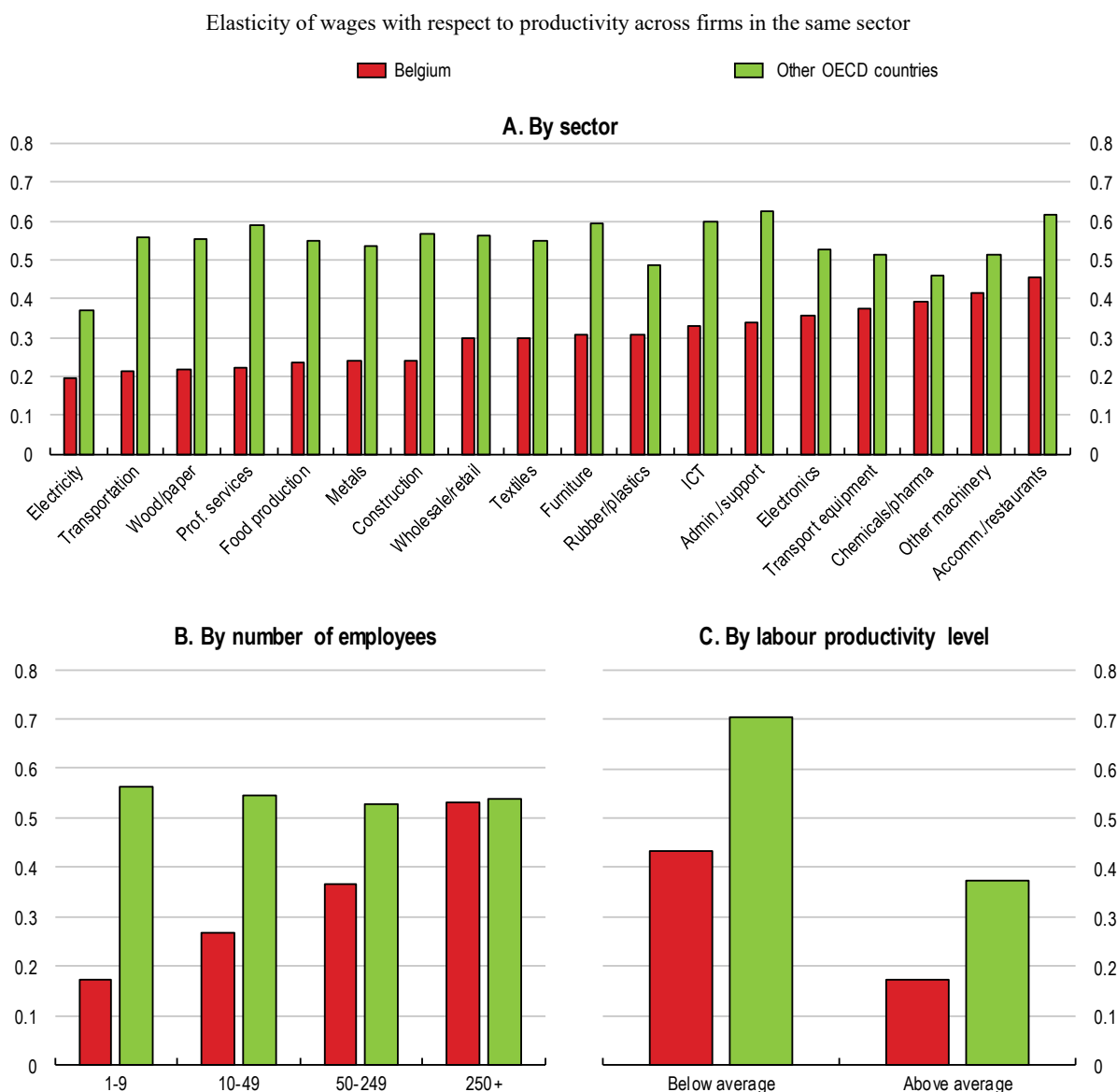
The extent of the wage-productivity misalignment in Belgium is not equally strong in every sector. In some sectors (for example the chemical and pharmaceutical industry), wages and productivity are almost as aligned as in the comparison countries (Figure 3.5, Panel A). But in other sectors (including the textile industry) wage flexibility seems particularly low. This sectoral variation in wage flexibility may originate from differences in the content of sectoral agreements. In the chemical sector, collective agreements set merely the level and evolution of the sectoral minimum wages, leaving large freedom for firms to set wages. In the textile industry on the other hand, collective agreements set the level and evolution of effective wages, constraining adjustments at the level of the individual firm. These results echo earlier findings by Rusinek and Rycx (2013^[7]) who show that in Belgium firm-level wages and profits are more tightly linked in “decentralised sectors”. Heterogeneity between sectors is overall much greater in Belgium than in the OECD on average, where wages and productivity are similarly aligned in different sectors.

Breaking the aggregate estimate down by four size classes of firms shows that the lower estimate for Belgium is solely due to small and medium-sized firms (Figure 3.5, Panel B). For large firms with at least 250 employees, wages and productivity are as aligned as in the other countries. Again, this may be due to sectoral differences in centralisation, which in Belgium is stronger in sectors predominantly characterised by small and medium-sized enterprises and weaker in sectors with large firms. The final breakdown (Figure 3.5, Panel C) distinguishes between firms with productivity above and firms below the sector average. In every country in the sample, wages are more aligned with productivity in firms with below-average productivity. This is also the case in Belgium, where wages at high-productivity firms seem to be particularly non-responsive to productivity differences.

Taken together, the results suggest that, in Belgium compared with other countries, high-productivity firms pay lower wages than what their high level of productivity would justify and low-productivity firms pay higher wages than what they can normally afford. Higher wages would be one way for higher-productivity firms to attract workers, increase their market share and grow. At the other end, lower wages would make it easier for lower-productivity firms to overcome a temporary blip in demand and reduce their risk of being turned into a “zombie firm”. Productive firms appear to look for ways around the system, to some extent successfully, by rewarding workers with free company cars and other fringe benefits that are not specified in collective bargaining agreements.

The analysis thus far has documented that wage-productivity alignments across firms are much lower in Belgium than in other countries. As mentioned, theoretically, such misalignments may be associated with a less optimal allocation of workers across firms and lower within-firm productivity growth. On the upside, they may help ensure a more equal distribution of wages.

Data for Belgium are used to examine these hypotheses empirically. For each sector in each year, the elasticity of wages with respect to productivity across firms is calculated. Based on regressions, these sector-year wage-productivity correlations are then studied for their links with productivity and wage dispersion in the sector, as well as the employment growth at firms and within-firm productivity growth. The empirical approach for estimating the links with employment reallocation and firm productivity growth follows recent OECD work (Bailin Rivaes et al., 2019^[8]), which itself draws on Foster, Grim and Haltiwanger (2016^[9]) and Decker et al. (2017^[10]).

Figure 3.5. Breaking down the wage-productivity correlations along several dimensions

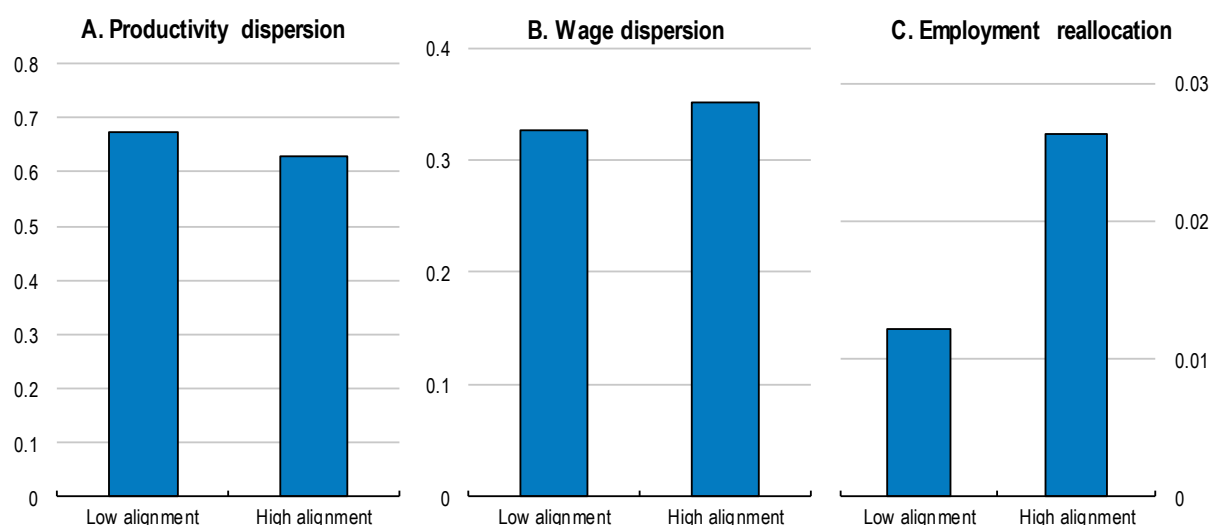
Note: Results are based on sector-by-sector, size class-by-size class and productivity level-by-productivity level OLS regressions (country-by-country) of the log wage on log labour productivity across firms. The regressions include interacted sector-year fixed effects. OECD is the unweighted average of the OECD countries with available data except Belgium (see Figure 3.4).

Source: OECD estimates based on Orbis.

The analysis suggests that, at times when in a sector wages correspond less to productivity, productivity dispersion across firms is higher (Figure 3.6, Panel A), but wage dispersion across firms is lower (Figure 3.6, Panel B). The finding that wage dispersion is lower when firms' wages are less aligned with their productivity is intuitive: the sector-level centralisation of Belgium's collective bargaining system is likely to contribute to the compression of wages across firms in the same sector, without much regard to their varying levels of productivity. When sector-level centralisation works, it tends to equalise wages between firms in the sector.

The result for productivity dispersion suggests that the smaller wage dispersion may come at a productivity cost. A greater dispersion of labour productivity across firms can be a sign of a greater dispersion of marginal products across firms and thus a greater misallocation of labour inputs. Further analysis that examines this in more detail shows that employment growth is stronger in high-productivity firms, but that this productivity-enhancing labour reallocation process is much higher in periods when wages are more closely aligned with productivity (Figure 3.6, Panel C). Estimates are statistically significant at the 1% level, when standard errors are clustered at the sector-year level. Regressions that use within-firm productivity growth as the outcome yield, by contrast, statistically insignificant estimates.

Figure 3.6. Wage-productivity misalignment in Belgium is associated with more productivity dispersion, lower wage dispersion and less productivity-enhancing labour reallocation



Note: Panels A and B: Results are based on OLS regressions of the within-sector-year standard deviation of log labour productivity (Panel A) or the log wage (Panel B) on the within-sector-year elasticity of wages with respect to productivity. The regressions include sector and year fixed effects. Panel C: Results are based on OLS regressions of firms' employment growth on the firm's log labour productivity in the previous year, alone and interacted with the within-sector-year elasticity of wages with respect to productivity. The displayed empirical association is for firms that in the previous year had a 10% higher productivity. The regressions include interacted sector-year fixed effects. In the regressions underlying the three panels, estimates for the within-sector-year elasticity of wages with respect to productivity are coded as a 1-0 indicator variable (above and below the sample average) to reduce the influence of extreme values. This is what is referred to as low and high alignment.

Source: OECD estimates based on Orbis.

Two related pieces of evidence support the conclusion that the lack of flexibility at the firm level, which characterises centralised bargaining systems like the one in Belgium, may come at the expense of lower productivity growth. Based on data for seven countries (not including Belgium), OECD (2018^[2]) finds that centralised bargaining systems tend to be associated with lower productivity growth if coverage of agreements is high. Garnero, Rycx and Terraz (2019^[11]) show that hourly productivity is higher in firms in Belgium that have a firm-level agreement (complementing the sector-level agreement). Their results are based on the system generalised method of moments (GMM) to help identify causality from decentralisation to productivity; nevertheless, approach and data do not allow establishing causality beyond doubt.

To summarise the main insights in this section: wages in Belgium are much more similar for different firms in the same sector than in other countries with available data. Belgium's high degree of sector-level centralisation in wage bargaining is likely to be a contributing factor. However, this upside of centralised wage-setting may come with the downside of a less optimal allocation of workers. Sector-level centralisation constrains the scope for firms to set wages and is therefore plausibly linked with a stronger misalignment of wages and productivity across firms; in particular, misalignment appears to be stronger in sectors in which wage negotiations are more centralised. The evidence suggests that such wage-productivity misalignment weakens employment growth of high-productivity firms and hence aggregate productivity growth. The challenge from a policy perspective is to promote more dynamism of wages and employment across firms, while preserving the benefits that the collective bargaining model in Belgium brings.

Skill imbalances in the economy may be affected as well to the extent that the wage-setting system makes it difficult for high-productivity firms to attract skilled workers. The chapter next examines the links between skills and productivity in Belgium more generally.

3.2. Skills and productivity

Skill imbalances – that is, shortages, surpluses and skill mismatch in the workplace – can have detrimental effects on the productivity of workers and firms for a variety of reasons. They are likely to slow the adoption of new technologies (Forth and Mason, 2006^[12]), delay production (Haskel and Martin, 1993^[13]), increase labour market turnover (Edin and Gustavsson, 2008^[14]) and forego the output that could be obtained through a better use of skills (OECD, 2016^[15]). Skill imbalances can therefore have a sizeable negative impact on productivity growth.

Belgium, like other advanced economies, is facing a number of megatrends that have made it more challenging for policy makers to support skill match and use at work. Globalisation and demographic change are reshaping the demand for skills, while other developments in the labour market, including increasing labour market participation and greater migration flows, also change the supply of skills. Technological innovations and the transformation to a more digitally-based economy make it more necessary than before for workers to adapt to changing skill demands by firms.

This section takes a somewhat broader view than skill imbalances. The analysis starts from the labour supply and demand for occupations and hence looks at occupational imbalances. As occupations require certain skills, the concepts of occupational and skill imbalances are closely intertwined. The last part of the section investigates the relationship between skill use at work and productivity. It builds on recent analysis carried out in the context of the *OECD Skills Strategy* for Flanders which, among other things, provides precise indications on how to strengthen the governance and financing of the adult learning system (OECD, 2019^[16]).

Imbalances between the labour supply and demand for occupations

Some degree of occupational imbalances is inevitable as a country's supply of workers can adjust to labour market demands only with some lag. However, persistent imbalances and large shortages or surpluses may be a symptom of labour markets not functioning optimally and of the inability of a country to counteract these developments with adequate policies.

The OECD has developed a new approach to measure imbalances for occupations (OECD Skills for Jobs Database⁴). Shortages arise when firms struggle to find workers with the right skills. By contrast, surpluses emerge when workers face low demand for their skills in the labour market. Shortages in certain occupations (excess demand) and surpluses in others (excess supply) can appear simultaneously. The approach to quantify the extent of imbalances relies on information on wages, employment, unemployment, hours worked and under-qualification and is therefore more objective than previous measures based on employer surveys. Box 3.1 provides a more detailed description of the methodology used to measure labour market imbalances in the database.

Box 3.1. Methodology to measure occupational imbalances (OECD Skills for Jobs Database)

To draw a multidimensional picture of labour market imbalances, the OECD Skills for Jobs Database uses time series of hourly wage growth, employment growth, the unemployment rate, growth of hours worked and the change in under-qualification at the occupation level (two-digit ISCO). These five sub-indicators compare the long-run trend of each occupation with that of the overall national economy. Occupations that are significantly above (for the unemployment rate: below) the economy-wide average long-run path are defined to be in shortage. Surplus is defined analogously. This gives a ranking of occupations (the so-called Occupational Shortage Indicator).

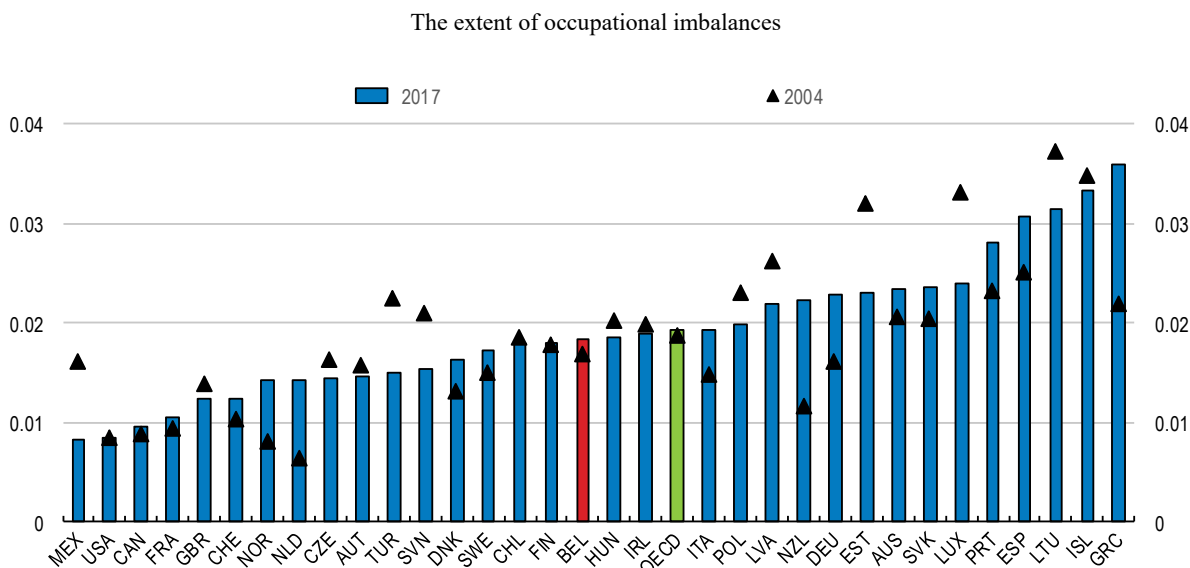
The Occupational Shortage Indicator is then mapped into the underlying knowledge, skill and ability requirements associated with each occupation, using the O*NET taxonomy of the US Bureau of Labour Statistics. The final Skills for Jobs indicators therefore measure the extent to which about 150 knowledge, skill and ability dimensions are in shortage or surplus and so the degree of knowledge, skill and ability mismatch. For further information, see OECD (2017^[17]). This describes, for example, how the Skills for Jobs Database deals with the classification break of occupations in 2011, as well as other methodological issues.

Occupational imbalances in Belgium are similar to the OECD average

The extent of occupational imbalances in Belgium is close to the OECD average (Figure 3.7). Based on this measure, shortages and surpluses are about half as high as in the weakest-performing countries (Greece, Iceland and Lithuania) and about twice as high as in the best-performing countries (Canada, Mexico and the United States).

Since 2004, occupational imbalances in Belgium have increased slightly, while changes have been more marked in some other countries. Occupational shortages and surpluses have increased considerably for example in Greece, the Netherlands, New Zealand and Spain. By contrast, they have fallen in Estonia, Luxembourg, Slovenia and Turkey. Overall in the OECD, imbalances today are at a similar level as in the mid-2000s.

⁴ See www.oecdskillsforjobsdatabase.org.

Figure 3.7. The extent of occupational imbalances is close to the OECD average

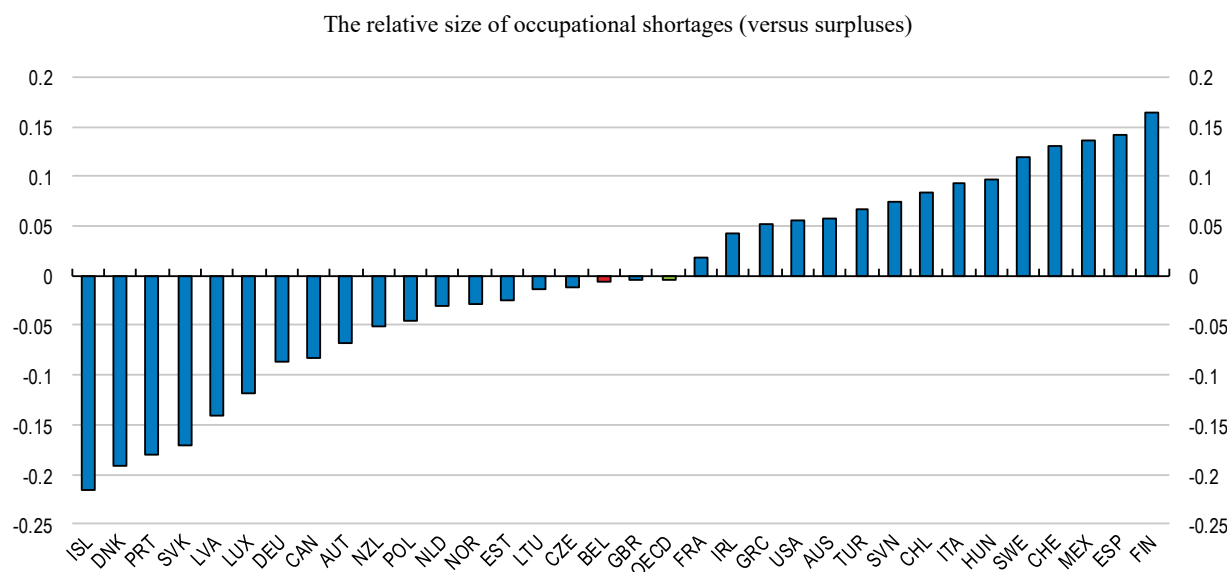
Note: The extent of occupational imbalances is calculated as the average of the standard deviations across occupations for the five sub-indicators in the Occupational Shortage Indicator (i.e. wages, employment, unemployment, hours worked and under-qualification). These five sub-indicators compare the long-run trend of each occupation with that of the overall economy and so consider occupations in shortage for which wages, employment, hours worked and under-qualification have grown more than in the overall economy. A higher value in the figure denotes larger occupational imbalances, because it indicates that more occupations are in shortage or surplus. For further details on the approach, see OECD (2017^[17]). OECD is the unweighted average of the OECD countries with available data. Data refer to 2017 or last available year; for Belgium, the last available year is 2015. The first year is 2004 or closest available year.

Source: OECD estimates based on OECD Skills for Jobs Database.

In Belgium, the extent of occupational shortages and that of surpluses are of similar size (Figure 3.8). Tackling both challenges simultaneously calls for complementary policy approaches. The problem of shortages in certain job categories can be addressed through skill development (i.e. training and upskilling of workers). Occupational surpluses, instead, imply a situation where skill supply exceeds its demand. They may emerge as a result of inadequate career guidance, with too many individuals choosing education paths with weak labour market prospects, or due to technological progress making some jobs increasingly redundant. Hence, improvements to career guidance and increased participation in lifelong learning targeted to skills in high demand are crucial policy levers to ensure that public and private investments in education are better aligned with labour market needs.

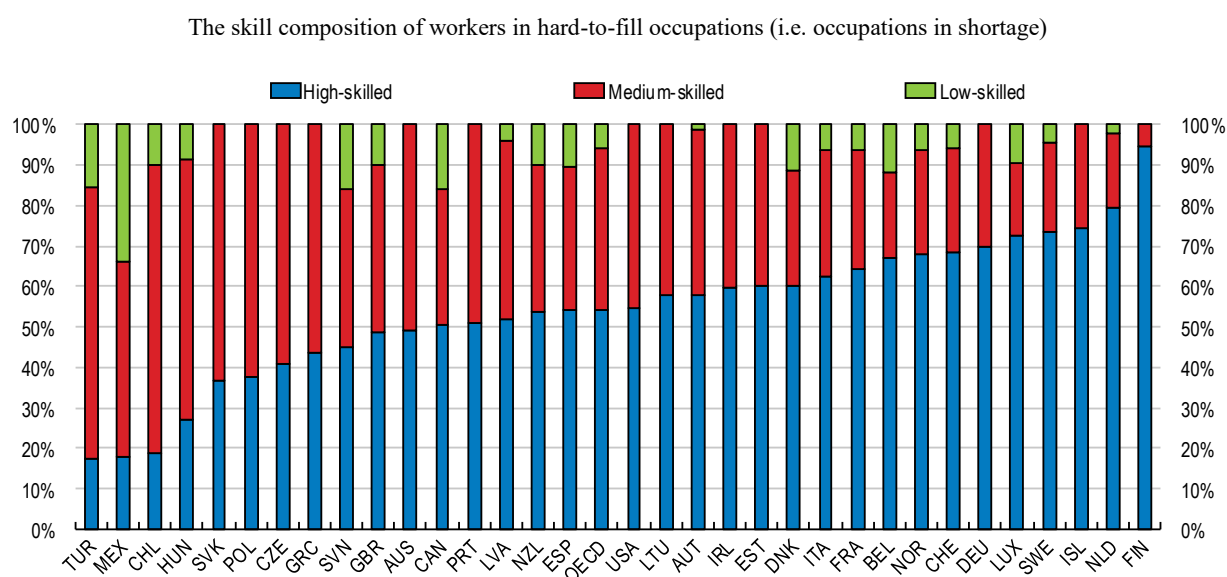
Shortages are concentrated in high-skilled occupations

The skills that are in shortage and high demand vary substantially from country to country. On average in the OECD, the occupations of half of all workers employed in hard-to-fill occupations, or occupations in shortage, are high-skilled occupations (Figure 3.9). They include managerial positions and jobs in high-skilled professions, for example health care, education or ICT. Approximately 4 out of 10 workers in shortage occupations are in the medium-skill tier and 1 out of 10 in the low-skill category.

Figure 3.8. Shortages and surpluses are of equal size

Note: The relative size of occupational shortages (versus surpluses) is calculated as the average occupational shortage minus the average occupational surplus, when weighting each occupation by its employment share. A positive value implies that shortages are more intense than surpluses. OECD is the unweighted average of the OECD countries with available data. Data refer to 2017 or last available year; for Belgium, the last available year is 2015.

Source: OECD estimates based on OECD Skills for Jobs Database.

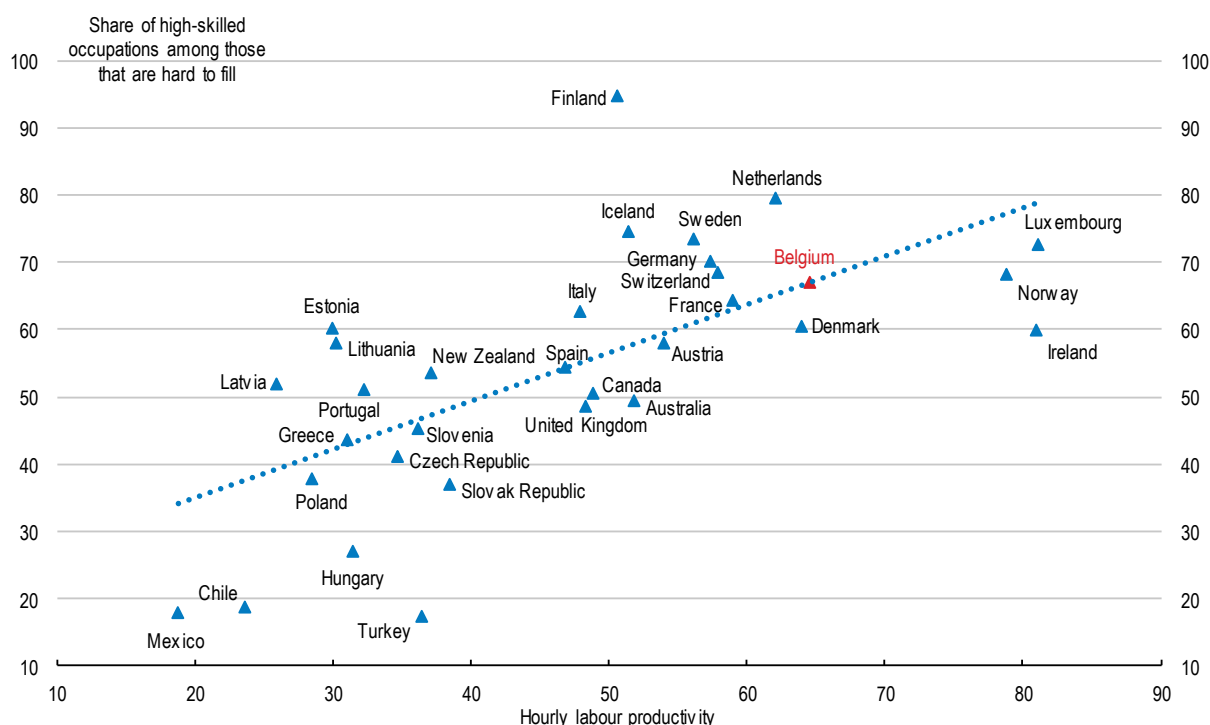
Figure 3.9. In Belgium shortages arise primarily in high-skilled occupations

Note: High-, medium- and low-skilled tiers are ISCO occupational groups 1 to 3, 4 to 8 and 9 respectively. OECD is the unweighted average of the OECD countries with available data. Data refer to 2017 or last available year; for Belgium, the last available year is 2015.

Source: OECD estimates based on OECD Skills for Jobs Database.

In Belgium, almost 70% of workers employed in shortage occupations are in high-skilled occupations, well above the OECD average. Around 20% and 10% of workers in shortage occupations are employed, respectively, in medium- and low-skilled occupations. This is typical for high-productivity countries (one of which Belgium is), where shortages in high-skilled occupations tend to be relatively more severe (Figure 3.10).

Figure 3.10. Higher labour productivity is associated with a higher share of high-skilled occupations among those that are hard to fill



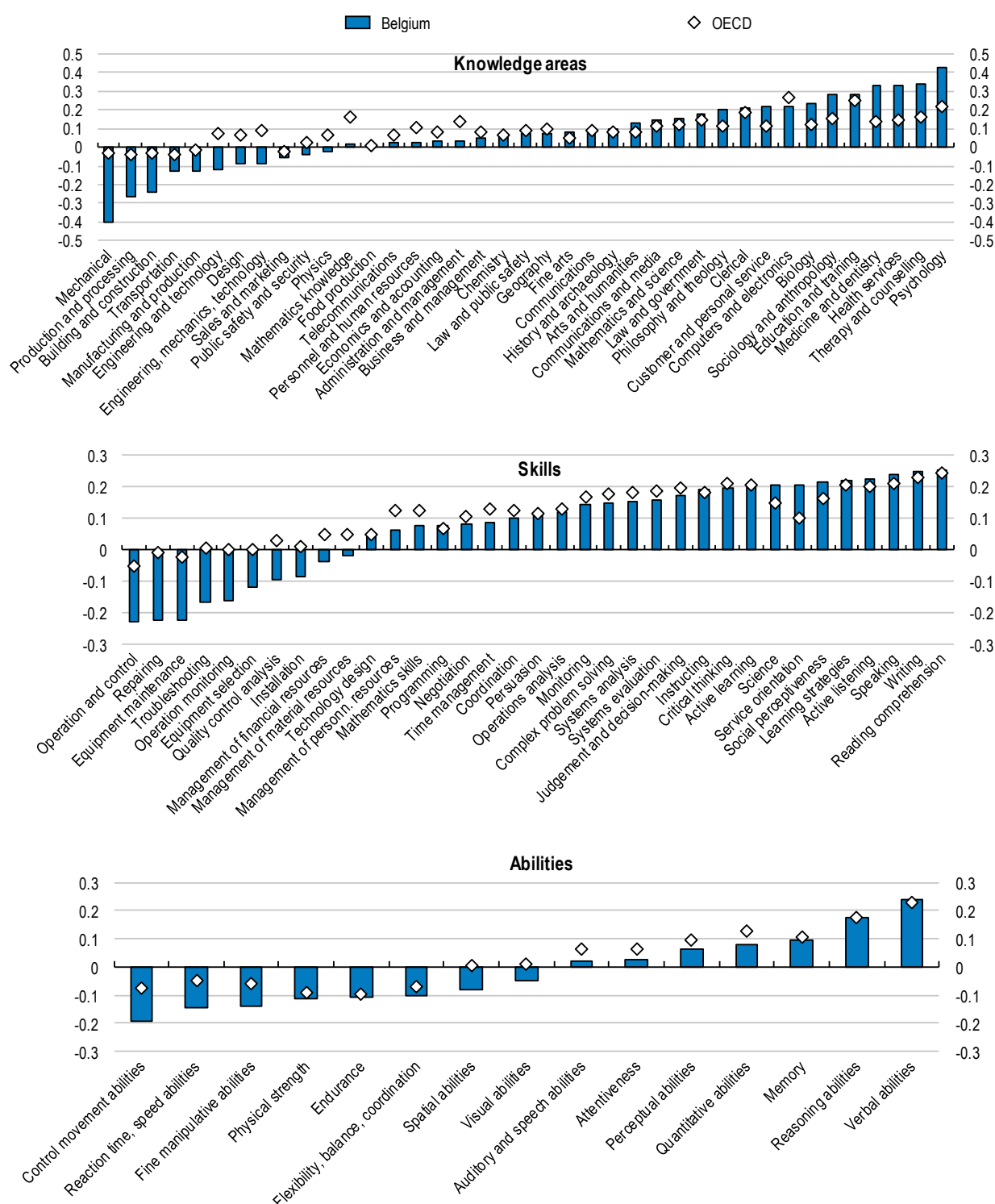
Note: Data refer to 2017 or last available year; for Belgium, the last available year is 2015.

Source: OECD estimates based on OECD Skills for Jobs Database and OECD Productivity Statistics Database.

Occupations can be mapped into knowledge areas, skills and abilities. Knowledge areas refer to the body of information that enables adequate performance at a job (e.g. knowledge of plumbing for a plumber or knowledge of mathematics for an economist). Skills refer to the proficient manual, verbal or mental manipulation of data or things (e.g. complex problem solving or social skills). Abilities refer to the competency to perform an observable activity (e.g. ability to plan and organise work, attentiveness or endurance). Occupational shortages and surpluses therefore translate into knowledge, skill and ability shortages and surpluses.

In Belgium, shortages in knowledge, skills and abilities arise in high-level cognitive areas (Figure 3.11). Routine and physical abilities tend to be in surplus. Some results may at first sight appear surprising: for example, knowledge in engineering and technology is estimated to be in surplus, whereas knowledge in psychology is in shortage. This has to do with the mapping between knowledge areas and occupations. The mapping relates knowledge in psychology to high-demand occupations in the health care and other services sectors and knowledge in engineering and technology, in part, to installation, troubleshooting and repairing and hence occupations facing a high risk of being automated.

Figure 3.11. A detailed overview of knowledge, skill and ability imbalances



Note: Positive values mean shortages, while negative values mean surpluses. Results are presented on a scale where the maximum value represents the strongest shortage observed across OECD countries. Data refer to 2015 or closest available year.

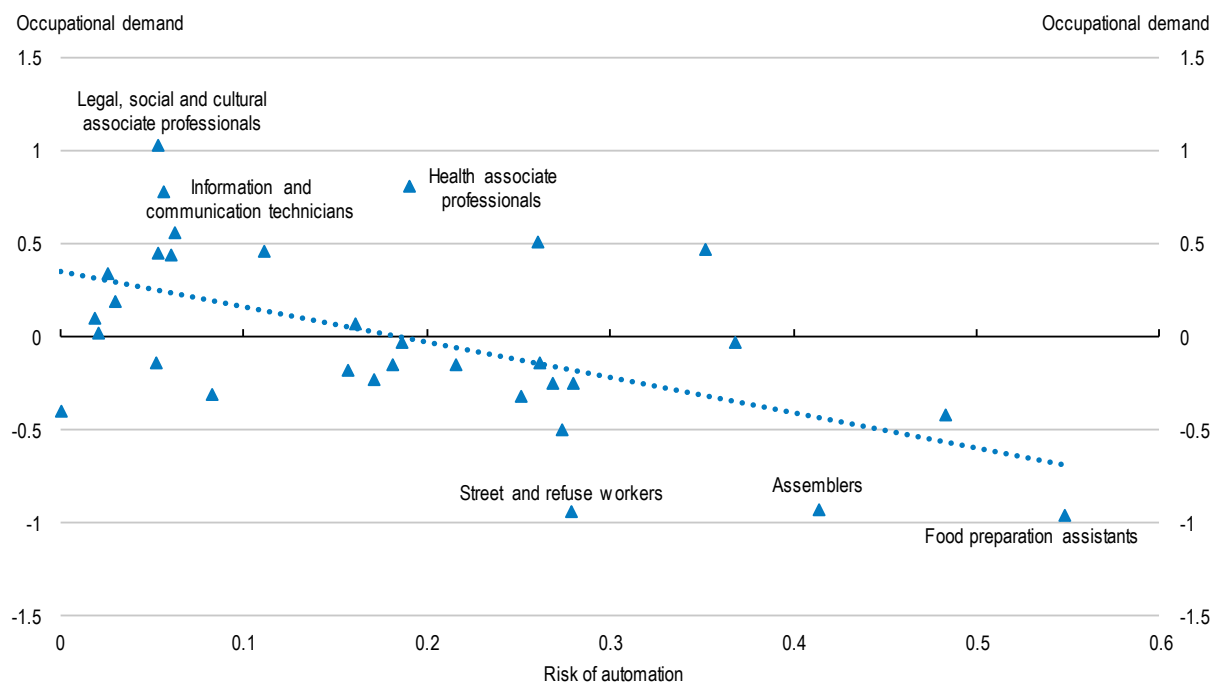
Source: OECD estimates based on OECD Skills for Jobs Database.

Automation is likely to exacerbate occupational imbalances

The advent of advanced robotics and artificial intelligence (AI) is almost certainly going to create surpluses in occupations that make a significant use of manual and physical skills. This could be accompanied by shortages of workers able to perform non-routine cognitive tasks, if the supply does not keep up with the rise in demand. In this spirit, recent influential work by Acemoglu and Restrepo (2019^[18]) studies the effect of automation on employment. Their analysis suggests that automation has been associated with a reduction in production costs, which has encouraged the creation of jobs that require workers to perform new and complex tasks, displacing workers with more basic skills.

Nedelkoska and Quintini (2018^[19]) calculate occupation- and country-specific risks of automation. Combining estimates for occupational imbalances in Belgium with these occupation-specific estimates for the risk of automation in Flanders reveals a statistically significant, negative association between the two dimensions (Figure 3.12). Jobs facing a high risk of automation tend to experience surpluses, while the demand for workers in jobs facing a low risk of automation exceeds their supply. Occupations with an excess supply of workers and facing a high risk of automation usually employ low-skilled workers involved in routine tasks (for instance food preparation assistants, assemblers and street and refuse workers). Occupations in shortage are characterised by high-level cognitive skill requirements and core tasks that are difficult to automate. Examples are cultural, health, legal and social professionals and ICT technicians.

Figure 3.12. Occupations with a higher risk of automation are in lower demand in Belgium



Note: Positive values for occupational demand mean shortages, negative values mean surpluses. The triangles represent different occupations. Data on risk of automation refer to Flanders and on occupational demand to Belgium. Of the Belgian communities, only Flanders participates in PIAAC (OECD Survey of Adult Skills).

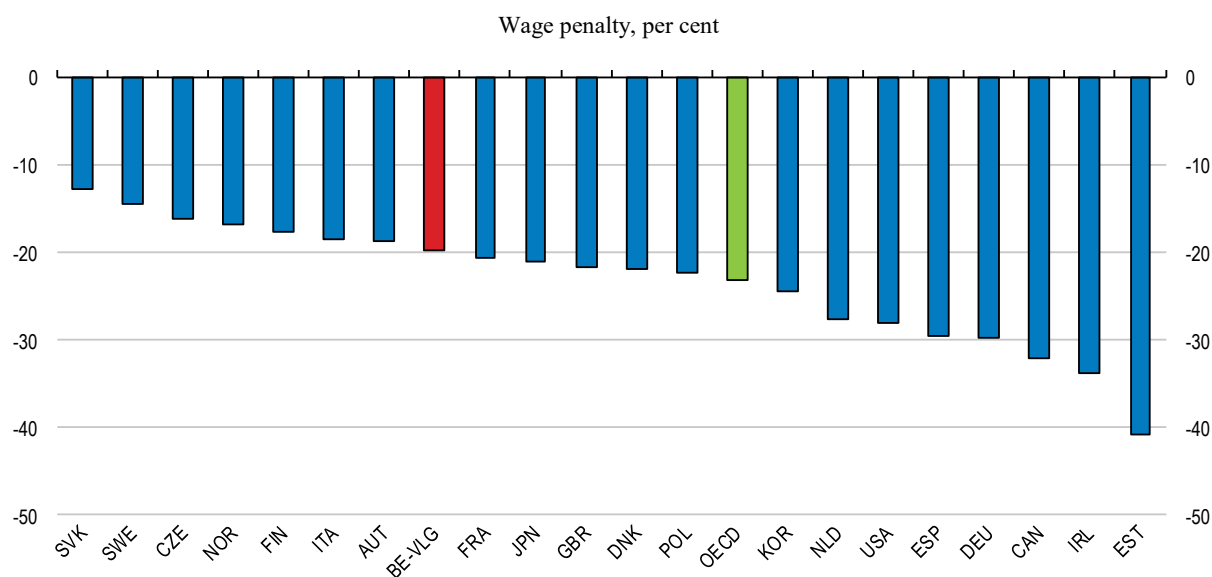
Source: OECD estimates based on OECD Skills for Jobs Database and Nedelkoska and Quintini (2018^[19]).

The challenges stemming from automation call for targeted policy action designed to help low-skilled workers navigate a changing technological landscape and remain in the labour market. Many of the tasks that are currently difficult to automate are related to the ability of workers to decipher meaningful patterns from apparently unrelated events or schemes, using high-level cognitive skills. In the future, machine learning algorithms are likely to improve the ability of AI to work in “unstructured situations”, but for the time being the demand for workers with high-level cognitive abilities to work with, process and interpret insights from big data has been rising steadily.⁵

The matching of skill demand and supply is related with productivity

Cross-country micro-data work based on PIAAC (OECD Survey of Adult Skills) indicates that misallocation of talent to jobs can harm productivity growth. Only Flanders participates in PIAAC, and so the following two figures do not report estimates for the other Belgian communities. Mismatched workers earn less than they otherwise would, indicating that they would be more productive if they were in a job that was a better match with their skills. On average in the OECD, over-qualified and field of study-mismatched workers are estimated to incur a wage penalty of 23% when compared with well-matched workers who have the same qualifications (Montt, 2015_[20]). In Flanders, this wage penalty is 20% and so slightly lower than the cross-country average (Figure 3.13).

Figure 3.13. Over-qualified and field of study-mismatched workers face a wage penalty



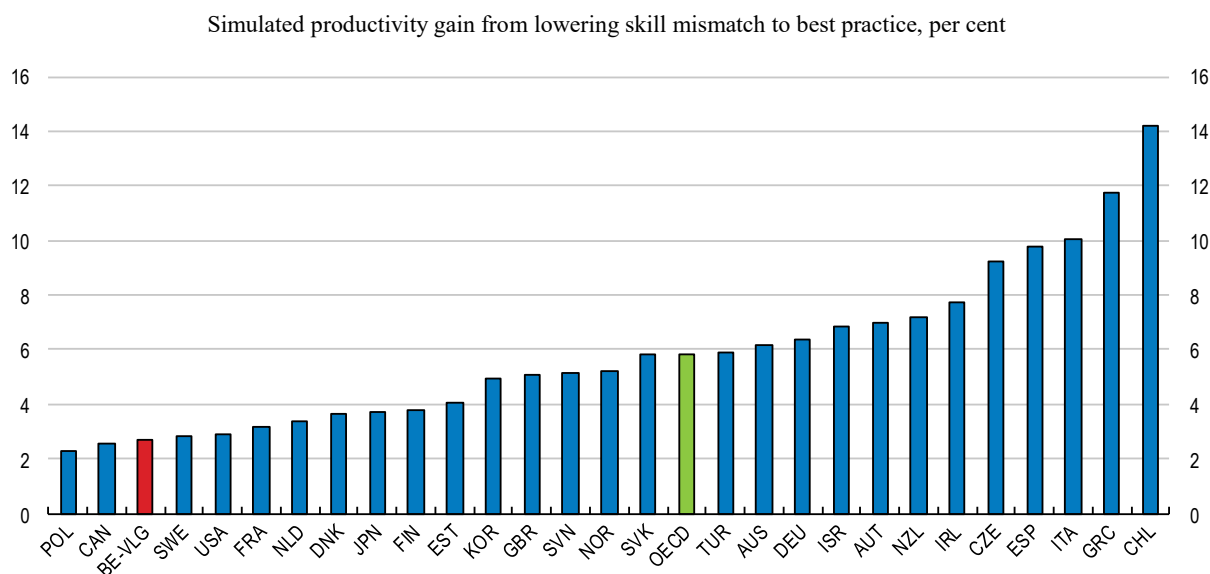
Note: Coefficients are estimated through Mincer-type wage regressions controlling for: field of study mismatch, over-qualification, age, experience, type of employment contract, firm size, numeracy proficiency and field of study dummies. All coefficients are statistically significant at the 1% level, with the exception of the Slovak Republic (10% significance level). The average coefficient is unweighted. Of the Belgian communities, only Flanders participates in PIAAC. Data for the United Kingdom refer to England and Northern Ireland. OECD is the unweighted average of the OECD countries with available data.

Source: OECD estimates based on PIAAC (OECD Survey of Adults Skills) and Montt (2015_[20]).

⁵ According to Burning Glass data, references to analytical and data-oriented skills appear in millions of US job postings, and data analysis is one of the most demanded skills by US employers.

Misallocation of talent is also associated with lower labour productivity as more productive firms find it increasingly difficult to attract skilled labour and gain market shares at the expense of less productive firms (Adalet McGowan and Andrews, 2015^[21]). Most countries have scope to attain substantial productivity gains by reducing skill mismatch. In Flanders, skill mismatch, as measured in PIAAC, is low and thus the potential productivity gains from reducing these imbalances are at 2% lower than in other countries. Yet, they are still positive, highlighting room for productivity improvements (Figure 3.14). Results from the OECD Skills for Jobs Database confirm that a country's economic performance and productivity growth are related with the evolution of labour market imbalances.

Figure 3.14. Lowering skill mismatch increases productivity, although the scope for such productivity gains is estimated to be comparatively small in Flanders



Note: The productivity gain is estimated from the difference between the actual allocative efficiency and a counterfactual allocative efficiency that is based on the skill mismatch in the country with the best practice. The coefficient for the effect of mismatch on productivity is based on a sample of 19 countries for which both firm-level productivity and mismatch data are available. The estimated productivity gains for the other countries should be interpreted with caution to the extent that these are not included in the econometric analysis due to insufficient productivity data. Of the Belgian communities, only Flanders participates in PIAAC. Data for the United Kingdom refer to England and Northern Ireland. OECD is the unweighted average of the OECD countries with available data.

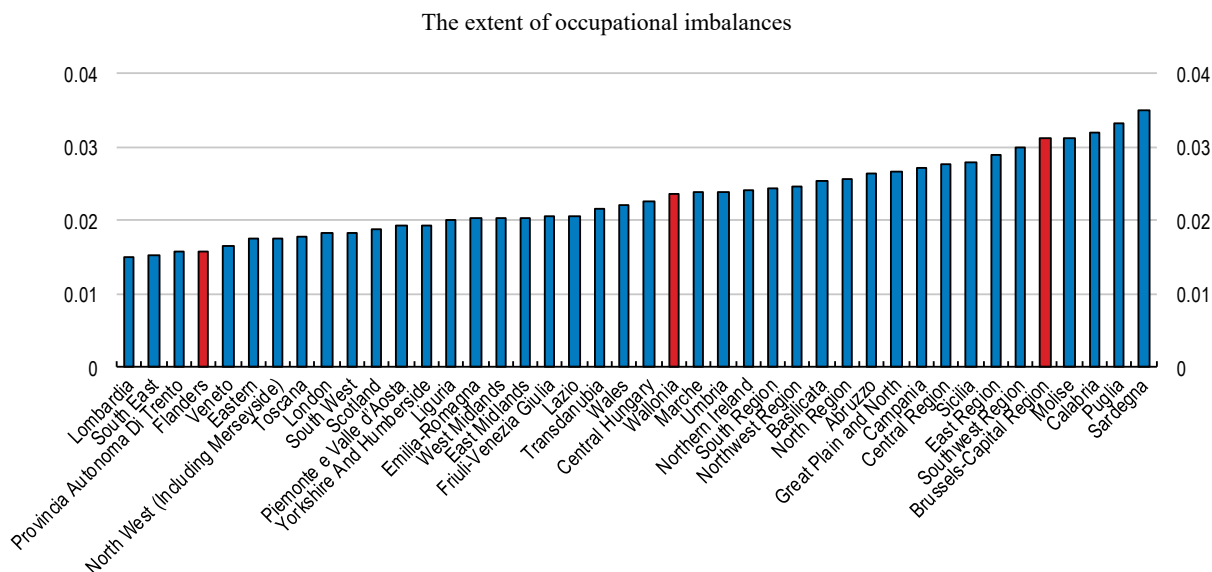
Source: Adalet McGowan and Andrews (2017^[22]) based on PIAAC (OECD Survey of Adult Skills).

Differences in labour market matching emerge at the regional level

Country-level aggregates of occupational imbalances may mask differences across regions. This could be especially the case in Belgium, where activation and education are the competence of the regions and communities and linguistic barriers hamper geographical mobility. Labour mobility is quite low in Belgium, although commuter flows have risen substantially. Weak labour mobility may, for instance, lead to the emergence of specific regional imbalances as workers do not respond to labour market incentives to relocate to a region where their skills may be in stronger demand. Differences in the economic structure across regions may also mean that some regions face specific skill gaps or shortages, but not others.

The extent of labour market imbalances varies significantly across the regions covered by the OECD Skills for Jobs Database (Figure 3.15).⁶ Three Italian regions show up at the top of the labour market imbalance ranking, namely Calabria, Apulia and Sardinia. Lombardy (Italy), the South East (England) and Trentino (Italy) are at the other end of the spectrum, with relatively low imbalances. Of the three regions in Belgium, the Brussels-Capital Region experiences the strongest labour market imbalances, followed by Wallonia and Flanders, which is among the best-performing regions.

Figure 3.15. Occupational imbalances are largest in the Brussels-Capital Region, followed by Wallonia and lowest in Flanders



Note: The extent of occupational imbalances is calculated as the average of the standard deviations across occupations for the five sub-indicators in the Occupational Shortage Indicator (i.e. wages, employment, unemployment, hours worked and under-qualification). These five sub-indicators compare the long-run trend of each occupation with that of the overall economy and so consider occupations in shortage for which wages, employment, hours worked and under-qualification have grown more than in the overall economy. A higher value in the figure denotes larger occupational imbalances, because it indicates that more occupations are in shortage or surplus. For further details on the approach, see OECD (2017^[17]). Sub-national data are available for Belgium, Hungary, Italy, Poland and the United Kingdom. Region of a worker is place of residence, not place of work. Data refer to 2016 or last available year; for Belgium, the last available year is 2015.

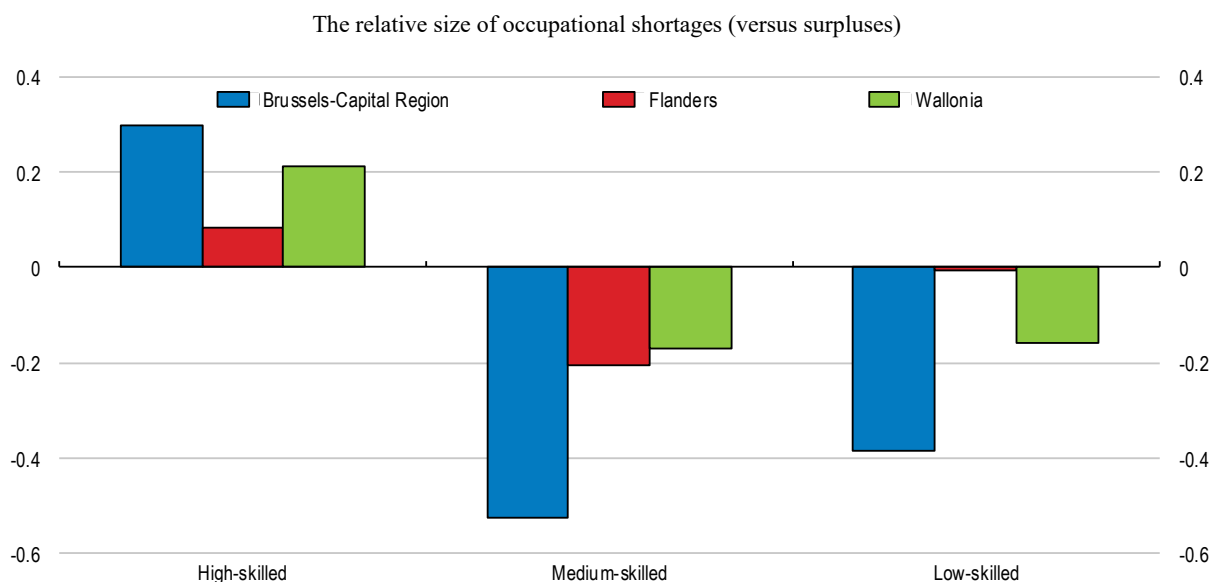
Source: OECD estimates based on OECD Skills for Jobs Database.

Analysing the relative intensity of shortages versus surpluses by skill level shows that in all three Belgian regions the high-skilled are in demand and the low- and medium-skilled in supply. The Brussels-Capital Region experiences the strongest shortages of high-skilled workers, but also significant surpluses of medium- and low-skilled workers. In Wallonia, the shortages of high-skilled workers are of similar magnitude as the surpluses of medium- and low-skilled workers. Imbalances are smaller in Flanders, although high-skilled workers are in shortage and medium-skilled workers in excess supply (Figure 3.16). NBB (2019^[23])

⁶ Sub-national data are available for five countries: Belgium, Hungary, Italy, Poland and the United Kingdom. Region is defined by place of residence, not place of work, which is likely to be relevant in Belgium, as a considerable number of workers commute for work from Flanders and Wallonia to the Brussels-Capital Region.

reports that labour market shortages are greater in Flanders than in the other two regions. This is not inconsistent with the findings and approach in this chapter, to the extent that shortages are widespread in Flanders across most occupations.

Figure 3.16. Shortages are concentrated in high-skilled occupations, surpluses in low- and medium-skilled occupations



Note: High-, medium- and low-skilled tiers are ISCO occupational groups 1 to 3, 4 to 8 and 9 respectively. The relative size of occupational shortages (versus surpluses) is calculated as the average occupational shortage minus the average occupational surplus, when weighting each occupation by its employment share. A positive value implies that shortages are more intense than surpluses. Region of a worker is place of residence, not place of work. Data refer to 2015.

Source: OECD estimates based on OECD Skills for Jobs Database.

Skill use in the workplace

Many workplaces have introduced new technologies or undergone significant restructuring in the way jobs and tasks are carried out, sometimes out of necessity, at other times with the stated aim to improve productivity (Eurofound, 2017^[24]). Organisational change may mean a stronger importance of managerial skills. The organisational restructuring of the workplace increases, for example, the pressure on workers to develop autonomy and independence in the way they perform tasks and to lead and co-ordinate with others.

Data bear out the need for managerial quality to support effective skill use at the workplace. Countries that have undergone substantial restructuring in the workplace experience also stronger pressures, i.e. shortages, in management-related skills. Belgium displays average levels along both dimensions, the extent to which organisational change has occurred and the extent to which shortages in management-related skills exist.⁷ Improvements to managerial quality would enhance the chances of success for firms that are being reorganised or restructured.

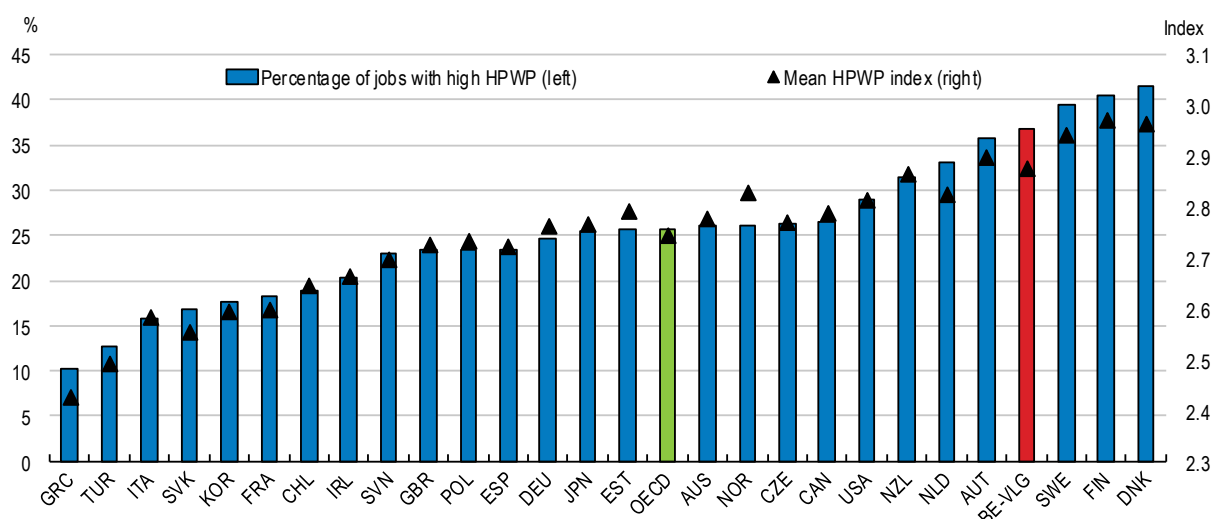
⁷ This analysis is based on the OECD Skills for Jobs Database and the European Working Conditions Survey.

Even for firms that are not being reorganised or restructured, improvements to managerial quality are conducive to lowering their number of under-skilled workers and raising their productivity growth (Adalet McGowan and Andrews, 2017^[22]). Well-managed firms may be less susceptible to skill mismatch by being more effective at: *i)* screening potential job applicants; *ii)* developing new work practices to integrate new technologies; *iii)* internally reallocating over-skilled or -qualified workers to more productive uses within the firm; and *iv)* taking remedial measures or laying off under-skilled or -qualified workers.

Besides managerial quality, a variety of other factors can promote skill use at work. These include, for example, participative employee relations, which can build trust and support employees in developing relevant experience and abilities, reward systems that emphasise skill upgrading and team-based activities around mutual learning (OECD/ILO, 2017^[25]).

High-performance work practices are often used to refer to management strategies aimed at increasing the productivity and profit of organisations. They encompass, among other factors, mentoring, pay incentives, training, autonomy and communication. Internationally comparable data on high-performance work practices are available for Flanders only and suggest that Flanders is close to best practice (OECD, 2019^[16]). On average across OECD countries, about one in four jobs applies high-performance work practices twice or more often per week. For Flanders, the equivalent figure is one in three (Figure 3.17).

Figure 3.17. High-performance work practices (HPWP) are used extensively in Flanders



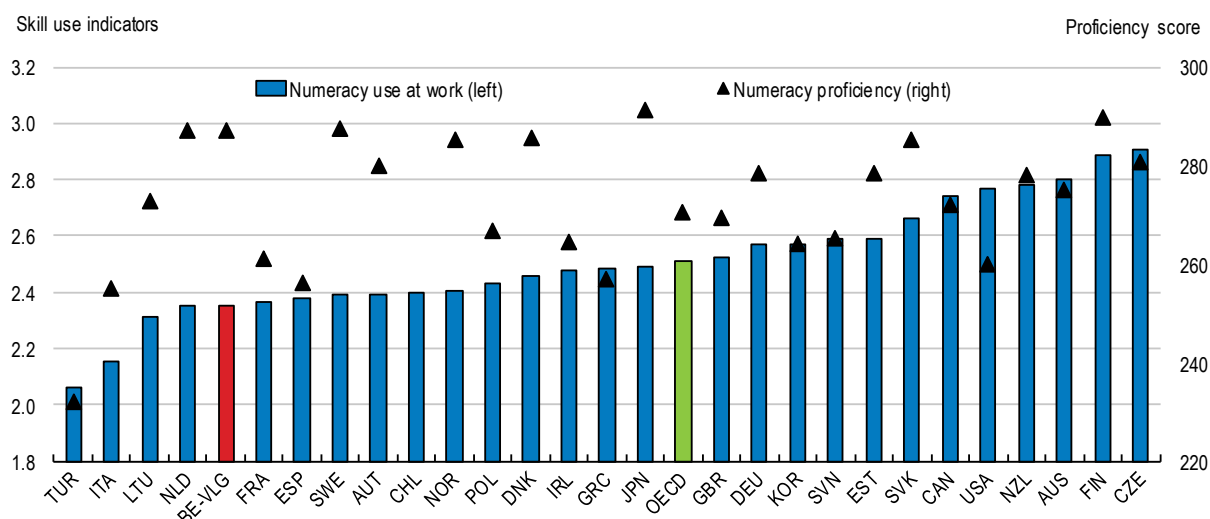
Note: The percentage of jobs with high-performance work practices is calculated as the share of workers in jobs with a summary score that is above the 75th percentile of the pooled distribution across all countries. Of the Belgian communities, only Flanders participates in PIAAC (OECD Survey of Adult Skills). Data for the United Kingdom refer to the unweighted average of England and Northern Ireland. OECD is the unweighted average of the OECD countries with available data.

Source: OECD (2019^[16]).

Despite the good performance in the indicators related to high-performance work practices, Flanders does not seem to make the best use of skills at work. While literacy proficiency and reading at work are slightly above the OECD average, the use of numeracy skills at work is relatively low (Figure 3.18). PIAAC data show that poor use of skills is associated with lower job satisfaction, which in turn may be linked with lower productivity (OECD, 2016^[26]). Therefore, on the basis of this evidence, investing more effort in spurring the use

of the available mathematical skills of Flemish workers, especially in areas where these skills may be important, could be conducive to productivity gains.

Figure 3.18. In Flanders numeracy skill use is low given high levels of proficiency



Note: Skill use indicators range from 1 to 5 and proficiency scores from 0 to 500. Of the Belgian communities, only Flanders participates in PIAAC (OECD Survey of Adult Skills). Data for the United Kingdom refer to the unweighted average of England and Northern Ireland. OECD is the unweighted average of the OECD countries with available data.

Source: OECD (2019_[16]).

References

- Acemoglu, D. and P. Restrepo (2019), “Robots and jobs: Evidence from US labor markets”, *Journal of Political Economy*, forthcoming, <https://economics.mit.edu/files/17106>. [18]
- Adalet McGowan, M. and D. Andrews (2017), “Skills mismatch, productivity and policies: Evidence from the second wave of PIAAC”, *OECD Economics Department Working Papers*, No. 1403, OECD Publishing, Paris, <https://dx.doi.org/10.1787/65dab7c6-en>. [22]
- Adalet McGowan, M. and D. Andrews (2015), “Labour market mismatch and labour productivity: Evidence from PIAAC data”, *OECD Economics Department Working Papers*, No. 1209, OECD Publishing, Paris, <https://dx.doi.org/10.1787/5js1pzx1r2kb-en>. [21]
- Bailin Rivas, A. et al. (2019), “Like it or not? The impact of online platforms on the productivity of incumbent service providers”, *OECD Economics Department Working Papers*, No. 1548, OECD Publishing, Paris, <https://doi.org/10.1787/080a17ce-en>. [8]
- Berlingieri, G., P. Blanchenay and C. Criscuolo (2017), “The great divergence(s)”, *OECD Science, Technology and Industry Policy Papers*, No. 39, OECD Publishing, Paris, <https://dx.doi.org/10.1787/953f3853-en>. [5]
- Berlingieri, G., S. Calligaris and C. Criscuolo (2018), “The productivity-wage premium: Does size still matter in a service economy?”, *OECD Science, Technology and Industry Working Papers*, No. 2018/13, OECD Publishing, Paris, <https://dx.doi.org/10.1787/04e36c29-en>. [6]
- Decker, R. et al. (2017), “Declining dynamism, allocative efficiency, and the productivity slowdown”, *American Economic Review*, Vol. 107/5, pp. 322-326, <http://dx.doi.org/10.1257/aer.p20171020>. [10]
- Edin, P. and M. Gustavsson (2008), “Time out of work and skill depreciation”, *ILR Review*, Vol. 61/2, pp. 163-180, <https://doi.org/10.1177/001979390806100202>. [14]
- Eurofound (2017), *Sixth European Working Conditions Survey - Overview Report (2017 Update)*, Publications Office of the European Union, Luxembourg, <http://dx.doi.org/10.2806/784968>. [24]
- Forth, J. and G. Mason (2006), “Do ICT skill shortages hamper firms’ performance? Evidence from UK benchmarking surveys”, *NIESR Discussion Papers*, No. 281, <http://www.niesr.ac.uk/pubs/DPS/dp281.pdf>. [12]
- Foster, L., C. Grim and J. Haltiwanger (2016), “Reallocation in the Great Recession: Cleansing or not?”, *Journal of Labor Economics*, Vol. 34/S1, pp. S293-S331, <http://dx.doi.org/10.1086/682397>. [9]
- Garnero, A., F. Rycx and I. Terraz (2019), “Productivity and wage effects of firm-level collective agreements: Evidence from Belgian linked panel data”, *OECD Social*, [11]

- Employment and Migration Working Papers*, No. 223, OECD Publishing, Paris, <https://dx.doi.org/10.1787/132aa88e-en>.
- Haskel, J. and C. Martin (1993), “Do skill shortages reduce productivity? Theory and evidence from the United Kingdom”, *Economic Journal*, Vol. 103/417, pp. 386-394, <https://doi.org/10.2307/2234777>. [13]
- Haugh, D. et al. (2016), “Cardiac arrest or dizzy spell: Why is world trade so weak and what can policy do about it?”, *OECD Economic Policy Papers*, No. 18, OECD Publishing, Paris, <https://dx.doi.org/10.1787/5jlr2h45q532-en>. [4]
- Montt, G. (2015), “The causes and consequences of field-of-study mismatch: An analysis using PIAAC”, *OECD Social, Employment and Migration Working Papers*, No. 167, OECD Publishing, Paris, <https://dx.doi.org/10.1787/5jrxm4dhv9r2-en>. [20]
- NBB (2019), *Annual Report 2018*, National Bank of Belgium, Brussels, https://www.nbb.be/doc/ts/publications/nbbreport/2018/en/t1/report2018_complet.pdf. [23]
- Nedelkoska, L. and G. Quintini (2018), “Automation, skills use and training”, *OECD Social, Employment and Migration Working Papers*, No. 202, OECD Publishing, Paris, <https://dx.doi.org/10.1787/2e2f4eea-en>. [19]
- OECD (2019), *OECD Skills Strategy Flanders: Assessment and Recommendations*, OECD Skills Studies, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264309791-en>. [16]
- OECD (2018), *OECD Economic Outlook, Volume 2018 Issue 2*, OECD Publishing, Paris, https://dx.doi.org/10.1787/eco_outlook-v2018-2-en. [3]
- OECD (2018), *OECD Employment Outlook 2018*, OECD Publishing, Paris, https://dx.doi.org/10.1787/empl_outlook-2018-en. [2]
- OECD (2017), *Getting Skills Right: Skills for Jobs Indicators*, Getting Skills Right, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264277878-en>. [17]
- OECD (2017), *OECD Employment Outlook 2017*, OECD Publishing, Paris, https://dx.doi.org/10.1787/empl_outlook-2017-en. [1]
- OECD (2016), *OECD Employment Outlook 2016*, OECD Publishing, Paris, https://dx.doi.org/10.1787/empl_outlook-2016-en. [15]
- OECD (2016), *Skills Matter: Further Results from the Survey of Adult Skills*, OECD Skills Studies, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264258051-en>. [26]
- OECD/ILO (2017), *Better Use of Skills in the Workplace: Why It Matters for Productivity and Local Jobs*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264281394-en>. [25]
- Rusinek, M. and F. Rycx (2013), “Rent-sharing under different bargaining regimes: Evidence from linked employer-employee data”, *British Journal of Industrial Relations*, Vol. 51/1, pp. 28-58, <http://dx.doi.org/10.1111/j.1467-8543.2011.00877.x>. [7]

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In-Depth Productivity Review of Belgium

Belgium has a high level of productivity. However, growth of productivity has declined quite strongly over the past two decades, and more so than in other advanced economies. This is a worrying development, as fewer productivity gains mean less wage growth and a slowdown in improvements to pensions, health care and well-being. This *In-Depth Productivity Review of Belgium* assesses in detail the drivers of productivity and recommends a 7-Point Action Plan to reignite productivity growth in Belgium. Reviving productivity growth requires action in many areas cutting across governments and ministerial competences. Measures are needed to instil more dynamism in Belgium's economy, both among businesses and in the labour market, and to make the public finances more growth-oriented. In addition to recommending detailed policy measures to revive productivity growth, the *Review* contains three analytical chapters that lay out the evidence base: Chapter 1 on economy-wide and sectoral trends in productivity; Chapter 2 on the role of firms for productivity, with a focus on the dispersion of performance among businesses; and Chapter 3 on the worker dimension of productivity, with a focus on the role of wage bargaining and skills.

Consult this publication on line at <https://doi.org/10.1787/88aefcd5-en>.

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