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Sluggish Productivity  
Growth in Denmark: The  
Usual Suspects?

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**By Müge Adalet McGowan and Stéphanie Jamet**

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ABSTRACT/RÉSUMÉ

**Sluggish productivity growth in Denmark: the usual suspects?**

Despite sound policies and institutions, Danish productivity has grown modestly over the past decade, both historically and in relation to other countries, contributing to weak economic growth and an erosion in competitiveness. An examination of the four potential drivers of this puzzle, namely competition, education, labour market flexibility and the size of the public sector, shows that there is room for improvement in all areas, calling for action on each of these fronts.

This Working Paper relates to the 2012 *OECD Economic Survey of Denmark* ([www.oecd.org/eco/surveys/denmark](http://www.oecd.org/eco/surveys/denmark)).

JEL classification: D24; H11; I25; J63; J80; O3; O4; O52.

Keywords: Denmark; growth; productivity; competition; education; employment protection legislation; size of government.

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**Croissance de la productivité anémique du Danemark: les suspects habituels ?**

Malgré des politiques et institutions saines, la productivité danoise a connu une croissance modeste au cours de la dernière décennie, à la fois historiquement et par rapport à d'autres pays. Celle-ci a contribué à une croissance économique faible et une érosion de la compétitivité. L'analyse de quatre facteurs potentiels de ce puzzle, à savoir la concurrence, l'éducation, la flexibilité du marché du travail et la taille du secteur public, montre que des améliorations sont possibles dans tous ces domaines, appelant à des actions sur chacun de ces fronts.

Ce Document de travail se rapporte à *l'Étude économique de l'OCDE du Danemark, 2012* ([www.oecd.org/eco/etudes/danemark](http://www.oecd.org/eco/etudes/danemark)).

Classification JEL : D24; H11; I25; J63; J80; O3; O4; O52.

Mots clés : Danemark ; croissance ; productivité ; concurrence ; éducation ; législation sur la protection de l'emploi ; taille du gouvernement.

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## SLUGGISH PRODUCTIVITY GROWTH IN DENMARK: THE USUAL SUSPECTS?

By Müge Adalet McGowan and Stéphanie Jamet<sup>1</sup>

1. Over the past decade, Danish productivity has grown modestly, both historically and in relation to other countries. In 2000, Denmark ranked eighth among OECD countries in terms of labour productivity; by 2011, it had become twelfth (Figure 1, Panel A and B). Low productivity growth has contributed to weak economic growth, and led to high unit labour costs and lower competitiveness.

2. Labour productivity growth declined from an average of 2.2% in 1981-93 to 1.4% in 1994-2007, reflecting slowing total factor productivity (TFP) and capital deepening (OECD, 2009a). In recent years, TFP growth has improved, leading to an increase in average growth rates, but the deterioration relative to the earlier decade still remains (Figure 1, Panel C). The Danish Economic Council (2010) found the decline in TFP growth to be the main driver behind low productivity growth and suggested that increased competition can help allocate resources more efficiently. The slowdown in TFP growth is observed in most sectors, but especially in business services, construction and network industries (IMF, 2010; OECD, 2009a).

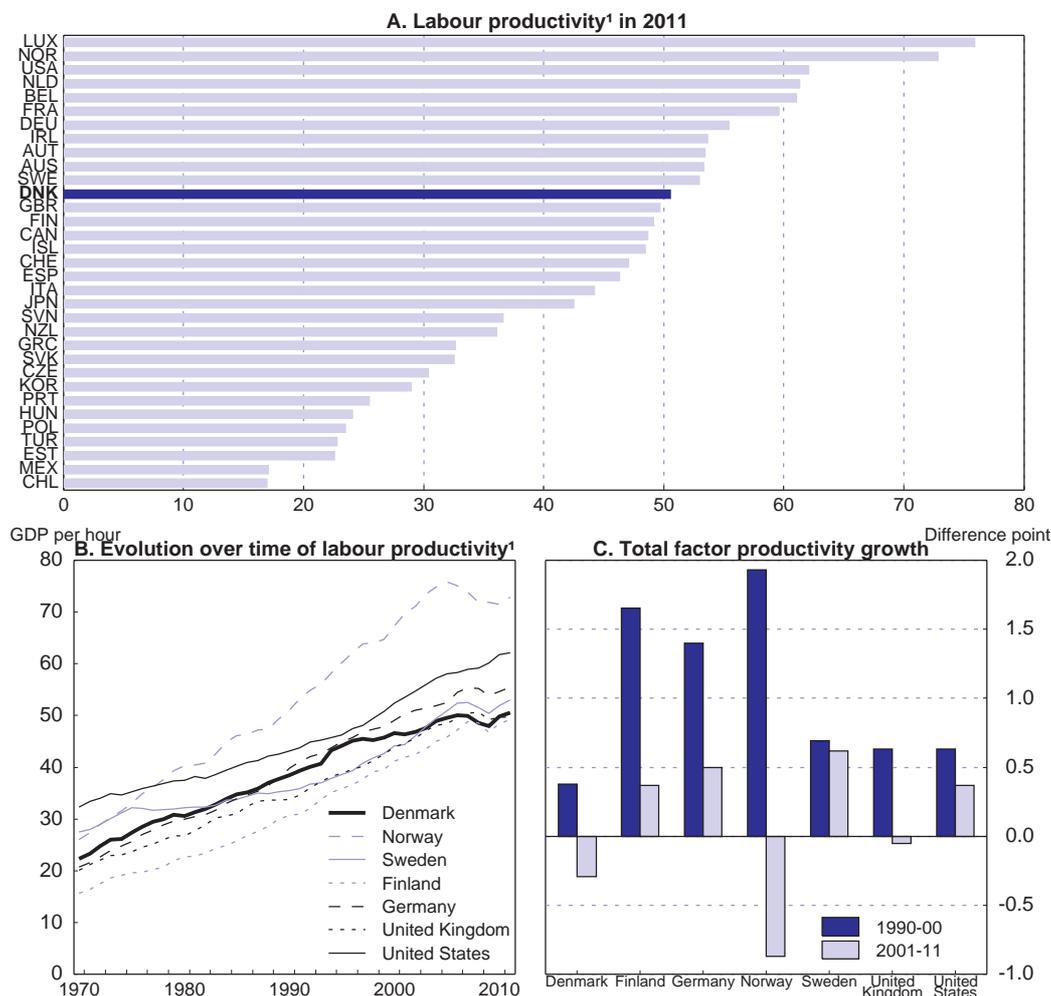
3. Weak productivity growth was identified as an important challenge by the Growth Forum in March 2011 and the new government that took office in October announced the creation of a Productivity Commission. The issue has been studied extensively, but the slowdown remains puzzling, given Denmark's sound economic framework in terms of regulations, education performance and labour market flexibility. The Danish authorities are trying to address the problem through various channels by increasing investment in education (95% target to finish upper secondary education), R&D and innovation, lowering income taxes, reducing administrative burdens and increasing competition. In November 2011, a new programme called Growth through Leadership was set up to assist small and medium-sized enterprise (SME) managers with a view to boost SME growth. The new government also announced a tax credit for some types of R&D spending in the Fiscal Bill for 2012. The 2012 Tax Reform proposal also includes some changes to improve firms' access to venture capital.

4. Many cross-country analyses have looked at the link between various policies/factors and productivity growth, and a number of empirical studies have been conducted for Denmark. This paper looks at four potential "candidates" that may account for the loss in productivity momentum in Denmark: competition, education, labour market flexibility and the size of the public sector. In each case, it reviews the main theoretical arguments and empirical analyses for Denmark to see to what extent the suspect bears some responsibility.

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1. Müge Adalet McGowan and Stéphanie Jamet are from the Economics Department of the OECD. This paper provides background analysis conducted for the *OECD Economic Survey of Denmark* published in January 2012. The authors would like to thank Vincent Koen for valuable comments on earlier drafts. Special thanks go to Lutécia Daniel for technical assistance and to Nadine Dufour and Pascal Halim for technical preparation.

Figure 1. Labour productivity<sup>1</sup> and total factor productivity growth



- Within-firm effects: strong competition can give firms incentives to reduce inefficiencies in organisation and management and upgrade their technology, leading to higher productivity growth. By making comparisons across firms and monitoring easier by owners and markets, competition overcomes the principal-agent problem, encouraging managers to work harder (Vickers, 1995). Competition also provides incentives to cut costs in order to increase profit margins and to capture a larger market share (Schmidt, 1997). Empirical studies find positive, but nonlinear within-firm effects for competition. Firms more exposed to competition have higher productivity growth, reflecting the fact that competition acts as a disciplining device for managers. Firms facing greater competition and lower rents strive to be more productive in order to continue their business (Nickel, 1996; Blundell *et al.*, 1999; Aghion *et al.*, 2005), although excessive competition can lower profits too much and remove these incentives (Schmidt, 1997).
- Between-firm effects: competition can have a market-sorting effect, by increasing the market shares of more productive firms at the expense of low-productivity ones or by boosting productivity through the exit of less productive firms. Competition, for example through trade liberalisation, can reallocate resources to more efficient uses by driving inefficient firms out of the market (Pavcnik, 2002; Eslava *et al.*, 2009). Studies show that half of a country's growth comes from firm churning, with entry, exit and changing market shares improving economic growth (Ahn, 2001; Davis and Haltiwanger, 1992). Persistence of low productivity firms in an economy could be an indication of distortion to entry and exit mechanisms (Criscuolo *et al.*, 2009). The relative importance of entry and exit on productivity growth depends on the stage of the product cycle. Entry of firms makes a higher-than-average contribution to productivity growth in high-technology industries, which are at earlier stages of their product cycle, whereas the effect is lower in mature industries that rely on incumbent firms' investment in R&D for productivity growth (Scarpetta *et al.*, 2002; Brandt, 2004). High productivity dispersion in an industry could imply a high-productivity industry with intense competition or an industry with a long tail of inefficient firms, if dispersion is accompanied by low entry and exit (Oulton, 1996; Syverson, 2003). High turnover can raise productivity if entrants bring in new technologies (Geroski, 1995).

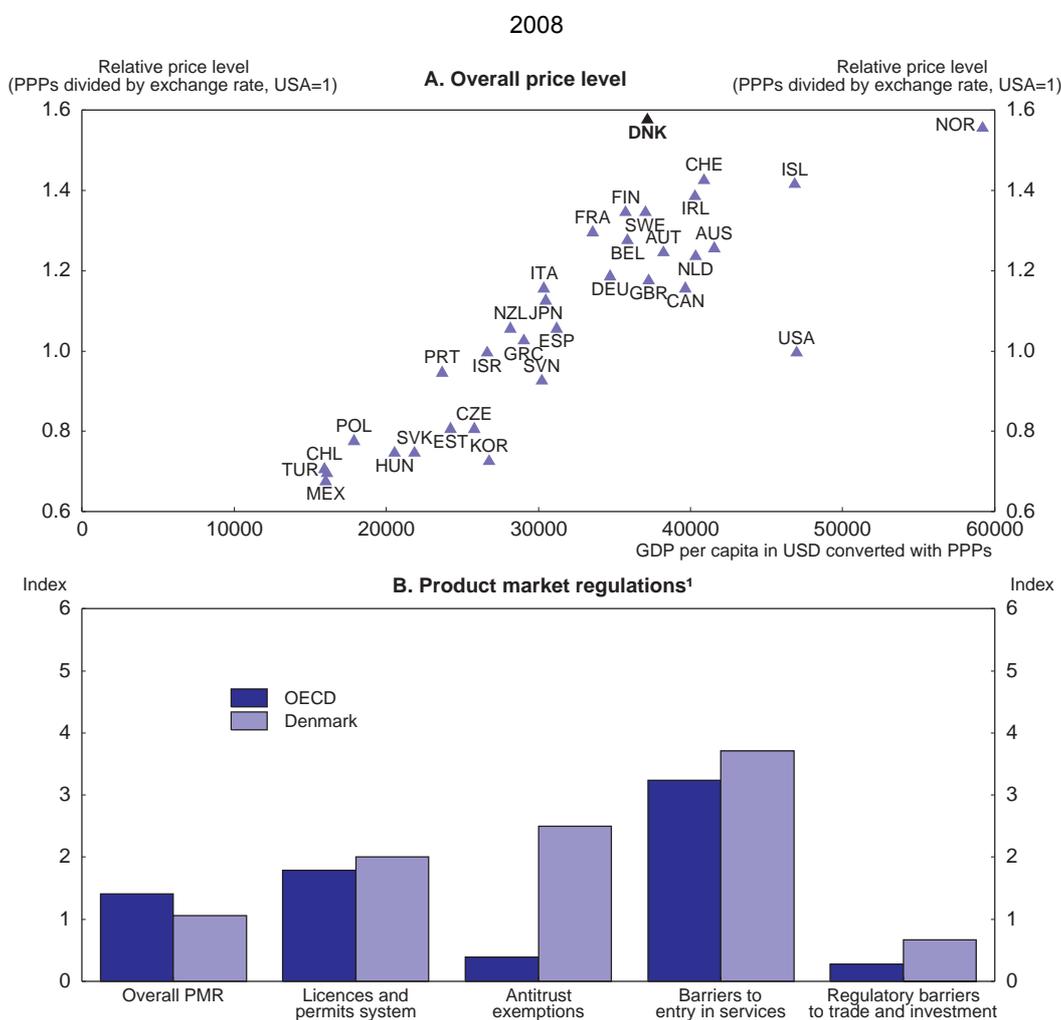
7. Although the between and within-firm effects will spur innovation through exposure to new ideas, the overall relationship between competition and innovation is ambiguous. On the one hand, according to Schumpeter (1942), competition can be detrimental to innovation since market power gives firms an incentive to invest due to higher expectations of future profits from innovation as well as the resources to invest in R&D. On the other hand, competition may force a firm to innovate in order to survive by staying ahead of its rivals (Porter, 1990) and more competition can speed up the adoption of new technologies, increasing the steady-state rate of growth (Aghion and Howitt, 1992). Aghion *et al.* (2001) show that the impact of competition on innovation will depend on specific industry characteristics. The incentive to innovate is stronger if the firm is closer to the technological frontier because the probability of capturing the benefits of innovation is then higher. Innovation will also be conditioned by institutions and policies. Reducing the strength of anti-competitive product market regulations, removing restrictions on foreign direct investment (FDI), ensuring stable macroeconomic conditions and low real interest rates, improving the availability of financing for innovation, facilitating access to equity finance, making knowledge readily accessible, and measures to raise the availability of human resources for science and technology will all contribute to higher innovation activity (Jaumotte and Pain, 2005).

**Evidence for Denmark**

*Overall competition indicators are fairly strong*

8. Denmark ranks high on overall competition indicators, notably the OECD’s Product Market Regulation (PMR) and the World Bank’s Doing Business indicators. According to the Fraser Institute indicator of “economic freedom” that combines measures of governance, macroeconomic management and regulatory quality, Denmark ranks twelfth worldwide. In its Global Competitiveness Index, which covers macroeconomic and regulatory framework conditions and levels of education and infrastructure, the World Economic Forum ranks Denmark eighth. Barriers to entrepreneurship, including regulatory and administrative opacity and burdens on start-ups, are low in Denmark, leading to overall PMR indicators below the OECD average, but there is room for improvement in some areas (Figure 2).

**Figure 2. Level of prices and product market regulations**



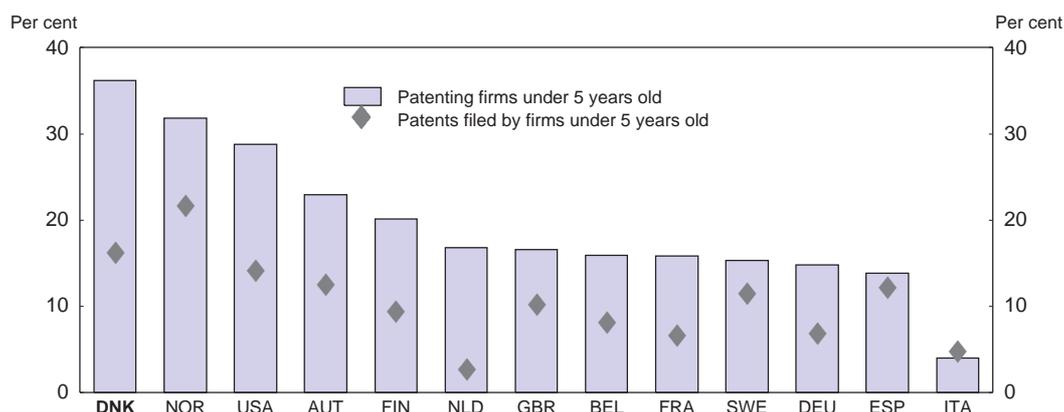
1. Index scale is 0 to 6, from least to most restrictive.

Source: OECD Analytical Database, OECD Product Market Regulation Database and OECD calculations.

9. As a result of the low burden on start-ups, in Denmark, start-up rates are high, around 10-12% as a percentage of all registered firms. New firms add dynamism to the Danish economy and account for a lot of job turnover as they contribute heavily to both job creation and destruction (Ibsen and Westergaard-Nielsen, 2011). New firms are also innovative, with a large number of patents filed by young firms in Denmark (Figure 3).

**Figure 3. Patenting activity of young firms<sup>1</sup>**

Share of young patenting firms and of Patent Co-operation Treaty (PCT) filings by young firms, 2005-07



1. Data refers to patent applications filed under the Patent Co-operation Treaty (PCT) by firms with a priority in 2005-07. Counts are based on a set of patent applicants successfully matched with business register data.

Source: OECD (2010), *Measuring Innovation: A New Perspective*, OECD, HAN Database, October 2009 and Bureau Van Dijk Electronic Publishing, August 2008.

#### *There are still problems in some sectors*

10. Despite these high overall rankings and openness to trade, weak competition in some areas and barriers to market entry have been identified as factors contributing to low productivity growth in Denmark. Strict zoning laws and non-harmonised standards prevent large and foreign firms from entering Danish markets. A rigid division of labour, lack of scale and off-shoring, and high input costs decrease the efficiency of firms (McKinsey, 2010; Competition Authority, 2010a). In addition, competition is relatively limited in Denmark's large public sector.

11. Despite some recent improvements, regulations can be reformed further to better support competition. Regulations are more restrictive than in the OECD on average in four areas: license and permit systems, anti-trust exemptions, barriers to entry in services and regulatory barriers to trade and investment (OECD, 2009a). The Danish Shop Closing Act was liberalised in 2010 to relax the rules on shop opening hours from 2012. In April 2011, a Competition Package including 40 initiatives primarily aimed at the construction and service sectors was introduced. The relaxation of ownership rules of clinics by dentists and general practitioners is welcome, but more progress for pharmacies, taxis, public transportation and healthcare is still warranted (OECD, 2012). There is scope to reduce restrictions on pharmacies, such as the removal of ownership and opening hour limitations. The Competition Authority's recommendation to reform the taxi industry is welcome, since the use of municipality-set maximum fares as set fares, and the issuance of taxi licenses to only one out of four applicants limit competition.

12. The relatively small number of firms supplying a large share of the market in some sectors might hinder competition. The small domestic market in Denmark prevents the exploitation of economies of scale. For example, services and construction are fragmented sectors with little "creative destruction" and have experienced less productivity growth than manufacturing. Some restrictive regulations in the retail

sector, such as zoning laws, prevent the exploitation of economies of scale through hypermarkets. Compared to larger economies like Germany, firms do not exploit opportunities to cooperate in product development or export promotion (Competition Authority, 2010b). To help address these problems, the Growth Forum (2011) recommended that SMEs be given improved access to venture capital and greater support for export financing and promotion.

13. According to the Competition Authority, there is also scope to improve the competition culture, which is relatively weak in Denmark. Consumer and supplier mobility is lower in Denmark than in Germany and the United Kingdom: 63% of surveyed firms perceive customers not to be willing to change across firms (Competition Authority, 2010b; Table 1). This can be attributed to a lack of transparency, especially for the services sector. For example, for the car repairs and services industries, quoting labour and spare part costs separately, can enhance transparency.

**Table 1. Customer mobility**

	% of firms responding		
	Denmark	Germany	United Kingdom
<b>Low</b>	63	49	36
<b>Medium</b>	31	42	44
<b>High</b>	6	10	21

Source: Competition Authority (2010), *Competition Culture*.

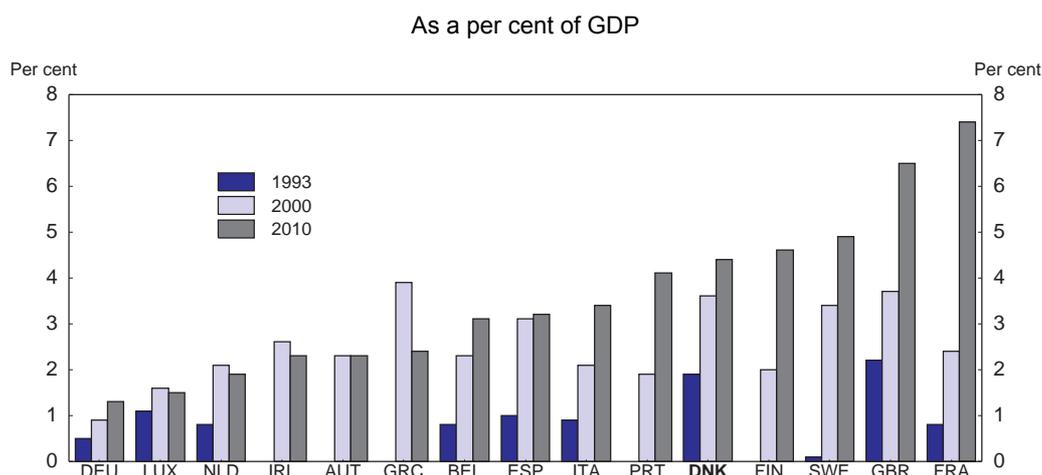
14. The Danish Competition Authority's *2010 Report* indicates that compared to six other rich OECD countries, Denmark has the highest net prices, adjusted for VAT, taxes and income. Prices in Denmark are, on average, 12% higher than comparable countries, reaching a 15-17% difference in services (5% in goods). This indicates that competition in the service sector, which is less exposed to competition from foreign companies, is especially weak. Despite high taxes and relative wages, profit margins are comparatively higher than abroad, as Danish firms are in the middle ranks among OECD countries, suggesting a lack of competition (Ministry of Finance, 2011).

15. Similar to many other small open economies, sectors exposed to foreign competition are more productive than non-exporters in Denmark. There are large potential productivity gains from more trade, especially in services (Moller *et al.*, 2011). Opening up more sectors to foreign competition can lead to higher productivity growth. Evidence also shows that foreign-owned companies are more productive than domestic companies in Denmark (Pedersen and Skaksen, 2011). In 2008, foreign-owned companies accounted for 3% of the number of enterprises but 24% of value added in the private sector. Sectors such as retail trade, professional services and construction, which have relatively low productivity, also have low shares of foreign-owned companies, suggesting that encouraging competition and FDI in these sectors would lead to a larger involvement of multinationals and higher productivity growth.

16. Given the size of the government in Denmark, competition in the public sector is also crucial for nationwide productivity. The extent of competition for public services has improved, private provision of public services has increased in recent years, and a Public Procurement Committee has been appointed. With the Enforcement Act of 2010, the Complaints Board for Public Procurement has been given powers to issue enforcement notices and impose financial sanctions, if the procurement rules are violated.

Although Denmark ranks relatively well in terms of advertised public procurements, the improvement in the last decade has not been as strong as elsewhere (Figure 4). There is some choice of public and private providers of welfare services. For example, in 2010, one third of the practical assistance to elderly and disabled people was provided by the private sector (Competition Authority, 2011). However, with only 25% of municipal contracts tendered in 2009, there is room for further expansion. Restrictive regulations in this area may decrease incentives to innovate and lower productivity.

**Figure 4. Public procurement, openly advertised**



Source: Eurostat, *Structural Indicators*.

*There is scope to improve the institutional set-up further*

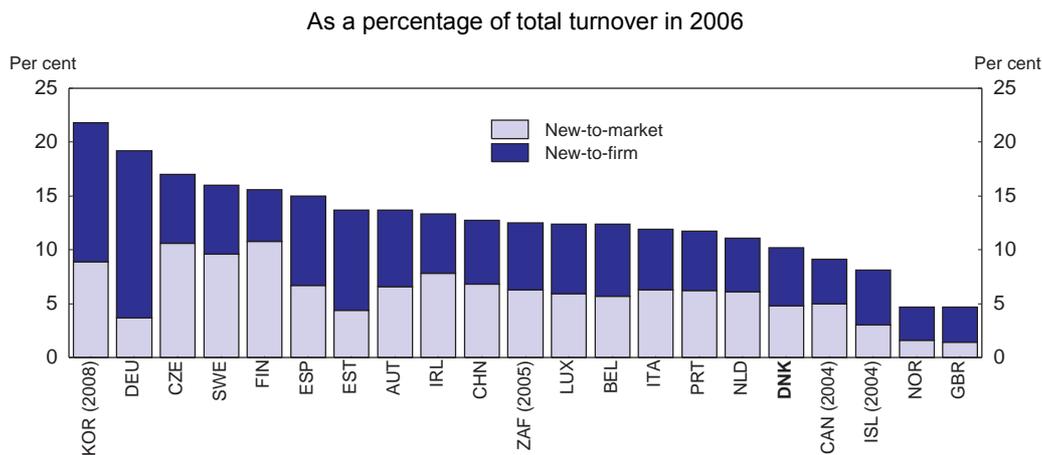
17. The organisational setup and enforcement powers of competition authorities are important determinants of their effectiveness. An effective competition authority should combine independence with close coordination with related agencies to minimise duplication and ensure consistency. They should have adequate powers to investigate anticompetitive behaviour and prosecute and impose sanctions. The Danish Competition and Consumer Authority (DCCA) satisfies most of these criteria. In April 2010, merger control was strengthened by lowering the thresholds of merger notifications, simplifying the procedures for handling unproblematic mergers, and extending the time limits for the handling of problematic ones (OECD, 2010a).

18. There is room to improve the institutional set-up further in Denmark. 15% of firms believe that there are violations of the Competition Act and that more effective investigation of uncompetitive practices by the authorities would be possible (Competition Authority, 2010b). The existence of two bodies between the DCCA and the courts (the Competition Council and the Appeals Tribunal), neither of which can impose fines, is not efficient. The Competition Council has 17 members, including experts and consumer and industry representatives, but there might be scope for improving its effectiveness by basing the board more on legal and economic experts. The remaining gaps that undermine decisions made by the DCCA include the lack of powers to directly prosecute and impose fines and the weakness of its sanctions. Unlike in many other European countries, the DCCA has to hand over its cases to the police and the prosecutor to bring them to court. The level of sanctions in Denmark is comparatively weak as well, with no possibility of imprisonment and low fines. The largest fine ever imposed in Denmark has been for DKK 5 million, corresponding to 0.06% of the relevant firm's annual turnover (McKinsey, 2010).

*Improved competition will enhance innovation*

19. In Denmark, innovation is high as measured by the number of patents, R&D spending as a percentage of GDP and R&D personnel (OECD, 2009b). R&D spending is 2.7% of GDP, compared to the OECD average of 2.3%. However, there is some room for improvement. The number of firms reporting product or process innovations is slightly lower than the average of other countries, and the share of turnover from new product innovations is low in Denmark (Figure 5).

**Figure 5. Firms' turnover from product innovation<sup>1</sup>**



1. Turnover or sales revenue is the total amount of money that the firm has earned from the sales of all its products during a given time period.

Source: OECD, *Innovation Micro Data Project based on CIS-2006*, June 2009 and national data sources.

20. Firm-level analysis for Denmark shows that firms engaged in R&D investment are more likely to be large and have higher productivity (Graversen and Mark, 2005). R&D active firms account for close to one half of total value added in the private sector, while making up 17% of the total number of firms. This is a pattern observed in many countries since a large firm size provides more resources for innovation. Therefore, in order to increase innovation, there is scope to improve regulations that restrict firms from becoming large.

21. Innovation results from a range of complementary assets that go beyond R&D, such as software, human capital and new organisational structures. Investment in these intangible assets is rising and overtaking investment in physical capital (machinery and equipment) in Finland, Sweden, the United Kingdom and the United States. Relatively weak competition in Denmark can partly explain the relatively low investment in intangible assets (Table 2).

**Table 2. Investment in intangible and fixed assets, as a share of GDP in 2006<sup>1</sup>**

	<b>Intangible assets<sup>2</sup></b>	<b>Fixed assets</b>
United States	12.0	7.5
Sweden	11.9	9.7
Japan	11.1	15.3
Canada	9.8	11.6
United Kingdom	9.7	5.9
Finland	9.1	7.5
France	7.9	8.9
<b>Denmark</b>	<b>7.9</b>	<b>8.8</b>
Portugal	7.6	10.7
Germany	7.2	8.3
Austria	6.5	10.0
Czech Republic	6.5	16.2
Australia	5.9	13.2
Spain	5.5	11.9
Italy	5.0	17.0
Slovak Republic	4.5	19.8

1. For Canada, Japan and Portugal, data pertain to 2005.

2. Intangible assets include software and databases, R&D and other intellectual products, brand equity, firm specific human capital, organisational capital. Fixed assets refer to machinery and equipment.

Source: OECD (2010), Measuring Innovation: A New Perspective.

### ***Bottomline***

22. Although Denmark ranks well in traditional overall competition indicators, weak competition in some areas may have contributed to relatively low productivity growth. There is room to improve competition, especially in services. Easing access by larger and international firms would help exploit economies of scale and stimulate R&D, thereby addressing the issue of high prices.

### **Education**

#### ***International background***

23. Both neoclassical and endogenous growth theories suggest that human capital has a positive effect on growth, both by improving labour productivity and contributing to overall technological progress (Romer, 1986; Lucas, 1988; Aghion and Howitt, 1998). Greater human capital can lead to a shift of production towards higher-value-added activities, improve entrepreneurship and make it easier to adopt new technologies, techniques and processes, thereby increasing the effects of R&D and spillover from FDI. Accumulation of human capital:

- allows workers to use existing physical capital more efficiently,
- increases the productivity of other factors,
- drives the development and diffusion of new technologies (Benhabib and Spiegel, 1994), and
- improves the adoption of the techniques developed externally (Nelson and Phelps, 1966).

24. Early empirical studies have found the relationship between education and growth to be positive (Barro, 1991; Mankiw *et al.*, 1992), although there were some contrary results (Pritchett, 1996). Although the magnitude and causality of the relationship were not well-established initially, as data and specification methods were improved, more stable positive results were established (Sianesi and van Reenen, 2003; Moretti, 2004; de la Fuente and Jimeno, 2009). The quality of education is also important for the size of the effect on growth (Hanushek and Kimko, 2000; Krueger and Lindhal, 2001).

25. The effect of education on growth also depends on the distance from the technological frontier. Romer (1990) suggests that human capital used in R&D is important for countries at the frontier, whereas in other countries, the average level of education available will determine the speed of technology dissemination. Islam (2010) finds that the effect of human capital on growth increases as the distance to the technological frontier narrows for medium and high-income countries.

### ***Empirical findings for Denmark***

#### *There is room to improve the efficiency of the education system*

26. While Danish public spending on education is among the highest among the OECD countries, the performance of the education system is mixed. On the one hand, overall education attainment is relatively high in Denmark, with 76.3% of the relevant age group in upper secondary education compared to the OECD average of 73.3%, and 34.3% in tertiary education, compared to an OECD average of 30%. Graduation rates in tertiary education of 47.3% also exceed the 38.6% OECD average. On the other hand, 39.5% of students do not complete upper secondary degrees within the theoretical duration, against an OECD average of 32%. Furthermore, PISA scores in reading, mathematics and science are close to OECD averages, despite higher spending on education (Figure 6).

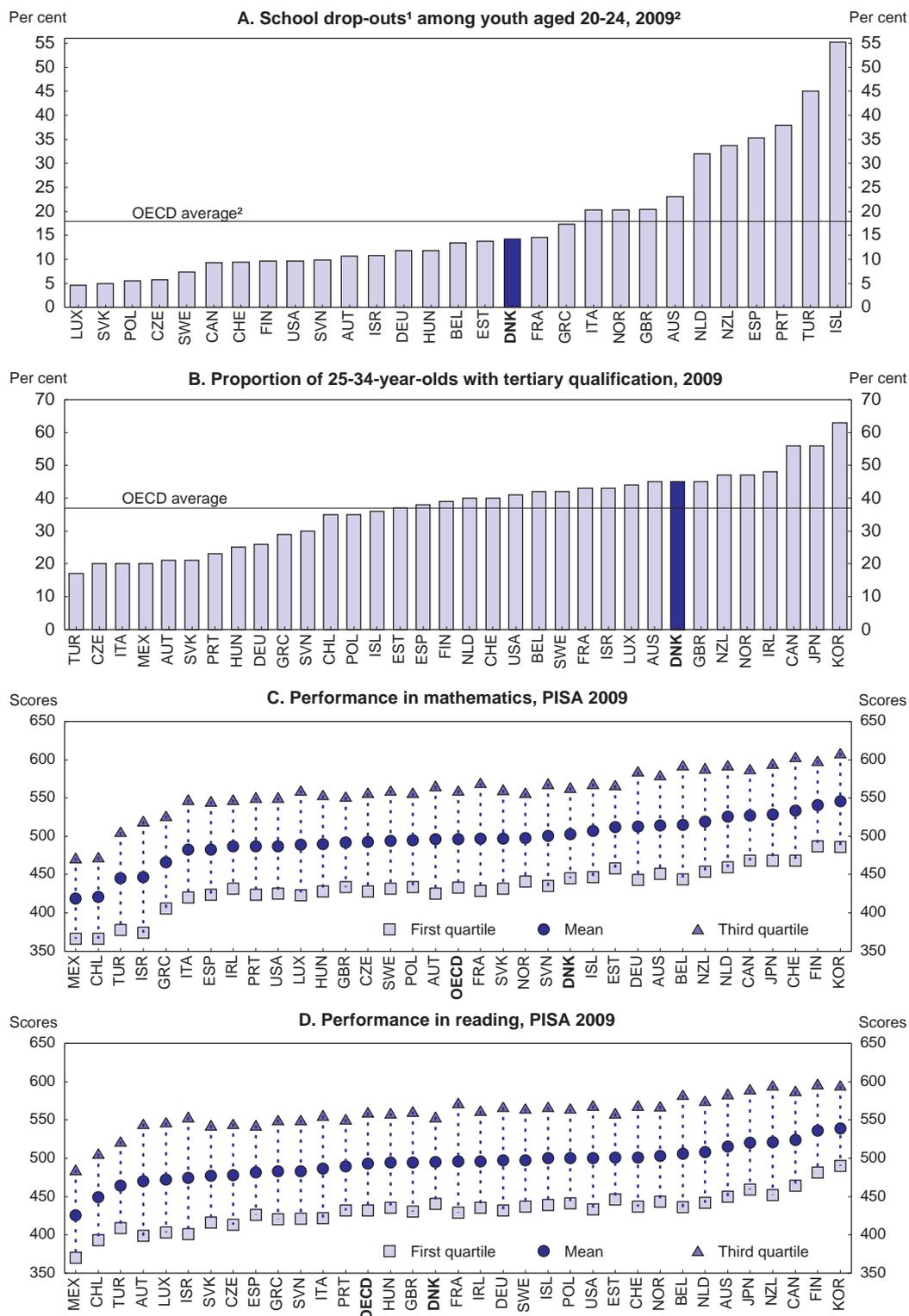
27. Measures to improve the efficiency of the Danish education system have been discussed in detail in the OECD 2009 *Economic Survey*. Improving the assessment and evaluation framework would give students and teachers incentives to perform better (Shewbridge *et al.*, 2011). This should be complemented by higher pay flexibility for teachers and school managers. Earlier completion of tertiary education could be encouraged by a system of tuition fees with income-contingent loans (OECD, 2012). The Growth Forum also made some recommendations to improve education outcomes (Box 1).

#### **Box 1. Recommendations from the Growth Forum on education**

Several recommendations were also made in the Growth Forum in order to improve education outcomes:

- Primary and secondary education: clearer objective setting for learning, provision of more information on school performance and more challenges to talented students, improving teacher competencies, allocation of more time by teachers to teaching compared to other activities, greater use of IT resources in teaching, choosing school managers on the basis of management skills, provision of more freedom in management together with increased accountability.
- Further education: improving the match between output from education and business needs (greater priority for fields where demand for employment is high, such as engineering and economics), increasing the cooperation between business and educational institutions, increasing the flexibility of further education with a greater role for the bachelor level and transition opportunities to different fields, making the student support system dependent on progress and switching it to loans at levels higher than a bachelor degree.
- Vocational education: improving the quality of existing institutions, tailoring the programmes more to individual needs of students in order to challenge the good ones and improve the completion rates of weaker ones, providing more opportunities for transition to further education from vocational training.

**Figure 6. Indicators of the performance of the education system**



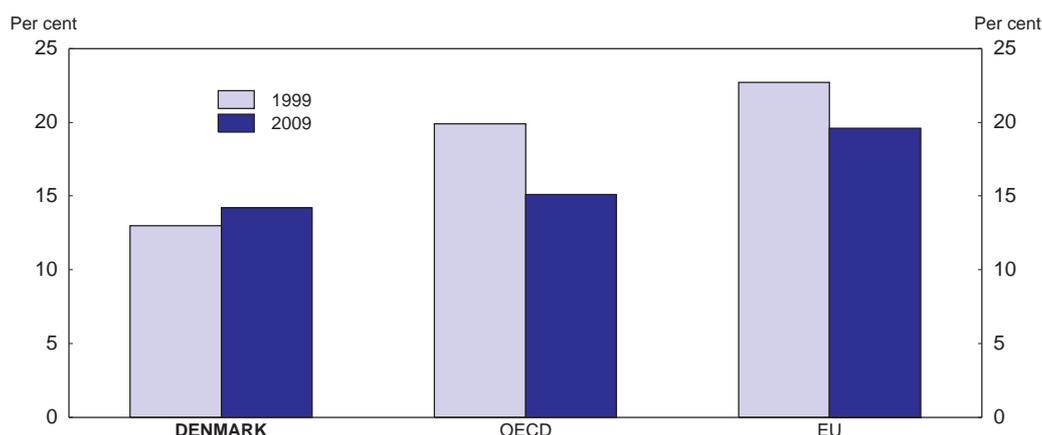
1. No longer in education without International Standard Classification of Education upper secondary level (ISCED level 3).  
 2. Unweighted average of countries shown.  
 Source: OECD *Project on Jobs for Youth* ([www.oecd.org/employment/youth](http://www.oecd.org/employment/youth)); OECD (2011), *Education at a Glance 2011*, OECD, Paris; OECD (2010), *PISA 2009 Results: What Students Know and Can Do*, Volume I, OECD, Paris.

*Increasing completion rates is a priority of the new government*

28. One of the biggest challenges is to increase completion rates in upper secondary education. The new government has kept the national target of a 95% completion rate to be achieved by 2015, and made it more ambitious by targeting a 60% completion rate for tertiary education by 2020. Based on past trends, 84% of students are expected to complete their upper secondary education by 2015. The share of the population aged 18 to 24 with at most lower secondary education and not in further education fell slightly in 2008 to 11.5%, after rising in the previous years, which could be a result of the economic crisis driving youth to seek education in the absence of jobs. Despite this fall and a figure below the European Union (EU) average of 14.9%, the gap to the target remains large.

29. In the last decade, drop-out rates of 15-24 year olds have increased in Denmark, while decreasing in the European Union and OECD, on average (Figure 7). This was driven especially by males with completion rates of 63.6%, compared to 78.6% for females. Although the tendency for females to outperform males in this area is observed in many countries, the gap is larger in Denmark. The large gap can be explained mainly by the drop-out rates in male-dominated areas of vocational training (OECD, 2010b). In 2008, completion rates for general upper secondary, vocational upper secondary and vocationally-oriented education and training were 82%, 78% and 48%, respectively.

**Figure 7. School drop-outs among youth aged 15-24<sup>1</sup>**



1. Share of youth not in education and without an ISCED 3 educational attainment.

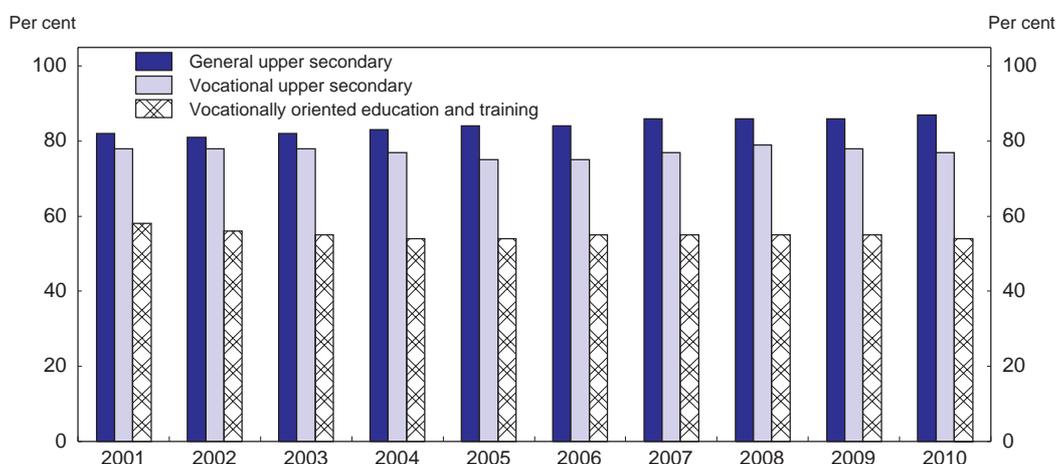
Source: OECD Project on Jobs for Youth ([www.oecd.org/employment/youth](http://www.oecd.org/employment/youth)).

*Further reform of the vocational education and training system is key*

30. Over the past two decades, reforms to the vocational education training (VET) system have streamlined it and made it more transparent and coherent, with an aim to make it more focused on individual needs of stronger as well as weaker students. The reforms to make VET more attractive to youth with different backgrounds and qualifications have included the introduction of new instruments to support an individual student's educational programme such as a portfolio to link school and workplace learning, provision of a contact mentor, and the introduction of an electronic education plan. In 2005, the Ministry of Education published guidelines detailing best practices in VET, such as preparing plans of actions with goals and strategies for an increased rate of completion, offering basic course packages that take into consideration the needs of weak students, and increasing emphasis on guidance and mentoring. Opportunities to divide the education into steps and individual courses of study have been created to address different competencies of students, and the efforts to create more practice placements and improve the quality of school-based practical placements have been strengthened (Ministry of Education, 2010).

Although these initiatives to increase individualised service provision are welcome, there is still scope to develop them further (Sabel *et al.*, 2010; OECD, 2012). Furthermore, completion rates for VET have fallen by ten percentage points since 2000 (Figure 8).

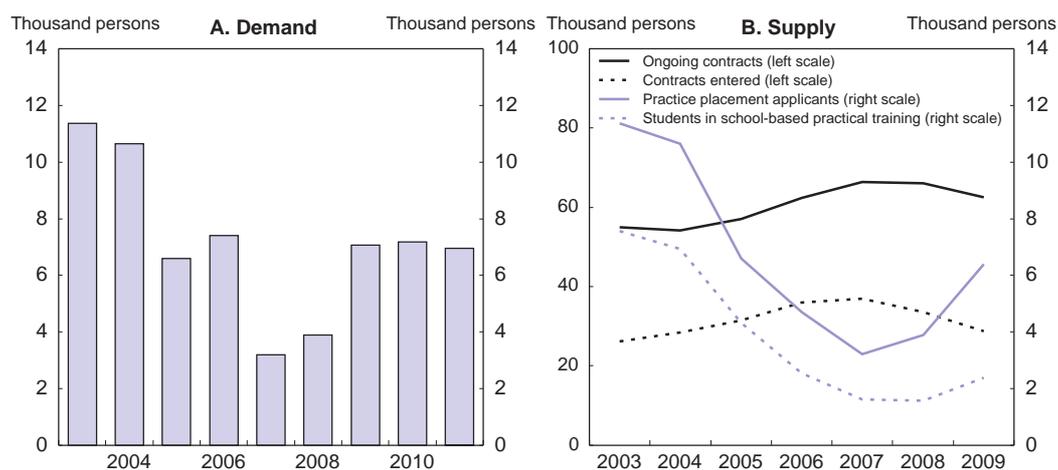
**Figure 8. Completion rates**



Source: Danish Ministry of Education Database.

31. The introduction of the basic programmes contributed to lower dropout rates in 2009 compared to 2008. To lower them further, the Danish Ministry of Education is considering options to improve the reputation of some of these programmes to attract stronger students as the lack of an admission criterion makes participation in VET a bad signal in the case of the more skilled students. As a result of the recent crisis, there has been an increase in the participation rates in education and training among youth, but VET has not received as much demand as general upper secondary education, partly due to these reputational effects and the lack of apprenticeship opportunities that restrict completion prospects.

**Figure 9. Demand and supply for apprenticeships**



Source: Danish Ministry of Education (2010), *Key Figures in Education*.

32. The availability of apprenticeships is important for the success of vocational training (Ministry of Education, 2010). The new government has concentrated on inadequate apprenticeship opportunities as a source of high drop-outs from VET. Demand for apprenticeships decreased during the boom years but bounced back with the crisis, even as their availability declined. Such procyclicality of apprenticeship availability contributes to lower completion rates in VET (Figure 9).

33. The Danish authorities have taken a variety of measures to address these challenges, which were compounded by the recent crisis. Youth Packages I and II in 2009 included initiatives directed at VET, such as the strengthening of existing mentor schemes, increasing the flexibility of VET, evaluating the curricula to assess whether unnecessarily stringent demands are made on students in terms of theoretical knowledge, and investing in guidance services. In order to address the apprenticeship gap, the Training Placement Package allocated DKK 1.35 billion to create 5000 new training placements in 2010. Measures include the provision of larger financial incentives to enterprises to create new training placements, an increase in the number of training placements within the VET colleges, and the creation of an obligation on the public service to create new placements. The previous government reached an agreement in November 2010 to allocate a further DKK 2.4 billion to provide 8900 apprenticeships for vocational education in 2011 (European Commission, 2011). The new government announced a DKK 2.6 billion allocation in the Fiscal Bill for 2012, leading to 10400 extra apprenticeships in 2012. It also established a working group to decrease the red tape for apprenticeships in the public sector, and set up trial internship centres at several vocational schools.

### ***Bottomline***

34. Despite high overall education attainment levels, there is room to improve the efficiency of the Danish education system. Lowering the drop-out rates in upper secondary education, especially from vocational training, can be achieved by further implementing reforms to address different skills and ethnic backgrounds of students and improving the availability of apprenticeship contracts, which form a big part of the success of vocational training. Overall, this would increase human capital, adding to productivity growth in the long run.

### **Employment protection legislation**

#### ***International background***

35. Employment protection legislation (EPL), the set of rules governing the hiring and firing of employees, is an important factor determining the flexibility of labour markets. Despite a large number of studies, there is no consensus on the relationship between EPL and productivity. The level of EPL most conducive to productivity growth depends on a number of factors, including wage rigidity and redistribution patterns.

- By increasing job tenure, strict EPL gives firms better incentives to invest in workers and leads to higher firm-specific training (Belot *et al.*, 2007), and learning-by-doing effects are captured better, leading to higher productivity growth. Likewise, an employee will have a stronger incentive to participate in productivity-enhancing firm-specific investment.
- EPL might raise average productivity by increasing reservation wages and making firms more selective such that less productive matches are not realised (Lagos, 2006).
- Employment protection may also lower productivity by reducing worker effort due to a lack of threat of layoffs in response to poor work performance or absenteeism (Ichino and Riphahn, 2005).

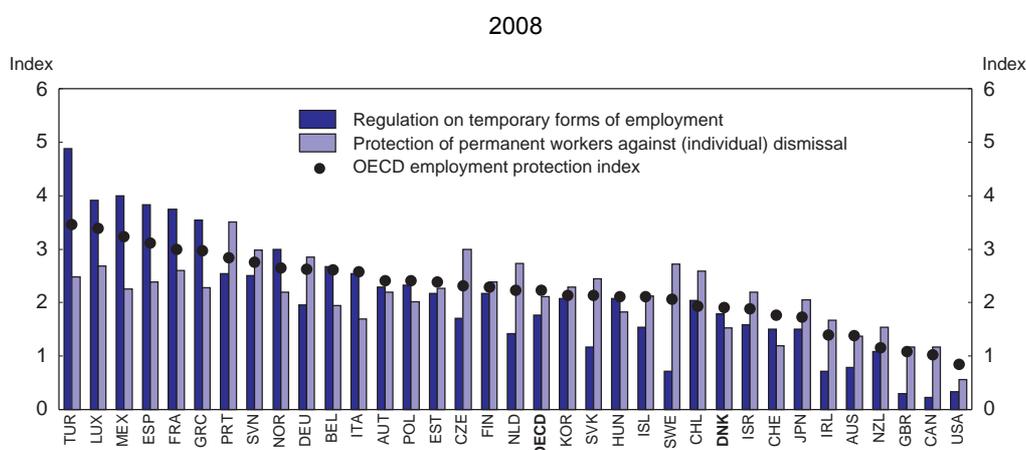
- Strict EPL imposes implicit and explicit costs on a firm's ability to adjust its labour force, leading to lower firing and hiring, such that the effect on average employment over the business cycle is ambiguous, but the speed of adjustment to equilibrium is lower. Strict EPL reduces the productivity threshold at which firms are willing to lay off workers and makes firms less willing to hire new workers if they expect employment changes in the future. This makes it hard for firms to adapt to changes in technology or product demand, leads to inefficient use of resources and lowers the return to investment and capital accumulation (Hopenhayn and Rogerson, 1993). As a result, strict EPL will be costlier in industries characterized by rapid technological change such as ICT (Samaniego, 2006). Bassanini *et al.* (2009) find that mandatory dismissal regulations have a depressing impact on productivity growth in industries where layoff restrictions are more likely to be binding.
- Creative destruction might be less in the presence of strict EPL since unproductive firms may not be able to exit due to high firing costs (Poschke, 2009).
- EPL may affect productivity by influencing the risk level that firms are willing to endure. Experimentation with new technologies and products are less common in countries with strict EPL (Bartelsman *et al.*, 2011). Saint-Paul (2002) argues that high firing costs may induce firms to engage in innovation that improves existing products rather than innovation that creates new ones, which are riskier but also have a larger productivity growth potential. Entry by innovative firms may also be deterred due to strict regulations. On the other hand, firms may be driven to productivity-enhancing investments in order to avoid downsizing (Koeniger, 2003), suggesting that the net effect of EPL on innovation and productivity growth is unclear.

### Empirical findings for Denmark

#### *EPL is relatively unrestrictive*

36. EPL is relatively unrestrictive in Denmark compared to other OECD economies (Figure 10). For employers, the cost of laying off workers is low due to relatively low procedural inconveniences and difficulties of dismissal (shorter notice periods for terminating employment contracts and less extensive severance pay). On average, for example, for white-collar workers, severance pay is provided only after 20 years of employment at an average rate of 1.5 month's salary. There is no severance pay for blue-collar workers on the basis of collective agreements. The unemployment insurance system is based on past salaries, rather than on experience.

Figure 10. Job protection in OECD countries<sup>1</sup>



1. OECD indicator for strictness of employment protection legislation. Index scale is 0 to 6, from least to most restrictive. Source: OECD, *Employment Protection Database*.

37. Combined with a generous social safety net and well-developed active labour market participation programmes, Denmark's flexible EPL constitutes its flexicurity system that has led to good employment outcomes (Andersen, 2011). Denmark's mediocre productivity performance cannot be readily ascribed to lax EPL since other countries with similar levels of EPL, such as Australia, the United Kingdom and the United States, have seen productivity grow faster. Furthermore, Denmark already had the flexicurity system during the period when productivity was improving relative to the United States.

38. Evidence of flexible labour markets leading to greater innovation in more complex, new products is mixed in Denmark. For example, the United States has flexible labour markets and a relatively high proportion of high-technology patents (aircraft, pharmaceuticals, office and computing machinery, communications equipment, and medical and optical instruments). However, Denmark specialises less in high-technology patents than Finland and Sweden, despite relatively more flexible labour laws (Table 3).

**Table 3. Patents by sector<sup>1</sup>**

Share of national total patents, 2006-08

	<i>Denmark</i>	<i>Finland</i>	<i>Germany</i>	<i>Sweden</i>	<i>United States</i>	<i>OECD</i>
<b>High technology</b>	0.44	0.57	0.36	0.55	0.53	0.48
<b>Medium-high technology</b>	0.07	0.03	0.04	0.03	0.04	0.04
<b>Medium-low technology</b>	0.39	0.31	0.48	0.33	0.32	0.37
<b>Low technology</b>	0.09	0.08	0.11	0.07	0.08	0.09
<b>2008 EPL</b>	<b>1.91</b>	<b>2.29</b>	<b>2.63</b>	<b>2.06</b>	<b>0.85</b>	<b>2.23</b>

1. A small share is not classified under any of these classifications. Definition of the different classification can be found at <http://www.oecd.org/dataoecd/43/41/48350231.pdf>.

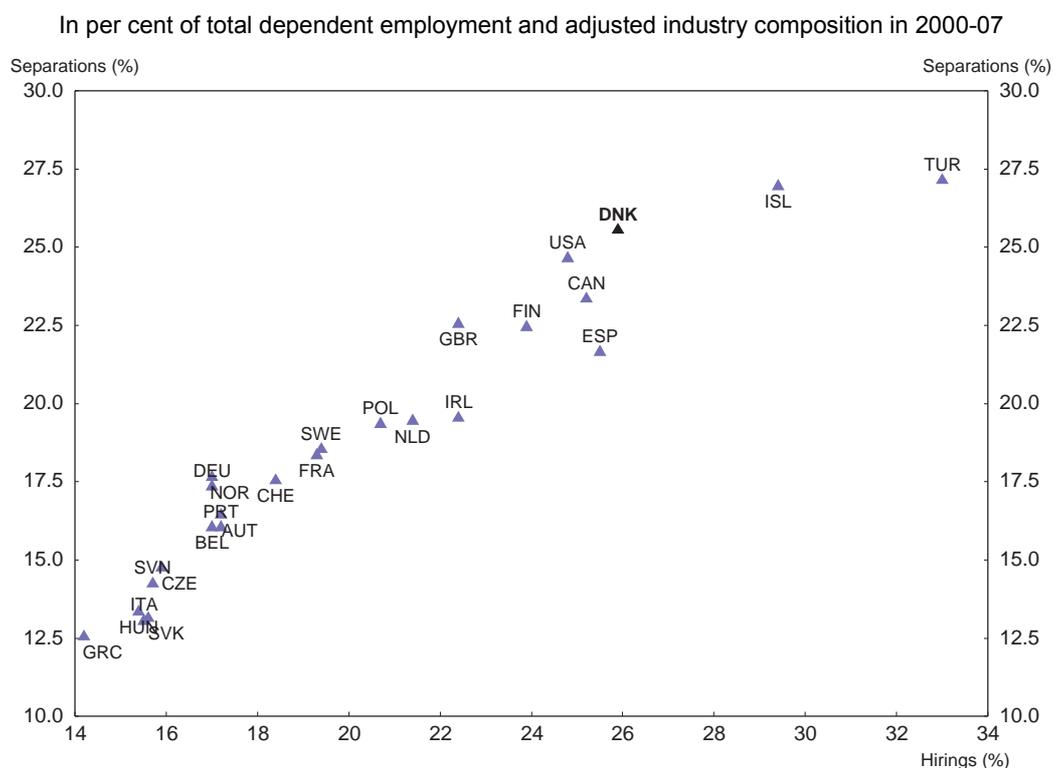
Source: OECD Patent Database and OECD Employment Protection Legislation Database.

#### *Turnover is high*

39. The flexicurity system is associated with high job flows. Generous unemployment benefits and the transferability of social benefits, pensions and holidays, imply that the costs of changing jobs or experiencing unemployment spells are low (Eriksson and Westergaard-Nielsen, 2009). The labour market is quite dynamic in Denmark, with annual job hiring and separation rates at about 20% (Figure 11; OECD, 2009b). This is comparable to other countries with large shares of temporary workers (Finland, Poland, and Spain) or relatively flexible regulations of open-ended contracts (the United Kingdom and the United States).

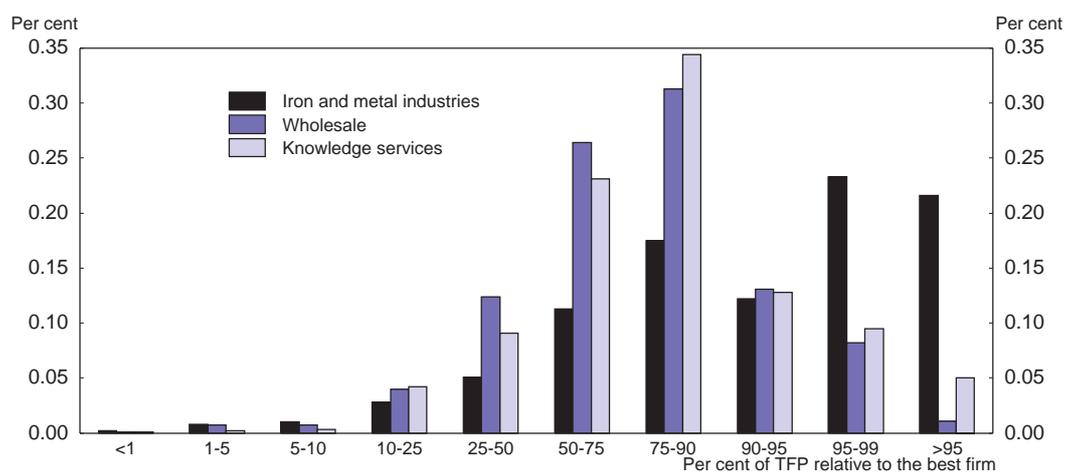
40. High job flows can be associated with better allocation of labour and higher productivity. Andersen (2011) shows that there is room for large gains from reallocation of labour in Denmark, which would be facilitated by the flexibility of the labour markets. TFP is highest among firms employing labour with better education, so there is scope for reallocation of high-skilled labour from unproductive firms to more productive ones. The reallocation of employment from less to more productive companies would also deliver productivity gains. For example, in knowledge services, three fourths of firms with low TFP generate 21% of gross value added and account for 10% of employment, whereas 10% of companies produce 73% of gross value added (Figure 12).

**Figure 11. Hirings and separations**



Source: OECD (2010), *Employment Outlook*.

**Figure 12. Fraction of sector employment by firm TFP**

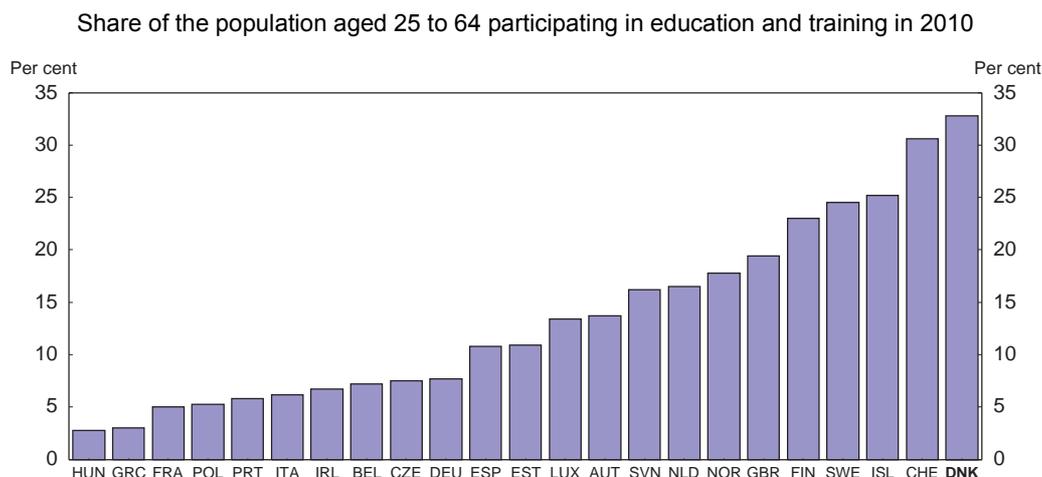


Source: Danish Economic Council (2010).

*Investment in human capital is not necessarily hindered by EPL*

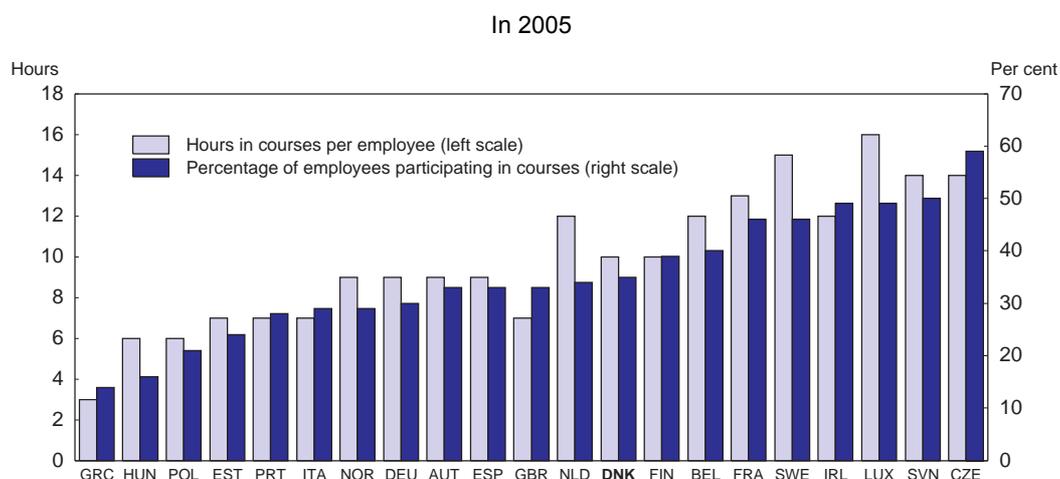
41. Considerable public and private resources are devoted to training and education in Denmark, especially for a country that has experienced relatively low levels of unemployment in the past. This contrasts with the conclusion in IMF (2010) that too much flexibility in labour markets leads to lower TFP in Denmark, by decreasing the cost of labour search and the incentives to invest in firm-specific human capital. In fact, Denmark had high levels of participation in job-related adult learning in the 1990s (OECD, 2010b) and more recently a lifelong learning indicator ranked Denmark well above other European countries (Figure 13).

**Figure 13. Lifelong learning**



Source: European Union Labour Force Survey, *Module on Lifelong Learning*.

42. In addition, there exist explicit or implicit arrangements between employers and employees that help protect firm-specific human capital and diversify risk. Participation in continuous vocational training by employees is common (Figure 14). Finally, although firing costs are low, in general this is exercised mainly during persistent recessions, suggesting that both firms and employees still have incentives to invest in firm-specific training. In addition, temporary layoffs are common in Denmark (Anderson and Svarer, 2007). A study by the Danish Economic Council in 2002 showed that in 1998, 30% of all unemployment spells were followed by rehiring by the initial employer within four weeks, suggesting that temporary layoffs accounted for 10% of total unemployment, and did not constitute an impediment to firm-specific training.

**Figure 14. Participation in continuous vocational training**

Source: Eurostat, *Continuous Vocational Training Survey (CVTS)*.

### **Bottomline**

43. There is no clear evidence to suggest that lax EPL leads to lower productivity growth in Denmark. Despite lower job tenure, there is still investment in training by firms, workers and the government, and survey evidence does not reflect any concerns about job security, given the benefits of the flexicurity system. The dynamic nature and the flexibility of labour markets can contribute to the much-needed reallocation of labour to more productive firms, increasing overall productivity growth.

### **Size of the public sector**

#### ***International background***

44. The impact of the size of the government on economic growth has attracted much attention, especially in the context of countries with a relatively large public sector and low productivity growth (Cook *et al.*, 2011). The size of the government includes several features such as the level of expenditures, and the extent of regulation and ownership. The government has a broad set of objectives, of which economic performance is only one. To some extent, there is a trade-off between the goal of achieving good economic performance and social objectives. Government size is generally measured in terms of expenditures. It can affect growth through various channels such as the cost of financing government expenditure, the mix of public spending, differences in the rate of productivity growth between the private and public sector, the impact of benefits on incentives to work, and the shift of resources from the external sector to the domestic economy.

45. The first channel is the cost of taxation. Taxes affect the decisions of households to supply labour, save and invest in human capital, and of firms to produce, invest, innovate and create employment, and of investors to choose assets. The tax structure is also important as taxes that reduce incentives to innovate and invest in physical and human capital are more damaging and a shift from taxing incomes and profits to property and consumption can increase growth (Arnold *et al.*, 2011; Barrios and Schaechter, 2008). Decreasing the proportion of more distortionary taxes can help cushion the costs of this channel on economic growth.

46. The growth impact of a given level of expenditure will be determined by its composition (Gemmel *et al.*, 2009). Concentrating expenditures on productive uses, such as the provision of a legal system, increasing investment in physical and human capital, R&D and public infrastructure, especially when market failures result in underinvestment by the private sector, can have a positive impact on economic growth (Bassanini *et al.*, 2001; Angelopoulos *et al.*, 2007). However, there is no consensus on what qualifies as productive expenditure. The long-run impact of public investment on growth is controversial, whereas public transfers and consumption are typically estimated to negatively affect economic growth. Social welfare benefits are sometimes seen as unproductive as they lessen incentives to work and save, but there are offsetting benefits such as incentives to wait for jobs that match skills better, to be more entrepreneurial, and to invest more in human capital (Kneller *et al.*, 1999a and 1999b). In addition, by reducing inequality, they may enhance growth (Barro, 2000).

47. Differences in productivity growth rates between the public and the private sector, and the efficiency of public expenditure, also influence economy-wide productivity performance. Public-sector productivity might be lower because some activities generally provided by the government have low productivity potential by nature but also because of the lack of competition in some activities dominated by the public sector. Many government services, such as police and education, have limited scope to reduce the quantity of labour without reducing their quality, and display limited productivity gains (Baumol, 1967). The lack of competition and profit-maximisation incentives in the public sector reduce innovation and “creative destruction”, a key mechanism of allocating resources to their most productive uses (Guriev and Megginson, 2005; Labonte, 2010). The incentives to monitor performance and improve corporate governance are also stronger in the private sector (Barry, 2002).

48. Overall, the relationship between government size and productivity growth is ambiguous as the relative importance of the positive effects due to beneficial externalities (legal system, infrastructure, correction of market failures) against the negative effects (government inefficiencies, burden of taxation, distortions of intervention in free markets) is hard to assess (Loko and Diouf, 2009). Empirical studies have mixed results and depend on the choice of countries and periods. Among OECD economies, small governments perform better in administration and economic performance, but incomes on average are more evenly distributed under large governments (Handler *et al.*, 2005, 2011).

### ***Empirical findings for Denmark***

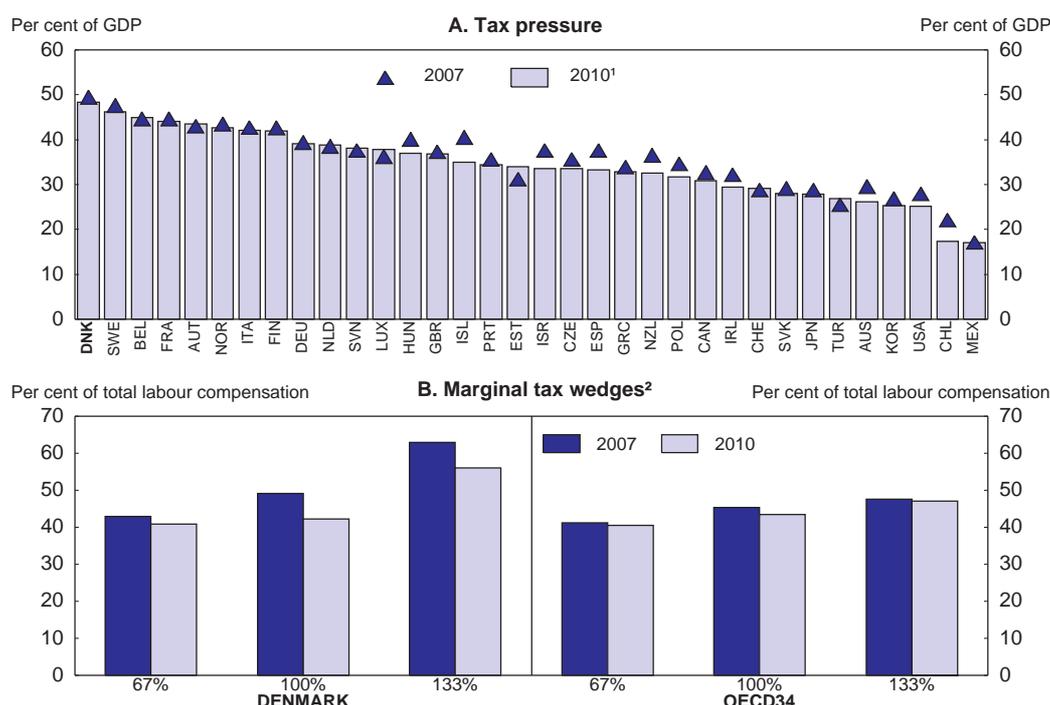
49. Difficulties in measuring productivity in services make international comparisons challenging. Labour productivity growth in the public sector has historically been set at zero with output assumed to equal inputs. This could unduly suggest lower aggregate productivity growth for countries with large public sectors (OECD, 2009a). Recent work by Statistics Denmark aims to better measure output and productivity in Denmark’s large public sector by moving from an input measure to an output measure. With this correction, the production of public services is increased, but the effect on overall labour productivity is less clear (Deveci, 2011).

50. Denmark ranks relatively well on a number of indicators that compare public sector performance and efficiency across countries. According to the World Bank’s government effectiveness indicator, which captures perceptions of the quality of public services, the quality of policy formulation and implementation, and the credibility of the government’s commitment to such policies, Denmark ranks second amongst OECD countries. However, tax pressure is high and there is room to improve the efficiency of public spending, especially in health and education (Joumard *et al.*, 2010; OECD, 2012).

### Tax pressure is high in Denmark

51. In Denmark, taxes are among the highest in OECD countries, due to the large size of the public sector and the objective of low inequality in society (Figure 15). Despite recent improvements, taxes on labour remain high in comparison to other OECD countries (OECD, 2011). In particular, high marginal tax wedges for incomes above the average can discourage workers from working longer hours, limit the attraction of foreign skilled workers and decrease entrepreneurship. There is also room for a move towards less distortionary taxes, such as on property. The freezing of property value taxes in nominal terms since 2002 has lowered property taxes, which can distort the allocation of saving and investment (Andrews *et al.*, 2011; OECD, 2012).

**Figure 15. Tax pressure and marginal tax wedges**



1. Or latest year available.

2. Evaluated at 67%, 100%, 133% of average earnings for a single person with no child.

Source: OECD Analytical Database and OECD Tax Database.

### There is room to improve the efficiency of public spending

52. Inefficient public spending is a drag on productivity. The high level of public expenditure in Denmark leads to good outcomes in terms of well-being and limiting inequality. In particular, social expenditures on incapacity, unemployment and health benefits are high relative to the OECD average (Table 4). However, Afonso *et al.* (2005) show that while Denmark's public sector performance ranks above the average of 23 OECD countries, its efficiency is below average. Furthermore, their efficiency analysis shows that, in Denmark, 62% of the current spending on public services would be sufficient to achieve the same public sector performance.

**Table 4. Social public expenditure in OECD countries**

Per cent of GDP in 2007

Countries	Old age	Incapacity	Health	Unemployment	ALMP <sup>2</sup>	Other	Total, gross basis	Total, net basis <sup>3</sup>
Australia	4.3	2.2	5.7	0.4	0.3	3.1	16.0	18.2
Austria	10.7	2.3	6.8	0.9	0.7	5.0	26.4	24.8
Belgium	7.1	2.3	7.3	3.1	1.2	5.3	26.3	26.2
Canada	3.8	0.9	7.0	0.6	0.3	4.3	16.9	19.4
Chile	4.5	0.7	3.7	0.0	0.3	1.4	10.6	
Czech Republic	6.9	2.3	5.8	0.6	0.3	2.9	18.8	19.2
<b>Denmark</b>	<b>7.3</b>	<b>4.4</b>	<b>6.5</b>	<b>1.9</b>	<b>1.3</b>	<b>4.7</b>	<b>26.1</b>	<b>23.9</b>
Estonia	5.2	1.8	4.0	0.1	0.1	1.8	13.0	
Finland	8.4	3.6	6.0	1.5	0.9	4.4	24.8	22.6
France	11.1	1.8	7.5	1.4	0.9	5.7	28.4	29.9
Germany	8.7	1.9	7.8	1.4	0.7	4.7	25.2	27.2
Greece	10.0	0.9	5.9	0.5	0.2	3.8	21.3	
Hungary	8.3	2.7	5.2	0.7	0.3	5.7	22.9	
Iceland	2.3	2.2	5.7	0.2	0.0	4.2	14.6	16.8
Ireland	3.1	1.8	5.8	1.0	0.6	4.0	16.3	16.8
Israel	4.3	2.9	4.3	0.3	0.1	3.6	15.5	
Italy	11.7	1.7	6.6	0.4	0.5	4.0	24.9	25.8
Japan	8.8	0.8	6.3	0.3	0.2	2.3	18.7	20.3
Korea	1.6	0.6	3.5	0.3	0.1	1.5	7.6	9.5
Luxembourg	4.8	2.7	6.4	0.9	0.5	5.3	20.6	19.1
Mexico	1.1	0.1	2.7	0.0	0.0	3.3	7.2	8.9
Netherlands	5.3	2.9	6.0	1.1	1.1	3.7	20.1	20.4
New Zealand	4.2	2.5	7.1	0.2	0.4	4.0	18.4	18.4
Norway	6.2	4.3	5.7	0.2	0.6	3.8	20.8	20.0
Poland	8.7	2.4	4.6	0.3	0.5	3.3	19.8	18.8
Portugal	9.2	2.1	6.6	1.0	0.5	3.1	22.5	23.6
Slovak Republic	5.4	1.5	5.2	0.4	0.2	3.0	15.7	16.0
Slovenia	8.2	2.1	5.6	0.4	0.2	3.8	20.3	
Spain	6.5	2.5	6.1	2.1	0.7	3.7	21.6	21.6
Sweden	9.0	5.0	6.6	0.7	1.1	4.9	27.3	26.0
Switzerland	6.3	3.0	5.6	0.6	0.6	2.4	18.5	
Turkey	5.0	0.1	4.1	0.0	0.0	1.3	10.5	11.3
United Kingdom	5.8	2.4	6.8	0.2	0.3	5.0	20.5	22.7
United States	5.3	1.3	7.2	0.3	0.1	2.0	16.2	18.9
<b>OECD<sup>1</sup></b>	<b>6.4</b>	<b>2.1</b>	<b>5.8</b>	<b>0.7</b>	<b>0.5</b>	<b>3.7</b>	<b>19.2</b>	<b>20.2</b>

1. Weighted average of 34 countries.

2. Active labour market programmes.

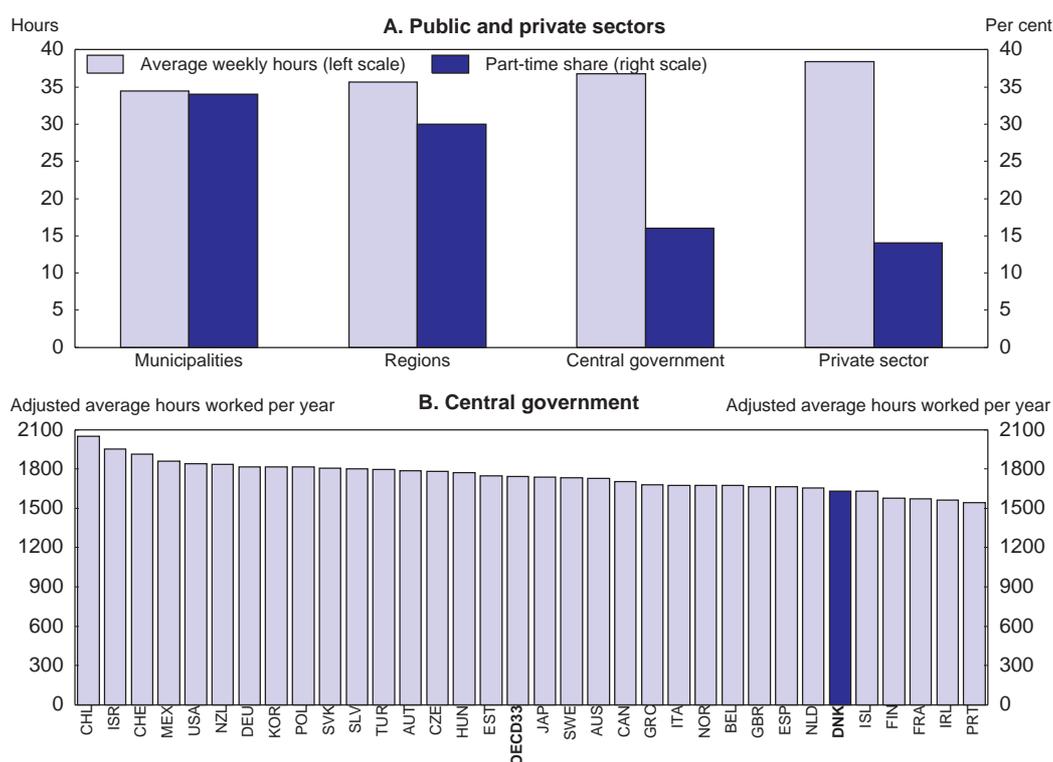
3. Net publicly mandated social expenditure, which account for the effect of government intervention through the tax system on social spending. It includes: *i*) direct taxes and social security contributions on cash transfers, *ii*) indirect taxes on goods and services bought by benefit recipients and *iii*) tax breaks with a social purpose.Source: OECD (2010), *Social Expenditure Database, 1980-2007*, Paris ([www.oecd.org/els/social/expenditure](http://www.oecd.org/els/social/expenditure)).

53. In Denmark, the biggest increase in spending between 2000 and 2008 has been in the area of health and social protection. The large size of the public sector limits competition in some sectors, most notably, the health sector, leading to weaker incentives to innovate and lower productivity. Managing healthcare spending may create some fiscal challenges over the coming decades and in order to prepare for increased future spending pressures, efficiency of spending should be reconsidered (OECD, 2008).

### *Good working conditions in the public sector attract many skilled workers*

54. The proportion of skilled workers employed in the public sector is high in Denmark (Danish Economic Council, 2010). High marginal tax rates, relatively moderate wage dispersion and better work conditions in the public sector (holidays and flexibility) might have caused a preference for public sector employment. In 2010, average weekly hours worked were higher in the private sector. Although this can be partly explained by the prevalence of part-time workers in the public sector, it still points to better working conditions that attract workers to the public sector. The average hours worked per year among central government employees in Denmark is also low in an international context (Figure 16).

**Figure 16. Working conditions in the public sector**



Source: Confederation of Danish Employers and OECD, *Government at a Glance* (2010).

55. By absorbing skilled labour into relatively low productivity growth activities, the public sector might exert a negative effect on economy-wide productivity growth. The growth of the public sector, to some extent, is self-supported. By increasing public expenditures directly, a high public sector wage bill leads to higher taxes, which in turn discourage workers to go to the private sector, thereby increasing employment in the public sector, and public expenditures.

### **Bottomline**

56. Denmark has a large public sector, measured in terms of taxes and government spending. This has contributed to a high level of well-being in terms of material conditions and quality of life. However, care must be taken to limit the potential adverse effects of a large public sector on productivity. There is room to improve the tax structure further, to increase the efficiency of spending on health and education and to provide better incentives to work in the private sector (OECD, 2012).

### **Conclusions on the potential drivers of relatively low productivity growth**

57. Many studies have examined Denmark's relatively low productivity growth both in relation to earlier periods and to other countries. Even so, its slowdown remains puzzling, given Denmark's sound economic framework in terms of regulations, education performance and labour market flexibility. An examination of the four potential drivers of this puzzle, namely competition, education, labour market flexibility and the size of the public sector, shows that there is room for improvement in all areas, calling for action on each of these fronts. There is scope to enhance competition, especially in services, and the institutional set-up for competition policy. Efficiency gains in expenditures on education and health are possible. Greater labour market flexibility would help the reallocation of labour to more productive firms, increasing overall productivity growth.

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