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DENMARK

JANUARY 2019

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OECD Economic Surveys: Denmark 2019

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Please cite this publication as:
OECD (2019), *OECD Economic Surveys: Denmark 2019*, OECD Publishing, Paris.
https://doi.org/10.1787/eco_surveys-dnk-2019-en

ISBN 978-92-64-31035-3 (print)
ISBN 978-92-64-31036-0 (pdf)

Series: OECD Economic Surveys
ISSN 0376-6438 (print)
ISSN 1609-7513 (online)

OECD Economic Surveys: Denmark
ISSN 1995-3151 (print)
ISSN 1999-0219 (online)

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The Survey *is published on the responsibility of the Economic and Development Review Committee, which is charged with the examination of the economic situation of member countries. The economic situation and policies of Denmark were reviewed by the Committee on 22 November 2018. The draft was revised in the light of the discussion and given final approval as the agreed report of the whole Committee on 11 December 2018.*

This Survey *was prepared in the Economics Department by by Mikkel Hermansen, Valentine Millot and Sune Malthe-Thagaard who was seconded from Danmarks Nationalbank, under the supervision of Pierre Beynet, Patrick Lenain, Annabelle Mourougane and Douglas Sutherland. Corinne Chanteloup provided the statistical research assistance and Stephanie Henry provided editorial support. The Survey also benefited from contributions by Christophe André, Thomas Chalaux, Caroline Klein, Valerie Smeets, Donal Smith, and Frederick Warzynski.*

The previous Survey *of Denmark was issued in May 2016.*

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BASIC STATISTICS OF DENMARK

(Data refer to 2017 or latest available. Numbers in parentheses refer to the OECD average)*

LAND, PEOPLE AND ELECTORAL CYCLE					
Population (million)	5.8		Population density per km²	133.9	(37.2)
Under 15 (%)	16.5	(17.9)	Life expectancy (years, 2016)	80.9	(80.6)
Over 65 (%)	19.7	(16.8)	Men	79.0	(77.9)
Foreign-born (%)	9.9		Women	82.8	(83.3)
Latest 5-year average growth (%)	0.6	(0.6)	Latest general election	June 2015	
ECONOMY					
Gross domestic product (GDP)			Value added shares (%)		
In current prices (billion USD)	329.9		Primary sector	1.6	(2.5)
In current prices (billion DKK)	2 178.1		Industry including construction	23.1	(26.9)
Latest 5-year average real growth (%)	1.9	(2.1)	Services	75.2	(70.6)
Per capita (000 USD PPP)	54.3	(44.3)			
GENERAL GOVERNMENT					
Expenditure (% of GDP)	51.2	(40.3)	Gross financial debt (% of GDP)	48.9	(110.9)
Revenue (% of GDP)	52.3	(38.1)	Net financial debt (% of GDP)	0.5	(66.4)
EXTERNAL ACCOUNTS					
Exchange rate (DKK per USD)	6.590		Main exports (% of total merchandise exports)		
PPP exchange rate (USA = 1)	7.238		Machinery and transport equipment	26.6	
In per cent of GDP			Chemicals and related products, n.e.s.	20.3	
Exports of goods and services	54.5	(55.4)	Food and live animals	17.0	
Imports of goods and services	47.4	(51.1)	Main imports (% of total merchandise imports)		
Current account balance	8.0	(0.4)	Machinery and transport equipment	33.5	
Net international investment position	59.0		Miscellaneous manufactured articles	16.4	
			Manufactured goods	13.9	
LABOUR MARKET, SKILLS AND INNOVATION					
Employment rate for 15-64 year-olds (%)	74.2	(67.8)	Unemployment rate, Labour Force Survey (age 15 and over) (%)	5.7	(5.8)
Men	76.9	(75.5)	Youth (age 15-24, %)	11.0	(11.9)
Women	71.5	(60.1)	Long-term unemployed (1 year and over, %)	1.3	(1.7)
Participation rate for 15-64 year-olds (%)	78.8	(72.1)	Tertiary educational attainment 25-64 year-olds (%)	39.2	(36.5)
Average hours worked per year	1 408	(1 759)	Gross domestic expenditure on R&D (% of GDP, 2016)	2.9	(2.3)
ENVIRONMENT					
Total primary energy supply per capita (toe)	2.9	(4.1)	CO_2 emissions from fuel combustion per capita (tonnes, 2016)	5.8	(9.0)
Renewables (%)	34.9	(10.2)	Water abstractions per capita (1 000 m³, 2015)	0.1	(0.8)
Exposure to air pollution (more than 10 g/m³ of PM2.5, % of population)	62.7	(58.7)	Municipal waste per capita (tonnes, 2016)	0.8	(0.5)
SOCIETY					
Income inequality (Gini coefficient, 2015)	0.263	(0.315)	Education outcomes (PISA score, 2015)		
Relative poverty rate (%, 2015)	5.5	(11.7)	Reading	500	(493)
Median disposable household income (000 USD PPP, 2015)	28.6	(23.0)	Mathematics	511	(490)
Public and private spending (% of GDP)			Science	502	(493)
Health care	10.2	(8.8)	Share of women in parliament (%, 2016)	37.4	(28.7)
Pensions (2013)	12.6	(9.1)	Net official development assistance (% of GNI)	0.74	(0.37)
Education (primary, secondary, post sec. non tertiary, 2014)	4.8	(3.6)			

Better life index: http://www.oecdbetterlifeindex.org

* Where the OECD aggregate is not provided in the source database, a simple OECD average of latest available data is calculated where data exist for at least 29 member countries.

Source: Calculations based on data extracted from the databases of the following organisations: OECD, International Energy Agency, International Monetary Fund, Statistics Denmark.

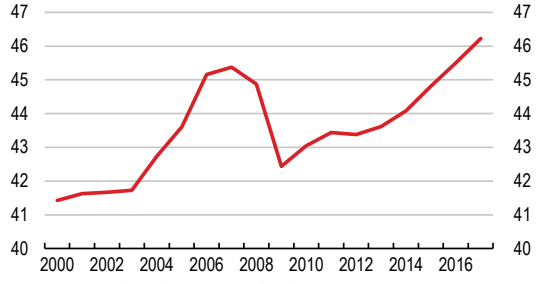
Executive Summary

The economy is growing after a long, but moderate, recovery

Living standards and wellbeing are high in Denmark. A long tradition of reforms and strong institutions underpins high social trust and labour market inclusiveness, which ensures that high economic performance can co-exist with low inequality. Strong adaptability to structural changes and shocks ensures that these good outcomes last. Commitment to addressing environmental challenges has made Denmark a frontrunner in green growth.

Economic conditions have improved in recent years with GDP growing above 2% since 2015, increasingly supported by domestic demand. Robust employment growth in the private sector has started to feed into wage increases. However, economic growth has been weaker than in other OECD countries over the past decades and GDP per capita has only recently passed its pre-crisis peak. Living standards have nonetheless improved at a faster pace as other factors have added to real income growth.

Figure A. The economy has recovered gradually
Real GDP per capita, USD PPP, thousand



Source: OECD National Accounts database.
StatLink https://doi.org/10.1787/888933897988

The steady expansion is projected to continue. High confidence and the strong labour market will support private consumption. Increased capacity utilisation in the business sector and elevated house prices in the large cities will promote further investment growth. Further tightening of the labour market is projected.

There are substantial downside risks. International trade tensions could escalate further, hurting the small and open Danish economy as a hard Brexit would do too. High household gross debt is also a source of vulnerability.

Table A. Economic growth will continue
Annual percentage change, volume

	2017	2018	2019	2020
Gross domestic product (GDP)	2.3	1.2	1.9	1.6
Private consumption	2.1	2.5	2.2	2.2
Government consumption	0.7	0.5	0.5	0.4
Gross fixed capital formation	4.6	7.7	1.5	3.3
Exports of goods and services	3.6	-0.5	2.8	3.0
Imports of goods and services	3.6	2.9	2.2	3.8
Unemployment rate	5.7	5.2	5.1	4.9
Consumer price index	1.1	0.9	1.8	2.0

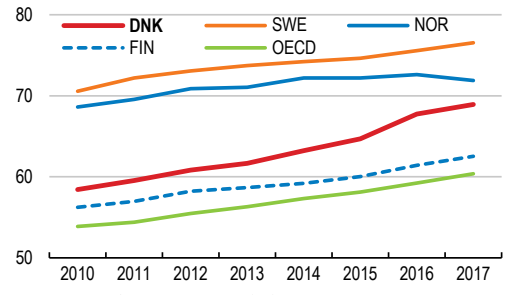
Source: OECD Economic Outlook 104 database.

Public finances are healthy, but public sector efficiency could be improved

Macroeconomic policy is set to remain supportive. Very accommodative monetary conditions implied by the peg to the euro in combination with broadly neutral fiscal policy in the near term may fuel the economy. As labour resources become scarcer, prudence is warranted. The fiscal framework controls spending well, but a tight structural budget deficit limit could constrain fiscal space excessively if buffers are not sufficient.

Indexation of statutory retirement ages to life expectancy underpins fiscal sustainability. A prolonged series of pension and benefit reforms has delivered sound public finances and strengthened potential growth. Employment rates of seniors have risen significantly. Further increases in the effective retirement age would require to further increase the incentives to work for seniors and continuously meet the needs of those with reduced work capacity.

Figure B. Senior employment is still below other Nordics
Employment rates for age 55-64, %



Source: OECD Labour Force Statistics.
StatLink https://doi.org/10.1787/888933898007

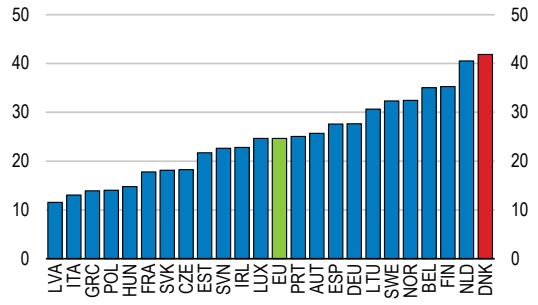
The Government is committed to improve public sector efficiency through digitalisation. However, collaboration across public services and administrative levels is inadequate and may blunt opportunities for innovation. A stronger link between performance and compensation of employees could help to boost productivity growth. Centralised and detailed collective agreements for each occupation also tend to constrain flexibility of managers.

Business framework conditions need to adapt to deal with disruptive technologies

Danish firms are close to the technological frontier thanks to digitalisation and favourable business framework conditions. Nonetheless, productivity growth has been disappointing in the recent past. The productivity slowdown has been particular pronounced in the sector of services, with a distinct weakness in less knowledge-intensive service industries such as trade, transport, food and accommodation.

Figure C. Danish firms extensively use digital technologies

Firms with high digital intensity, %

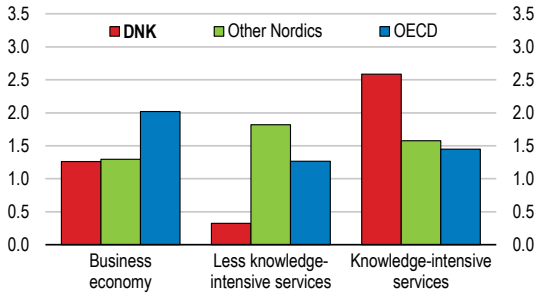


Source: European Commission, Digital Scoreboard 2017.

StatLink https://doi.org/10.1787/888933898026

Figure D. Productivity growth lags behind in less-knowledge intensive services

Labour productivity growth, 2000-15, %

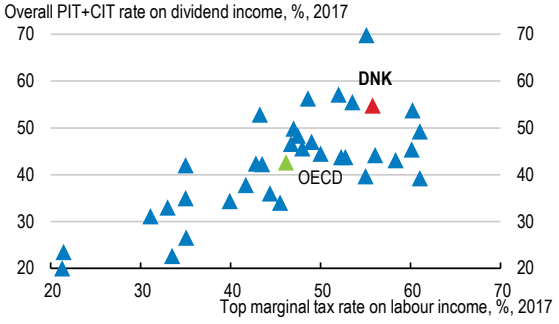


Source: OECD calculations based on OECD STAN database.

StatLink https://doi.org/10.1787/888933898045

Tax reform could give a boost to investment. Analyses based on Danish firm-level data suggest that digital adoption through investment in ICT capital increases firm productivity and contributes to business dynamics and firm growth. A further shift of taxation away from capital and labour income would improve economic incentives for investment, labour supply and the development of new business models.

Figure E. Top marginal tax rates on labour and dividend incomes are high



Source: OECD Tax database.

StatLink https://doi.org/10.1787/888933898064

Refining the competition framework would also allow more scope for new technologies to give a boost to productivity growth. A complex structure for enforcement and determination of anti-competitive practices results in sometimes lengthy court procedures and can weaken deterrence. While the competition framework is generally in line with international standards, revising differing practices with respect to the use of fines and exemptions would strengthen effective enforcement and help to combat attempts to shut out innovative disruptors.

Business R&D spending is strongly concentrated in a few large firms, especially in pharmaceuticals. Tax incentives for R&D expenditures have recently been increased, although business R&D support remains lower than in many OECD countries. Commercialisation of the outcomes from sizeable public R&D spending is trailing and call for improved cooperation between universities and the business sector.

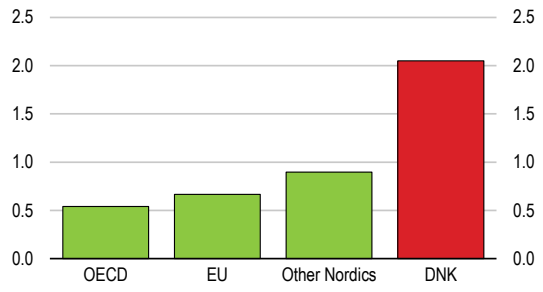
Ensuring supply of the right skills will boost productivity through better utilisation of advanced technology. The share of graduates in science, technology, engineering and math is low compared to many other OECD countries, while businesses increasingly report shortages in these

skills. Reform of generous student grants could strengthen incentives to meet labour market demands, especially since their impact on equal access to education tends to be elusive at the tertiary level. This would free resources for more effective public spending. Finally, dependence on foreign workers has grown substantially in recent years, but the visa permit system can be complex and slow for non-EU workers, hindering acute access to skilled labour.

Activation policies need to adapt to the challenges from new technologies

Wellbeing in Denmark is among the highest across OECD countries in most dimensions. This is not least due to a strong and inclusive labour market, including policies for reskilling of job seekers. Activation policies need, however, to adapt to the challenges from new technologies, which will transform the future of work. Also, a stronger focus is needed on cost-effectiveness of these labour market policies.

Figure F. Public spending on active labour market policies (ALMPs) is very high
% of GDP, 2016



Source: OECD Labour Force Statistics.
StatLink https://doi.org/10.1787/888933898083

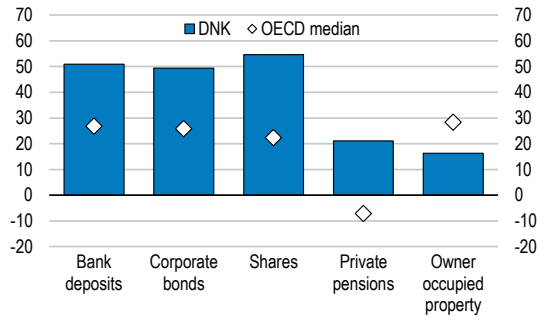
Integration of migrants is slowly improving. Employment rates for refugees and migrants are well below those of natives, even among higher educated, reducing wellbeing, potential living standards and the tax base. A recent integration-training programme, managed with social partners, has been effective in addressing barriers posed by high entry wages, but the target group is narrow.

Gender gaps are among the smallest across OECD countries, but the share of women in management positions remains low. Women still play the main role in primary childcare, which explains most of the remaining gender inequality in the labour market. After giving birth to the first child, women tend to move to more family-friendly jobs. More flexibility in the supply of childcare services could help reduce the gender gap further.

Favourable taxation of housing fuels household financial vulnerabilities

High household gross debt and low liquid assets pose vulnerabilities. Household balance sheets are large, reflecting a well-functioning mortgage market that allows households to hold large debt-to-income ratios, which are offset not only by housing assets, but also by sizeable occupational pension savings. However, owner-occupied housing is excessively stimulated by tax expenditures, while the rental market suffers from stiff regulation.

Figure G. Taxation is high and unequal across asset types
Marginal effective tax rates, %, 2016



Source: OECD (2018), Taxation of household savings.
StatLink https://doi.org/10.1787/888933898102

Getting pension savings right for all remains a challenge. The funded occupational pension scheme delivers decent living standards in retirement and is a vital pillar of fiscal sustainability. Yet, sizeable contribution rates lock large savings in pension funds and can create household balance sheet maturity mismatches in case of falls in asset prices and rising interest rates. Work and saving incentives suffer from pervasive means testing of public pensions, while a residual group has little pension savings. Recent reform has reduced the high marginal taxes by introducing additional tax deductions for pension contributions. Nevertheless, further reform may be needed to reduce complexity and improve transparency for personal financial planning.

MAIN FINDINGS	KEY RECOMMENDATIONS
Fiscal framework and public sector efficiency	
Fiscal policy was set close to the structural budget deficit limit at 0.5% of GDP during the initial phase of the recovery but is now moving away from the deficit limit. An exception can allow the structural budget deficit limit to be exceeded in exceptional circumstances.	Gradually tighten fiscal policy to reflect the economic upturn. Build fiscal space for a future setback to complement the scope to relax fiscal policy in exceptional circumstances.
Public sector efficiency is constrained by centralised and detailed collective agreements for each occupation, which implies a weak association between performance and compensation of employees and reduces flexibility of managers.	Reform public sector collective bargaining, in collaboration with trade unions, towards broader and higher-level agreements, allowing more bargaining at the local level.
Policy measures to reduce greenhouse gas emissions further focus on the transport sector, while less-expensive reductions can be achieved in the agricultural sector.	Implement the most cost-efficient emission reductions first, taking into account implications for global emissions.
Productivity	
Entrepreneurship and investment are hampered by high top marginal tax rates on labour and capital income as well as favourable inheritance taxation of family-owned businesses. Top personal income tax brackets generate a small share of the total tax revenue.	Reduce top marginal tax rates on labour and capital income. Withdraw reduced inheritance taxation of family-owned businesses.
Corporate income taxation strongly favours debt financing and mortgage loans dominate firm financing. The vast majority of equity and venture capital is invested abroad.	Implement an allowance for corporate equity (ACE) in the corporate income tax, accompanied by a sufficient anti-avoidance framework.
The structure of the competition framework and determination of anti-competitive practices are complex and differ from other countries. Use of fines must be imposed by courts and Ministers are permitted to make certain exemptions from the Competition Act.	Provide greater power to competition authorities to impose administrative fines and structural remedies within constitutional constraints. Develop clearer standards for exemptions from the Competition Act and involve competition authorities in their determination.
Business R&D spending is strongly concentrated in a few large firms and the share of innovative firms is low.	Broaden public support to business R&D through well-designed R&D grants and tax credits for incremental R&D expenses.
Student grants are very generous and higher than in other Nordic countries. At the same time, average age of graduation is high and misalignments with labour market demands prevail, including shortages of STEM graduates.	Reduce student grants for tertiary education and rely more on student loans. Link repayment conditions to subsequent income and labour market status.
Dependence on foreign workers has grown substantially, but the visa permit system can be complex and slow for non-EU workers.	Assess whether the current visa schemes for non-EU workers sufficiently address skill needs and consider simplifying entry procedures.
Inclusiveness	
Labour market integration of refugees and migrants is weak and unequal across municipalities. A trial integration-training programme has addressed barriers posed by high entry wages, but the target group is narrow.	Spread best integration practices across municipalities and strengthen co-ordination of services such as language training and subsidised work to ease integration. Improve the integration-training programme in collaboration with social partners and make it permanent.
Gender gaps are slowly closing, but bearing the larger burden in primary childcare tends to interrupt women's way to senior and management positions.	Increase flexibility in the provision of childcare services, including outside of regular working hours to further narrow the gender gap. Encourage parents to split parental leave more equally by increasing the share reserved for each parent.
Housing market, pension savings and financial regulation	
High household gross debt and widespread use of variable and deferred amortisation mortgage loans pose vulnerabilities. Favourable taxation and high rental market regulation stimulate homeownership unduly.	Reduce deductibility of interest expenses in personal income taxation. Deregulate the rental market and remove favourable conditions for parents to buy-to-let flats to their children.
Tax incentives for pension savings are complex due to several tax deductions and interactions with the public pension scheme. Large pension savings can create household balance sheet maturity mismatches.	Review the pension and tax system and implement reform to increase transparency and ease personal financial planning.
The financial sector is large relative to the economy and dominated by a few very large banks. A case of massive money laundering in the Estonian branch of the largest Danish bank points to weaknesses in supervision.	Improve prudential supervision and international collaboration by joining the European Banking Union. Increase scrutiny and implement more severe penalties for money-laundering activities.

Key Policy Insights

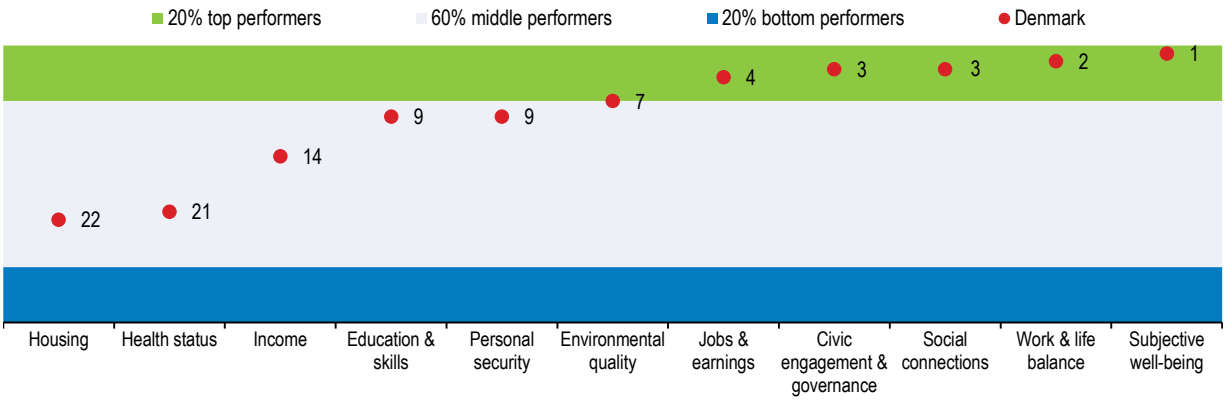
The economy is growing, though modestly

Denmark has traditionally delivered high living standards to its citizens and left few behind. High and equally-distributed incomes translate into strong feelings of wellbeing according to a range of measures (Figure 1). What is more, there is equality of opportunities across generations in terms of income, education and health (OECD, 2018[1]). Commitment to addressing environmental challenges has made Denmark a frontrunner in green growth. A comprehensive series of pension and benefit reforms has bolstered public finances and lifted more people into the labour market, which will help to sustain these good outcomes. In the future, lifting labour force participation by increasing the statutory retirement ages and facilitating the integration of migrant workers will also help to secure that this continues.

Globalisation and digital development have brought large benefits to Danish households and businesses. Denmark ranks as the most digitalised economy in Europe, partly due to a strong public sector digitalisation effort, and has the largest share of firms with high digital intensity. It is therefore in a strong position to reap the opportunities of emerging technologies. Moreover, framework conditions for businesses rank consistently at the top and steps have been taken to embrace new business models and the future of work, including adapting the tax system to comprise the platform and collaborative economy.

Figure 1. Wellbeing ranks high in many dimensions
Better Life Index, country rankings from 1 (best) to 35 (worst), 2017

A. Indicators of well-being



B. Denmark well-being sub-indicators selected rankings

	Sub-indicator	Rank	Measure	Denmark	OECD[2]
Highest rankings	Life Satisfaction	1	Average score	7.5	6.5
	Quality of support network	3	Perceived social network support, % of population	95	89
	Years in education	3	Years	19.7	17.0
	Voter turnout	4	% of population	86	69
	Employees working very long hours	4	% of dependent employed working >50 hours per week	2.2	12.6
	Time devoted to leisure and personal care	4	Hours per day	15.9	14.9
	Employment rate	5	% of the working-age population (aged 15-64)	75	67
Lowest rankings	Life expectancy	24	Years	80.9	80.1
	Housing expenditure	29	% of the household gross adjusted disposable income	24	20

1. Each well-being dimension is measured by one to four indicators from the OECD Better Life Index set.
2. The OECD average is population-weighted.
Source: OECD (2017), OECD Better Life Index, www.oecdbetterlifeindex.org.

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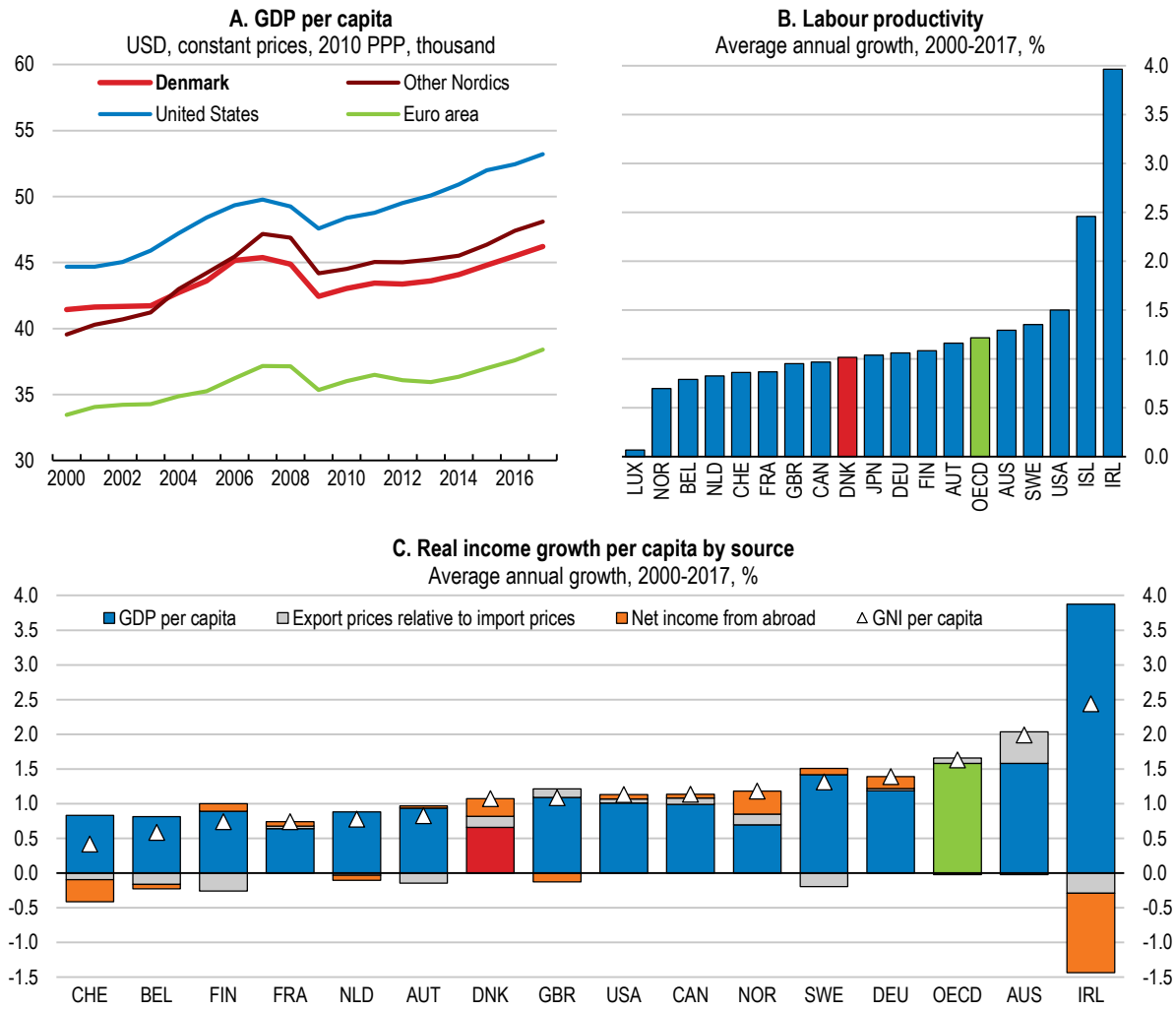
Given this strong background, the recent decades of weak economic performance has been disappointing and raised questions about the reasons behind Denmark's relatively low productivity growth. GDP per capita has increased less than in many comparable countries since 2000 (Figure 2, Panel A). Underlying GDP growth has picked up modestly more recently, but this has not been sufficient to prevent labour market tightening and spare capacity to be exhausted.

Figure 2. Growth has been weak, though other factors add to real incomes



Note: Other Nordics refers to a simple average of Finland, Iceland, Norway and Sweden. Panel B and C include the upper half of OECD countries according to 2017 PPP GDP per capita.
Source: OECD Economic Outlook; OECD National Accounts; and OECD Productivity databases.

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A main challenge for the Danish economy is to accelerate productivity growth (Figure 2, Panel B), especially in services. Most advanced countries have experienced a slowdown in productivity growth, but this is particularly surprising given Denmark's business-friendly policy settings and high level of digitalisation. The country's integration in global value chains has recently boosted GDP and productivity growth (by exports of goods produced abroad), but this may not last and potentially masks even weaker domestic economic development.

Material living standards have, however, improved at a faster pace since other factors have added to household incomes. Import prices have persistently grown at a slower pace than export prices, which has boosted consumers' real incomes. On top of this, returns from

investments of large pension and corporate savings have generated sizeable net income from abroad. As a result, GNI per capita growth shows a brighter development in line with other OECD countries (Figure 2, Panel C). Nonetheless, the recent growth under-performance needs to be reversed.

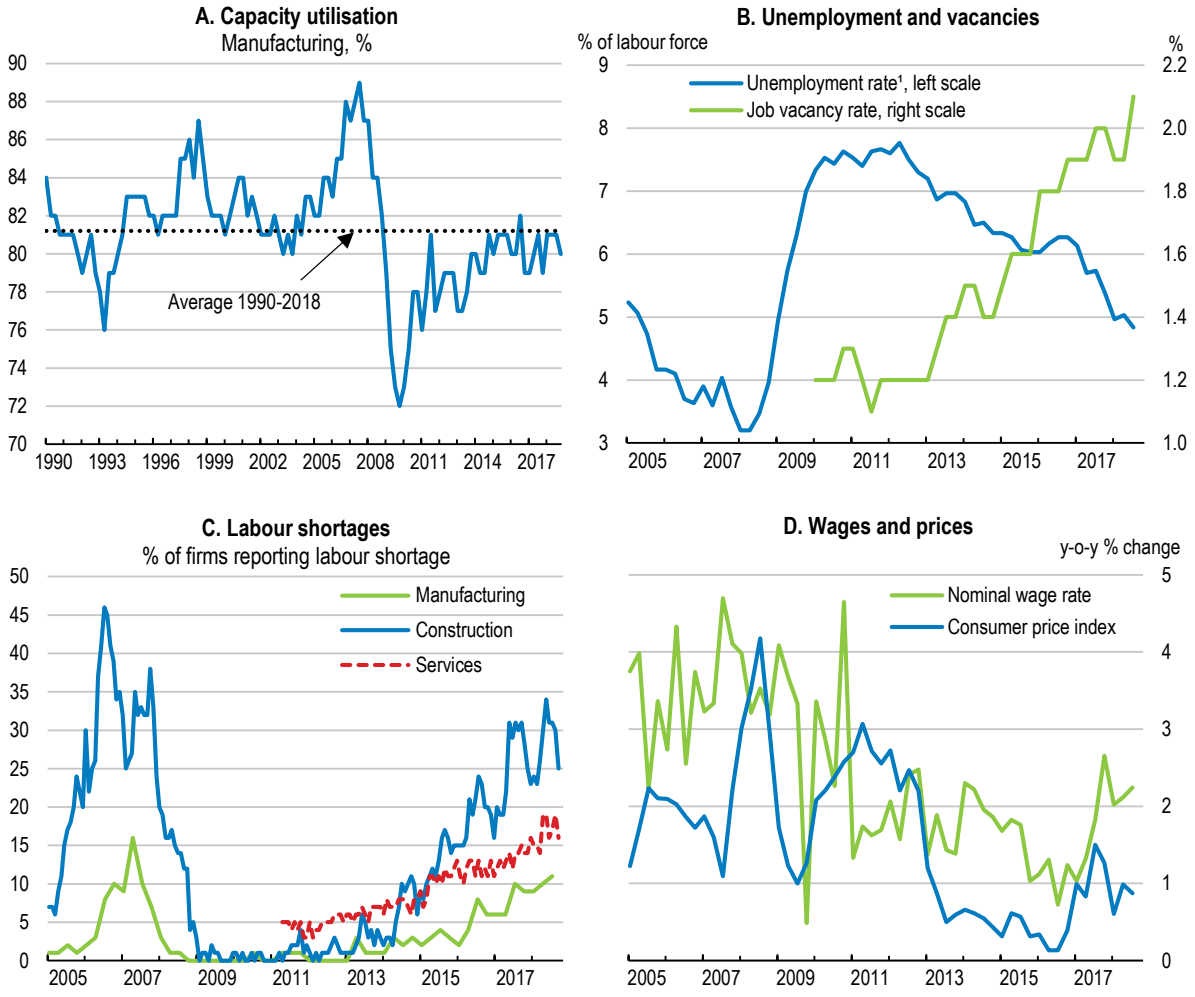
Against this background, the main messages of this *Survey* are:

- Boosting productivity growth is essential to ensure that living standards and wellbeing remain high. This requires further improving business framework conditions, notably competition pressures. Reducing high marginal taxes, broadening innovation activity and attracting more high-skilled foreign workers are also priorities.
- Shifting the tax burden from corporate earnings to housing to make taxes more neutral across asset types would benefit the allocation of savings and the level of business investment, hence boosting productivity and wages.
- Maintaining high and inclusive employment is essential to ensure disruptive changes benefit all. This will require a stronger focus on cost-effectiveness of policies and measures to mitigate barriers to work for refugees and migrants.

The outlook is for continued growth and a tighter labour market

Increased capacity utilisation (Figure 3, Panel A) and elevated house prices in the large cities have spurred business and residential investment on the back of very low interest rates. As steady private job creation has pushed down unemployment (Figure 3, Panel B), the number of job vacancies has been rising and labour shortages are reported in the construction sector and intensifying more broadly (Figure 3, Panel C). Nominal wage growth remains nonetheless moderate and inflationary pressures are contained so far (Figure 3, Panel D). Further wage increases of around 2% per year are scheduled through collective agreements in the coming years.

Figure 3. A tightening labour market is beginning to feed into wage growth



1. Data breaks in Q1 2016 and Q1 2017.
Source: Statistics Denmark; OECD Short-Term Labour Market Statistics and OECD Economic Outlook database.

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With no emerging imbalances, the outlook is favourable. In the short-run, the recording of the export of a single patent has distorted GDP data, boosting growth in 2017 and reducing it in 2018 (Table 1). Looking ahead, the broad-based economic expansion is projected to continue in 2019 and moderate in 2020, supported by high business and consumer confidence and very accommodative monetary conditions. Inflation is set to pick up and return to a level around 2% by 2020. Private consumption will be an important driver of growth sustained by rising real wages and implementation of income tax reductions. Yet, households' savings rate will remain relatively high as balance sheet consolidation is set to continue, bringing down high household gross debt. The buoyant housing market, especially in the larger cities, will continue to sustain residential investment. Labour shortages are expected to intensify and stimulate business investment and wage growth, although the labour force will rise thanks to increases in the statutory retirement age in 2019 and 2020 as well as income tax reforms. Labour market pressures could increase if

improved economic conditions in other European countries impede further recruiting of workers from abroad (Danish Ministry for Economic Affairs and the Interior, 2017[2]).

Table 1. Macroeconomic indicators and projections

Annual percentage change, volume (2010 prices)

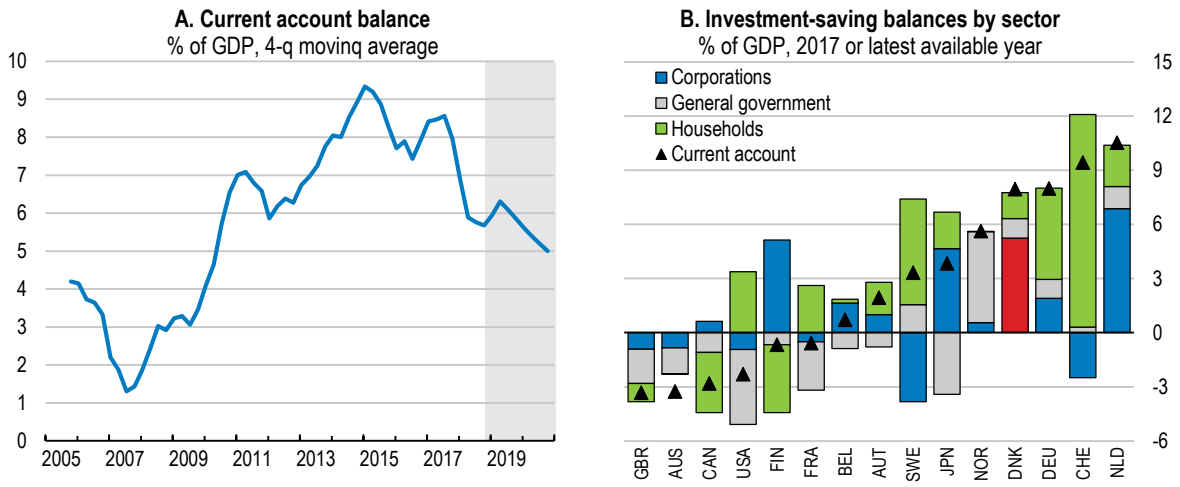
	2014 Current prices (billion DKK)	2015	2016	2017	Projections 2018	2019	2020
Gross domestic product (GDP)	1,981.2	2.3	2.4	2.3	1.2	1.9	1.6
Private consumption	934.3	2.3	2.1	2.1	2.5	2.2	2.2
Government consumption	510.9	1.7	0.2	0.7	0.5	0.5	0.4
Gross fixed capital formation	379.7	5.5	7.6	4.6	7.7	1.5	3.3
Housing	76.5	5.3	6.8	12.9	10.3	1.8	2.8
Business	228.6	8.9	8.4	4.7	8.6	1.3	4.1
Government	74.6	-4.7	5.4	-5.5	1.2	2.0	0.8
Final domestic demand	1,824.9	2.8	2.7	2.3	3.1	1.6	2.0
Stockbuilding[1]	18.4	0.0	-0.2	-0.1	0.0	0.0	0.0
Total domestic demand	1,843.2	2.8	2.5	2.2	3.1	1.5	2.0
Exports of goods and services	1,082.0	3.6	3.9	3.6	-0.5	2.8	3.0
Imports of goods and services	944.0	4.6	4.2	3.6	2.9	2.2	3.8
Net exports[1]	137.9	-0.2	0.1	0.2	-1.7	0.5	-0.2
Other indicators (growth rates, unless specified)							
Potential GDP	. .	1.3	1.5	1.5	1.6	1.6	1.6
Output gap (% of potential GDP)	. .	-0.6	0.3	1.0	0.6	0.9	0.9
Employment	. .	1.4	3.2	-0.8	1.9	1.0	0.9
Unemployment rate (% of labour force)	. .	6.2	6.2	5.7	5.2	5.1	4.9
GDP deflator	. .	0.4	0.7	1.4	0.3	2.0	1.9
Consumer price index	. .	0.5	0.3	1.1	0.9	1.8	2.0
Core consumer price index (excluding food and energy)	. .	1.3	0.7	0.9	0.8	1.8	2.0
Household saving ratio, net (% of disposable income)	. .	4.3	4.6	5.2	5.1	4.7	4.6
Current account balance (% of GDP)	. .	8.2	7.9	8.0	5.7	5.8	5.0
General government financial balance (% of GDP)	. .	-1.5	-0.4	1.1	0.0	-0.3	-0.2
Net one-offs (% of potential GDP)	. .	0.8	-0.1	-0.1	-0.2	0.0	-0.3
Underlying government primary balance (% of potential GDP)	. .	-0.9	0.2	0.9	0.1	-0.7	-0.5
General government gross debt (% of GDP)	. .	53.5	51.7	49.3	48.4	47.3	46.3
General government gross debt (Maastricht, % of GDP)	. .	39.8	37.3	35.6	34.6	33.6	32.6
General government net debt (% of GDP)	. .	4.9	3.9	1.1	1.0	1.3	1.4
Three-month money market rate, average	. .	-0.1	-0.1	-0.3	-0.3	-0.2	0.2
Ten-year government bond yield, average	. .	0.7	0.3	0.5	0.5	0.6	0.8

1. Contribution to changes in real GDP.
Note: A single sale of a pharmaceutical patent boosts exports in 2017 and accounts for 0.4 percentage point of GDP growth. This explains the temporarily weak growth in 2018 since exports drops in the absence of similar one-time transactions in the following year. The allocation of income from the patent sale across time is subject to later revision.
Source: OECD Economic Outlook 104 database.

The current account surplus at 8% of GDP in 2017 is among the largest across OECD countries relative to GDP (Figure 4). Danish net exports of goods make up most of the surplus (5.7% of GDP in 2017) with main trading partners dominated by geographically close countries (Figure 5). Moreover, goods produced and sold abroad comprise an increasing share of the trade surplus (Box 1). This reflects Denmark's deep integration in global value chains and activities of large Danish multinational corporations. A strong

international investment position (59% of GDP in 2017) also generates considerable income from abroad. Increasing savings, including by households, is the main reason for the sustained high surplus. Corporate savings remain high (Figure 4, Panel B) though business investment rates are approaching pre-crisis levels (see Chapter).

Figure 4. The large current account surplus has started to decline



Source: OECD Economic Outlook and OECD National Accounts databases.

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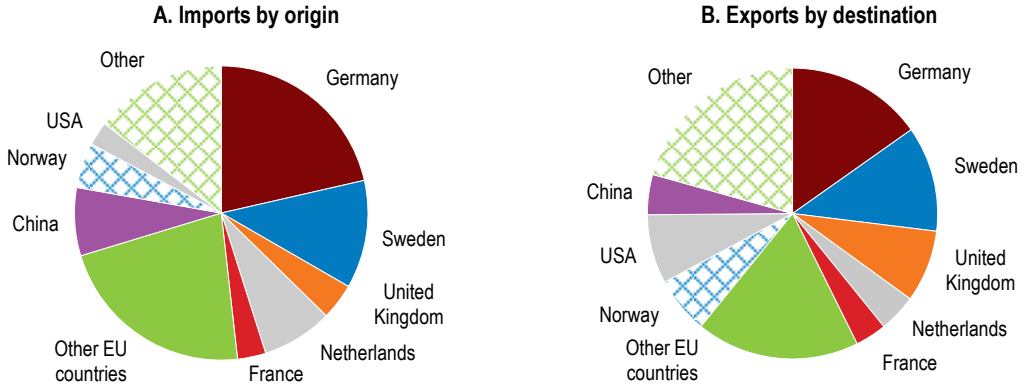
Figure 5. Denmark's main trading partners

Trade of goods, shares by partner, 2017, % of total



Source: Statistics Denmark.

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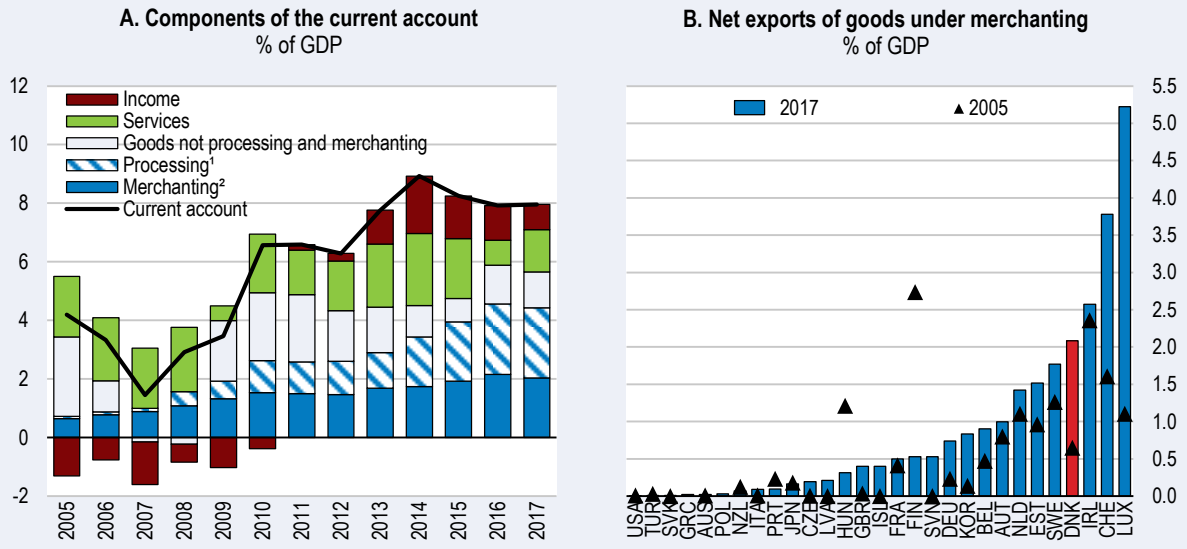
Box 1. Denmark's global value chain integration can blur measures of economic activity

Denmark benefits from high integration in global value chains, which contributes to its large current account surplus. However, a large share of Danish exports has never been in Denmark, but are goods produced and sold abroad with legal ownership by Danish firms. This is referred to as merchanting and processing and accounts for an increasing share of the large current account surplus (Figure 6, Panel A). The surplus from merchanting alone is among the highest across OECD countries (Figure 6, Panel B).

Figure 6. A large part of the current account surplus stems from goods produced abroad



1. Goods processed and sold abroad without crossing Danish borders.
2. Purchases and sales of goods abroad without crossing Danish borders.
Source: Statistics Denmark; IMF, Balance of Payments Statistics.

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The classification of such activity as export rather than investment income from abroad has a direct impact on the measurement of GDP and productivity. A back-of-an-envelope calculation shows that re-classifying all net exports from merchanting and processing as investment income would reduce average nominal GDP growth by 12% over the period 2005-2017. In manufacturing, half of the productivity growth over the same period derive from production controlled from Denmark but taking place abroad (Knudsen, 2018[3]).

While this is far from the only GDP measurement issue, the strong upward trend in net exports of goods produced abroad in recent years calls for further analysis. The question is whether improved GDP growth, as well as strong productivity growth in manufacturing (see Chapter), adequately reflect growing domestic activity and innovation or have been boosted by increasing measurement challenges due to growing importance of global value chains. This is a particular concern since a substantial part of these sales is likely to be transactions within multinational corporations sensitive to internal price setting behaviour (Jørgensen, Kramp and Mortensen, 2018[4]). Aggregate income growth on the other hand is unaffected, since both exports and investment income are part of GNI (Figure 2, Panel C).

The surplus is projected to decline towards 5% by 2020, driven by robust import growth and weaker exports. Net income from abroad is also set to decline due to rising interest rates. Although private consumption is expected to pick up as household consolidation ceases and support the reduction of the current account surplus (Mortensen, Jørgensen and Kramp, 2017[5]), further measures should be considered. Implementing recommendations from the thematic chapter of this *Survey*, such as an allowance for corporate equity (ACE), would help to boost business investment and further reduce the excess current account surplus.

Important downside risks to the outlook mainly derive from the large openness of the economy and normalisation of interest rates. A slowdown in international trade triggered by rising trade protectionism could reverse the large gains from globalisation. For the same reason, the uncertainty surrounding the conditions for the United Kingdom leaving the EU (Brexit) continues to be a downside risk. Rising housing wealth combined with continued very low interest rates, resulting from the currency peg to the euro, could trigger a boom in private consumption, resulting in overheating with higher wage and price inflation. A faster and larger-than-expected interest rate hike, on the other hand, risk prompting large property price drops in some parts of the country with macroeconomic spillovers and financial sector losses.

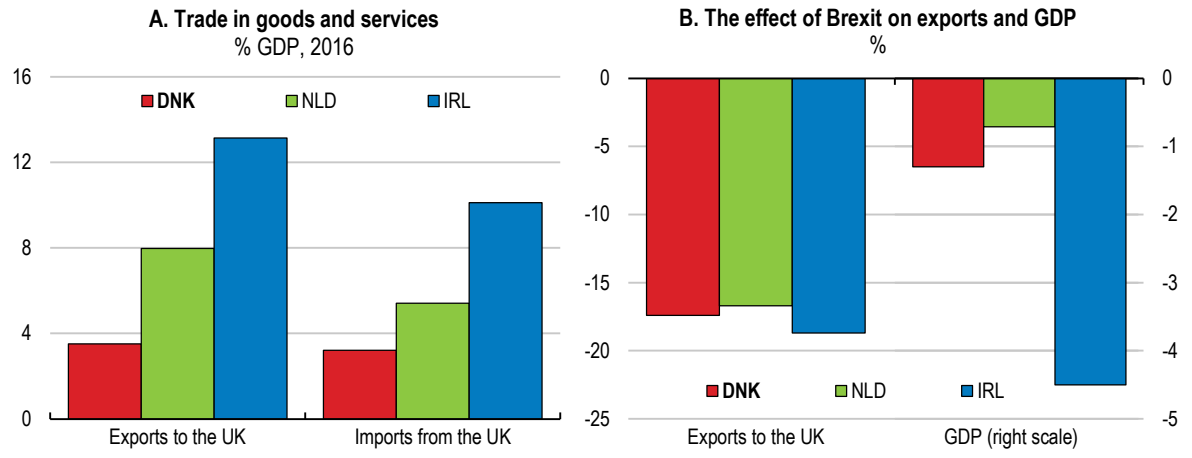
Table 2. Possible low-probability extreme shocks to the Danish economy

Shock	Possible impact
Escalation of import tariff increases	As a small open economy that is highly integrated in global value chains, Denmark is particularly exposed to an escalation of import tariff increases and retaliatory measures from affected countries. This would reverse large gains from globalisation.
Large negative economic impact of hard Brexit	A significant increase in trade and investment barriers between the EU and the United Kingdom would have major negative economic effects in the agricultural, food and manufacturing sectors. In addition, Danish fishery is very dependent on continued access to the British fishery zone.
Large declines of house prices in the big cities	An unexpected hike in interest rates could trigger significant drops in house prices, especially in Copenhagen, resulting in insolvent households and increased losses in the financial system. In addition, uncertainty prevails regarding possible price effects of the phase-in of the property taxation reform, especially in the larger cities after 2020.
Financial sector turmoil	The financial sector is large and dominated by a few very large banks, highly interconnected and integrated in global financial markets. Turmoil triggered by cases of misconduct (money laundering) or events outside of Denmark could severely distress the economy.

A hard Brexit would hit some sectors hard

As a small and open economy with the United Kingdom as the fourth largest export destination (absorbing 7.8% of total exports in 2017), Denmark is particularly exposed to Brexit. New analysis produced for this *Survey* (Smith, Hermansen and Malthe-Thagaard, 2018[6]) shows that, although the United Kingdom is a comparatively less important trade partner (Figure 7, Panel A), a worst-case scenario could result in a similar decline in GDP as in the Netherlands (Figure 7, Panel B) because of a more vulnerable sectoral composition of Danish exports.

Figure 7. The Danish economy is vulnerable to a worst-case Brexit scenario



Note: The simulation approach of a worst-case Brexit is similar for the three countries. In the case of Ireland, a more extended analysis incorporates additional effects via FDI and applies the NiGEM model, which reduces the impact on GDP to -1.5% (Arriola et al., 2018[7]).
Source: OECD International Trade by Commodity (ITCS) database; OECD International Trade in Services (ITSS) database; OECD National Accounts database; OECD calculations using the METRO model.

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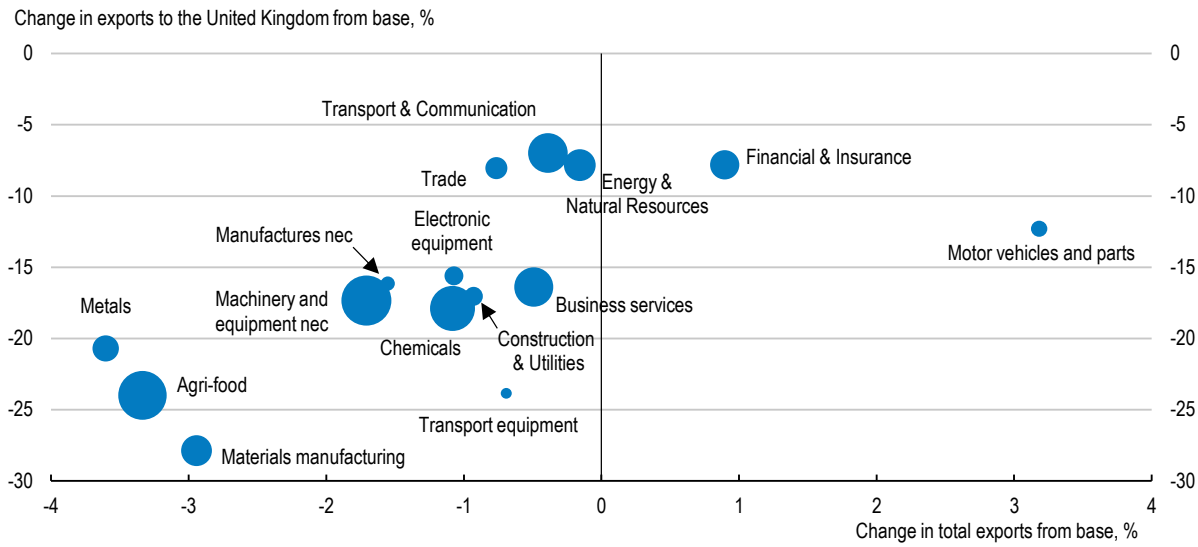
The model-based scenario is purely illustrative and does not represent a judgement about the most likely outcome of negotiations. It quantifies the contraction in trade between the United Kingdom and the European Union, including Denmark, if tariffs were to be governed by WTO most favoured nation rules and non-tariff costs would rise as well. The results suggest that Danish exports to the United Kingdom would drop by 17%, resulting in a 1.3% decline in GDP in the medium term, taken to be a period that allows adjustment of labour and some reallocation of capital across sectors, but not including longer-term structural effects. The agri-food, especially processed food, and machinery and equipment sectors account for more than half of the export reduction to the United Kingdom (Figure 8). By contrast, financial services would likely increase their overall exports as Denmark would capture demand from other EU countries as the United Kingdom reduces its exports.

The impact on employment could be particularly painful since the most affected sectors employ many low-skilled workers and the agri-food sector is concentrated outside the larger cities and especially in the western part of the country. The meat products sector would experience the largest decline at 7.4%, while labour demand for low-skilled workers in the comparatively large machinery and equipment sector would decline by 1.5% in the medium term.

Figure 8. Brexit would particularly affect agri-food and manufacturing

The size of the circles represents the sectoral share of total Danish exports



Note: Chemicals also include pharmaceuticals. Transport & Communication include air and sea transport and transport not elsewhere classified (nec).
Source: OECD calculations using the METRO model.

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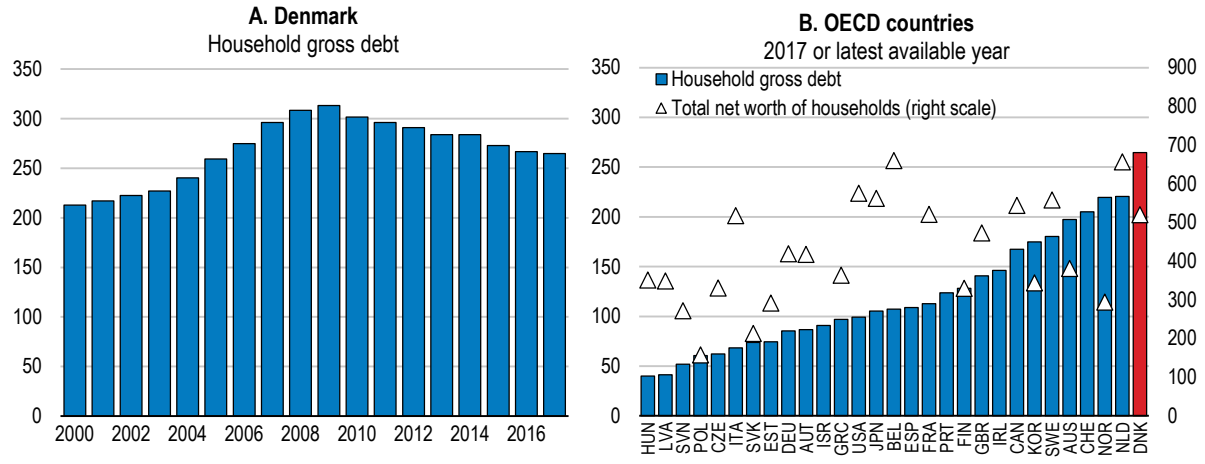
These results highlight the need to develop contingency plans to minimise possible economic disruptions in some sectors. The Government formed a Brexit task force in 2016, which has reviewed and initiated action in areas likely to be most affected, including initial recruitment of additional customs officers. Denmark is in a good position to absorb such a shock, should a worst-case outcome materialise. The flexible labour market and strong policies for reskilling of job seekers provide a strong basis to facilitate the needed reallocation of workers across sectors. Nevertheless, such adjustment will imply costs and produce job-losers in the short run, which should be mitigated to the extent possible, including by making efficient use of existing tools.

Macro-financial vulnerabilities have declined, but weaknesses remain

The financial institutions have adapted their business model to the negative interest rates and are considered to be robust and well capitalised by recent stress tests (Danmarks Nationalbank, 2018[8]; EBA, 2018[9]). Nevertheless, the Danish financial sector remains large by international standards, with a total-assets-to-GDP ratio of more than 500%, and is dominated by a few very large banks and highly interconnected. As discussed in the previous *Survey*, this poses a systemic risk and potentially creates important implicit liabilities for the public sector. At the same time, household gross debt continues to be the highest across OECD countries (Figure 9), albeit large pension savings counterbalances this (see below). Households, and the economy at large, are thus vulnerable to increasing interest rates and falling house prices (Systemic Risk Council, 2017[10]).

Figure 9. Household gross debt has decreased but is still very high

Household debt and net worth, % of gross household disposable income



Source: OECD Economic Outlook database.

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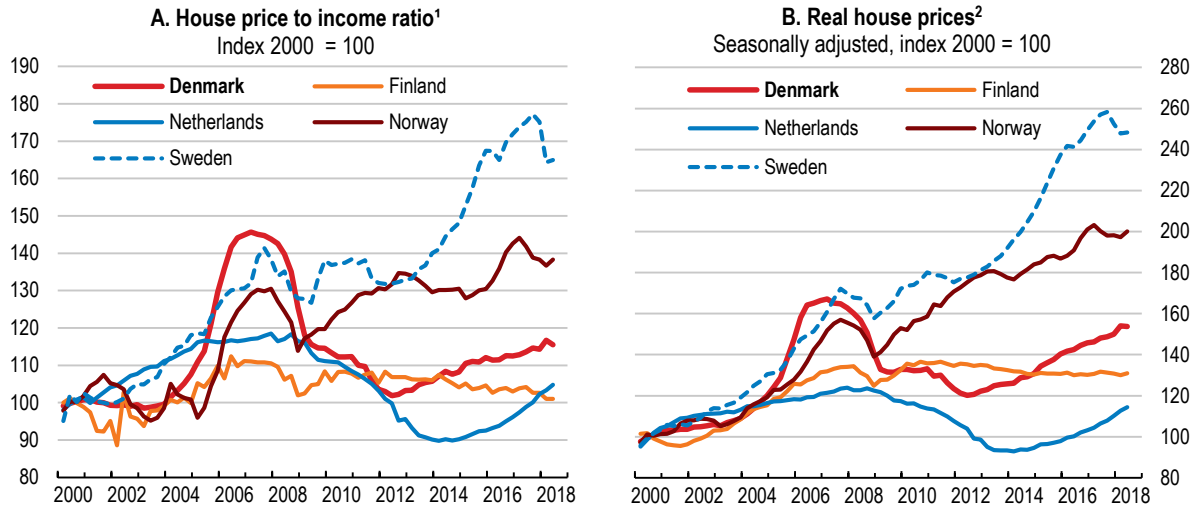
Significant action has been taken since the financial crisis to strengthen resilience of the financial sector (OECD, 2016[11]; Bohn-Jespersen and Mogensen, 2018[12]). The Government is currently considering the option to join the EU banking union, with a decision to be made in 2019. With few and very large banks relative to the Danish economy, advantages from strengthened supervision and a credible resolution mechanism for these institutions through the banking union would be sizeable. A main issue is to ensure appropriate regulatory treatment of the Danish mortgage institutions and the sizeable covered bonds market. Denmark should join the banking union to improve prudential supervision and strengthen international collaboration. Stronger integration of financial markets could also facilitate more competition in the longer term, which has been found to be weak, especially among mortgage institutions (Danish Competition Council, 2017[13]).

A recent disclosure of massive money laundering in the Estonian branch of the largest Danish bank (Danske Bank) provides a spotlight on the issue of systemically important financial institutions and the need for enhanced vigilance, especially across borders. The disclosed activities took place during 2007-2015. At that time, anti-money laundering regulation and supervision in Denmark was insufficient and had substantial shortcomings as pointed out in evaluations by the Financial Action Task Force (FATF, 2017[14]). The Government implemented the 4th EU anti-money laundering directive in 2017 and took further initiatives in September 2018 in response to the Danske Bank case, including higher fines and additional requirements on fit and proper management. Nevertheless, there is a need to review and ensure that the regulatory framework is at least in line with international standards and to strengthen cross-border collaboration. Scrutiny should be increased to raise the risk of detection and penalties for non-compliance should be raised to a level that forces management to fight such activities.

The housing market would benefit from tax reform and deregulation

House prices in Denmark have overall increased in line with fundamentals (Systemic Risk Council, 2018[15]) and at a slower pace than in other Nordic countries (Figure 10). This has limited borrowing needs and resulted in muted credit growth (Figure 11), which also reflects balance sheet consolidation by households and businesses. At the same time, a recent property tax reform, which again will base tax payments on market valuations of housing, implies that immovable property taxation will act as an automatic stabiliser of the real estate market going forward (Table 3). Moreover, the Government has started to increase the countercyclical capital buffer to prepare banks for a future downturn. The financial sector, and the economy more broadly, is thus in a better shape compared to the latest upturn in the mid-2000s and the risk of a severe downturn is significantly lower (see Annex 1.B).

Figure 10. House prices in Denmark have increased in line with household income



1. The nominal house price is divided by the nominal disposable income per head.
2. Nominal house prices deflated using the private consumption deflator from the national accounts.
Source: OECD Analytical House Price database.

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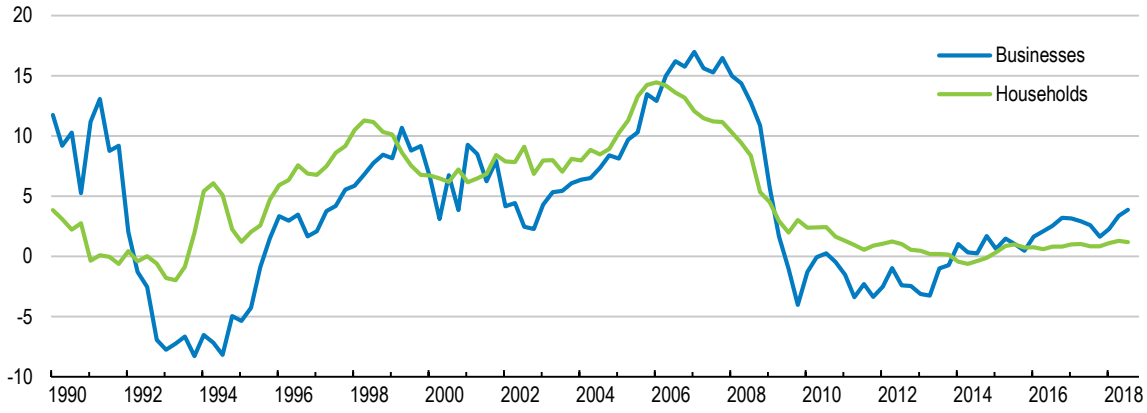
Figure 11. Nominal credit growth is low reflecting ongoing consolidation of high debt

Credit growth, year-on-year % change



Source: Systemic Risk Council.

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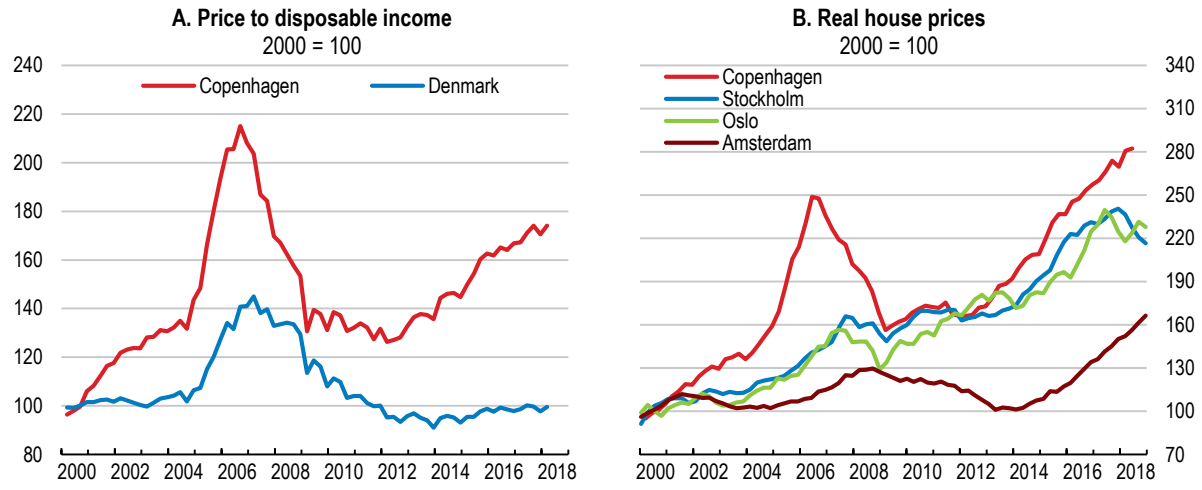
Table 3. Past OECD recommendations on financial sector and housing market risks

Recommendations	Action taken since May 2016 or planned
Reform property taxation, including by decreasing mortgage interest rate deductibility and regularly updating valuations in order to establish neutrality across different asset classes.	A property tax reform was approved in 2017 and will become fully effective in 2021. New valuations will be implemented and updated every second year starting in 2020. The new tax system replaces a nominal tax freeze of property taxation with proportional taxation, maintaining a progressive element for the most valuable homes. No changes have been made to mortgage interest rate deductibility.
Encourage mortgage institutions to strengthen the use of debt-service-to-income ratios.	From January 2018, new guidelines for mortgage loans to households with high debt restricts access to mortgage loans with deferred amortisation and variable interest rates. Households with debt-to-income ratios above 400% are required to fix interest rates for at least five years if the loan-to-value ratio is above 60%.
Give consideration to extending some of the locally targeted "Best practices" introduced by the regulator for granting a mortgage in hotspot areas to the whole country.	No specific action taken.
Support a bigger private rental housing market by easing rent regulation while striking a balance between landlord and tenant protection.	No specific action taken.

Beneath the modest increase in nationwide house prices are rapid increases in Copenhagen (Figure 12), and to some extent Aarhus. Thus, locally there are some concerns whether house prices are increasing faster than warranted by disposable income growth and low interest rates, thereby elevating debt-to-income ratios for new homeowners (Systemic Risk Council, 2017[16]). This prompted the authorities to tighten financial regulation by reducing access to risky loans for households with high debt relative to income from January 2018 (Table 3). This is a welcome step to reduce the interest rate exposure for new borrowers. However, vulnerabilities among existing households holding high debt based on risky loans remain unaddressed. These loans, with variable interest rate and a repayment-free grace period the first ten years (interest-only loans), represents about 35% of the outstanding stock of household mortgage debt. While this also includes many households with low debt-to-income ratios, households with both critically high loan-to-value and high debt-to-

income ratios hold around 10% of the total household debt and are very vulnerable to interest rate increases (Danmarks Nationalbank, 2018[17]).

Figure 12. Rapidly increasing flat prices in Copenhagen is a risk



Note: The house price index for Copenhagen is based on owner-occupied flats. For Amsterdam, Oslo and Stockholm available house price indices based on existing dwellings for permanent living are used. The private consumption deflator from the national accounts is used to deflate nominal house prices.
Source: Systemic Risk Council of Denmark; Statistics Denmark; OECD Economic Outlook Database; Statistics Netherlands; Statistics Norway; Statistics Sweden.

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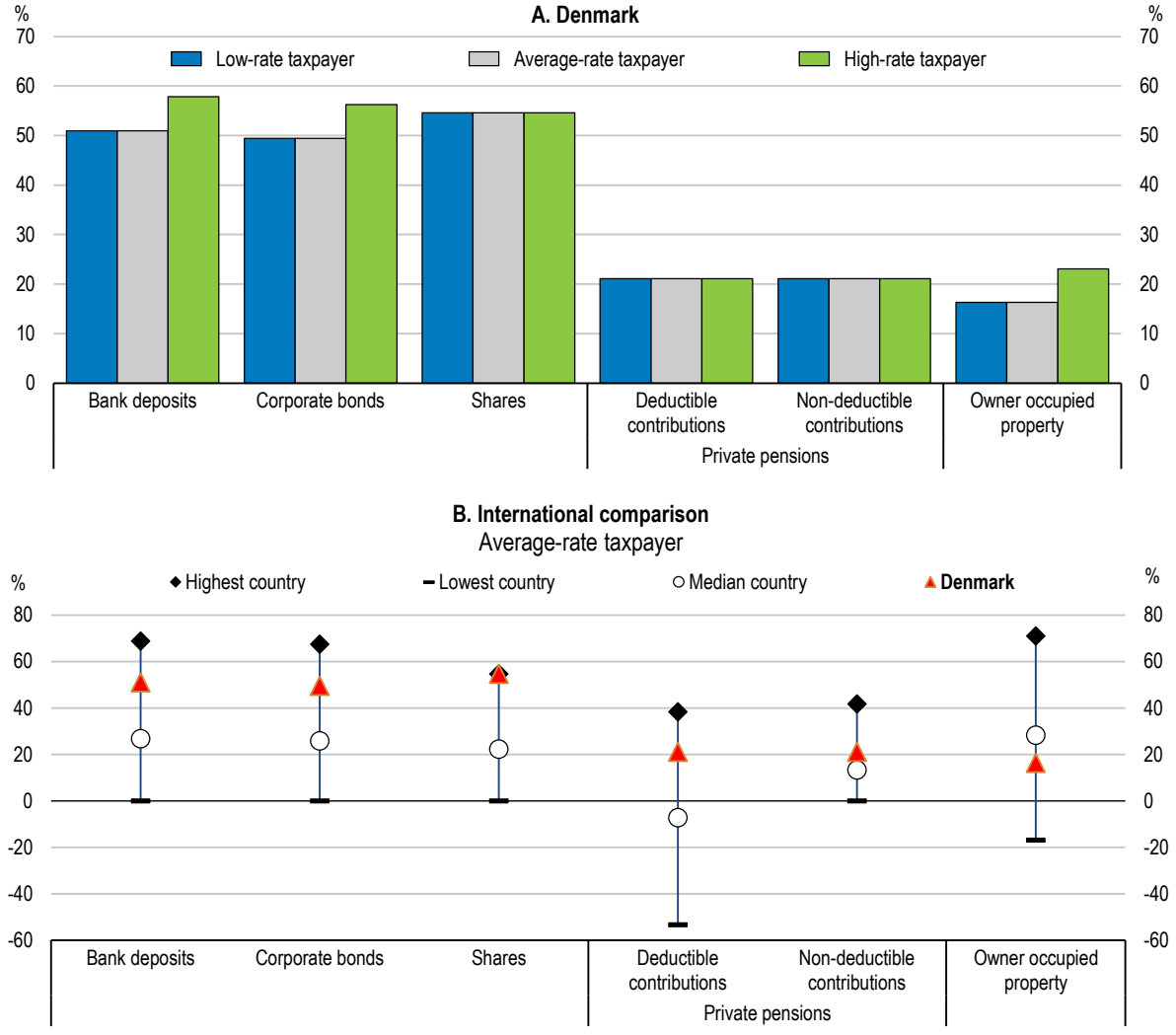
The buoyant housing market in parts of the country and low interest rates offer a window of opportunity to make progress on reforms to improve household resilience through economic incentives in the tax system. Even after the 2017 property tax reform, recurrent taxes on immovable property are low if evaluated against normal interest rate levels; the tax relief for interest expenses is comparatively high and has no cap, while capital gains on owner-occupied housing are exempted from taxation. This makes the tax treatment of owner-occupied housing very favourable compared to other savings vehicles (Figure 13, Panel A) than in most other OECD countries (Figure 13, Panel B). Such low property taxation and high interest deductibility are found to be capitalised into real house prices, which also inflate household gross debt (Høj, Jørgensen and Schou, 2018[18]; Andrews and Caldera Sánchez, 2011[19]). Even so, interest deductibility does reduce household exposure to interest rate increases as tax relief offsets part of the higher debt service burden.

Figure 13. Taxation of capital income at the household level is high but favours owner-occupied housing

Marginal effective tax rates across asset types, 2016



How to read this figure: The marginal effective tax rate summarises the tax on investing one additional currency unit across different assets with an expected holding period of five years (20 years for pension funds and housing). The tax rates are adjusted for country-specific average annual inflation rates over the period 2011-16. A low-rate (high-rate) taxpayer has relatively low (high) income and wealth. Savings in private pensions are assumed not to give rise to reductions in means-tested public pensions, which can raise marginal taxes substantially. This is the case for large groups in Denmark (Figure 21) (Danish Ministry of Finance, 2017[20]; 2018[21]). In many countries, pension contributions are deductible and tax-exempted on pay out, resulting in negative marginal effective tax rates. See source for details on the methodology and assumptions applied.

Source: OECD (2018), *Taxation of household savings*.

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At the same time, marginal taxes on other assets, like shares and corporate bonds, are substantially higher and among the top across OECD countries. This configuration of taxes is likely to hamper investment in personally-owned companies and development of the private equity market, which is likely to become a more important source of finance as intangibles become more important and new business models emerge (see Chapter). Many of the structural reforms recommended in the thematic chapter would boost investment and strengthen work incentives through tax reform (Box 2). Sustaining high inclusiveness, among other through a limited impact on redistribution of such reform, could to some extent be facilitated by removing selective support for certain high-income groups (such as reduced inheritance taxation of family-owned businesses). In any case, the progressivity of income taxes is substantially less important for redistribution compared to cash transfers (Causa and Hermansen, 2017[22]).

Box 2. Quantification of structural reforms

Selected reforms that are proposed in the *Survey* are quantified in the table below, using simple and illustrative policy changes. Other reforms, such as strengthening the competition framework or improving integration of migrants, are not quantifiable given available information or the complexity of the policy design. Some of the estimates reported are based on empirical relationships between past structural reforms and productivity, employment and investment. These relationships allow the potential impact of some structural reforms to be gauged. These estimates assume swift and full implementation and are based on cross-country estimates, not reflecting the particular institutional settings of Denmark. As such, these estimates are illustrative.

Table 4. Potential impact of structural reforms on per capita GDP

Policy	Measure	10 year effect, %	Long-run effect, %
Personal income taxation	Reduce the top marginal tax rate by 5 percentage points (from 56 to 51%).	0.18	0.23
Taxation of dividends and realised capital gains	Reduce the highest tax rate by 5 percentage points (from 42 to 37%).	0.04	0.05
Corporate income taxation	Implement an allowance for corporate equity (ACE).	0.55	0.73
Student grants	Reduce student grants for higher education by 20%.	0.04	0.09
R&D business support	Increase spending on business R&D support by 10%.	0.02	0.05

Note: The following recommendations are included in the fiscal quantification (Box 4), but insufficient information preclude a quantification of their impact on GDP: reduce tax relief for interest expenses; increase inheritance taxation of family-owned businesses; and increase spending on early childhood education and care.
Source: OECD calculations based on Égert and Gal (2017[23]); Danish Ministry of Finance (2017[24]; 2017[25]) and Danish Government (2017[26]).

Measures should be taken to move towards more tax neutrality across asset types. An ongoing reduction of the tax deductibility of interest expenses from 33.5% to 25.5% of expenses has had limited impact since it only applies above a threshold (EUR 6 700 for singles and EUR 13 400 for couples per year). Although the thresholds are fixed in nominal terms, most households continue to benefit from a tax relief of 33.5% for expenses below the thresholds in the current low interest rate environment. This leaves Denmark among the OECD countries with the most favourable tax treatment of interest expenses (OECD, 2018[27]), higher than in both Norway and Sweden. Denmark should reduce the

deductibility of interest expenses, for instance by gradually making the full amount of interest expenses subject to the lower rate of 25.5% tax relief.

The framework for taxation of immovable property is overall well designed. Denmark is among only three OECD countries (Australia and Estonia in addition) with a pure land tax, considered one of the most efficient taxes. In addition, the recent property tax reform will ensure valuations are updated every second year and maintains an element of progressive taxation. However, the recurrent property tax rate, expected to be set at 0.6% of a prudent valuation of homes from 2021, is likely to be below a neutral tax rate (Danish Economic Councils, 2016[28]), especially as interest rates normalise. Increasing recurrent taxation of housing can be a substantial burden for households with low incomes but high housing wealth. Deferring part of the taxation to the owner sells the house, which is already an option for pensioners, would be one way to mitigate such problems.

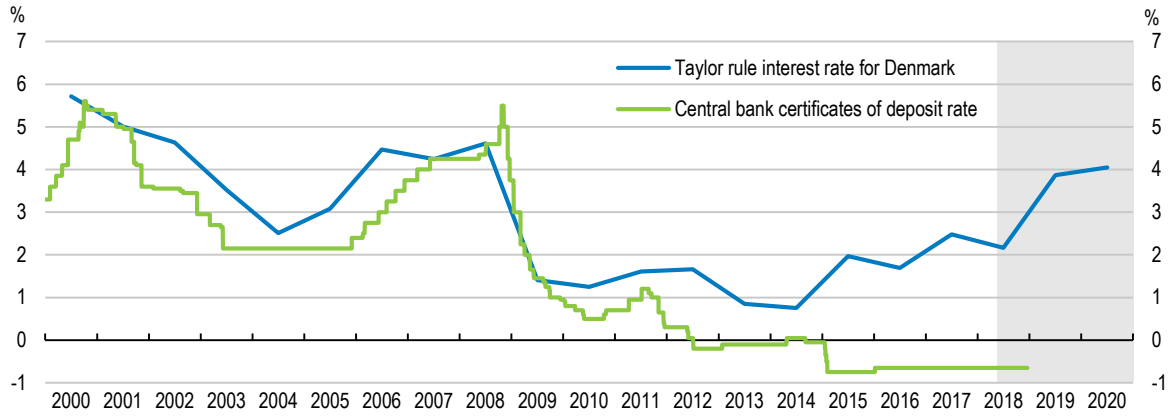
To target fast-rising prices of flats in the large cities additional measures are needed, albeit flats in Copenhagen and Aarhus make up a modest 6% of the national housing market by value. The rental market remains highly regulated with all private dwellings build before 1991 subject to strict rent control. Easing rent regulation and reducing housing subsidies as discussed in the 2016 *Survey* would stimulate a better utilisation of the housing stock and a larger private rental market. In turn, a larger and more dynamic rental market would ease the upward price pressure on the owner-occupied segment and promote labour mobility. Finally, selective support to parents to buy flats to rent to their children should be terminated to ease high demand for smaller flats. Current regulation allows parents to set below-market rents and receive tax allowances for the deficit. On top of this, children are entitled to rental subsidies like regular tenants.

Macroeconomic policies are stimulating the economy

The tightening labour market and the widening of the positive output gap in the coming years call for prudent economic policy to reduce the risk of accelerating wage and price inflation, which happened within only a few years during the latest upturn. The central bank deposit rate has almost continuously been negative since 2012, the longest period in OECD economies, reflecting the sole objective of monetary policy to maintain the peg to the euro. This objective means Danish monetary policy is governed by that of the ECB, leaving no room to counter growing imbalances and capacity pressures (Figure 14). The peg also implies that monetary policy conditions are likely to remain very accommodative for a sustained period of time as indicated by the ECB. Therefore, fiscal and macro-prudential policies become more crucial for stabilisation (Blanchard and Summers, 2017[29]). In most cases, it should nonetheless be sufficient for Denmark to let its large automatic stabilisers work, although they may have weakened somewhat over time as marginal taxes have been lowered and the unemployment benefit period shortened.

Figure 14. Monetary conditions will not help to stabilise the economy

Taylor rule estimated interest rate



Note: The Taylor rule rate is calculated as: interest rate = annual real potential GDP growth + core inflation + 0.5 * output gap + 0.5 * (core inflation – 1.9).
Source: OECD Economic Outlook 104 database; Danmarks Nationalbank.

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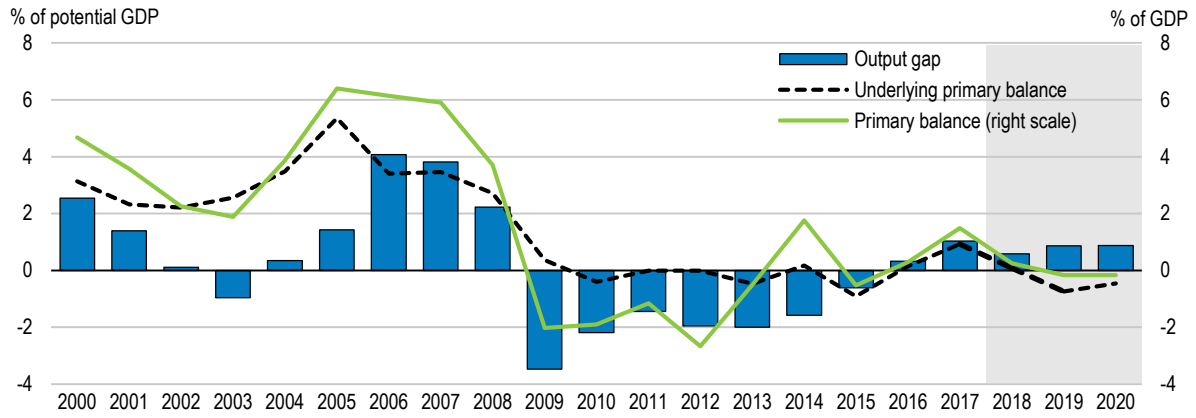
Fiscal policy is broadly neutral in the near term based on OECD estimates (Figure 15). An apparent deterioration of the primary balance mainly reflects normalization of certain extraordinarily high tax revenues in 2017. Going forward, the fiscal stance is set to reach the Government's target of structural balance after 2020. In the fiscal bill for 2018, the Government nonetheless sustained demand for construction services, where labour shortages are already sizeable, by making the tax credits for repairs in private homes permanent. The deterioration of the underlying fiscal balance since 2007 was partly due to an increase in public investment to support demand through the crisis and recovery. As the economy recovered, the high investment level has not been reversed as had been planned, but the overall fiscal stance has tightened somewhat since 2010. Looking ahead, it would be prudent to let fiscal policy lean against the wind in the already capacity constrained economy. This would reduce the risk of a repetition of pro-cyclical fiscal policy seen in the mid-2000s.

Figure 15. The fiscal policy stance is set to become broadly neutral



Source: OECD Economic Outlook 104 database.

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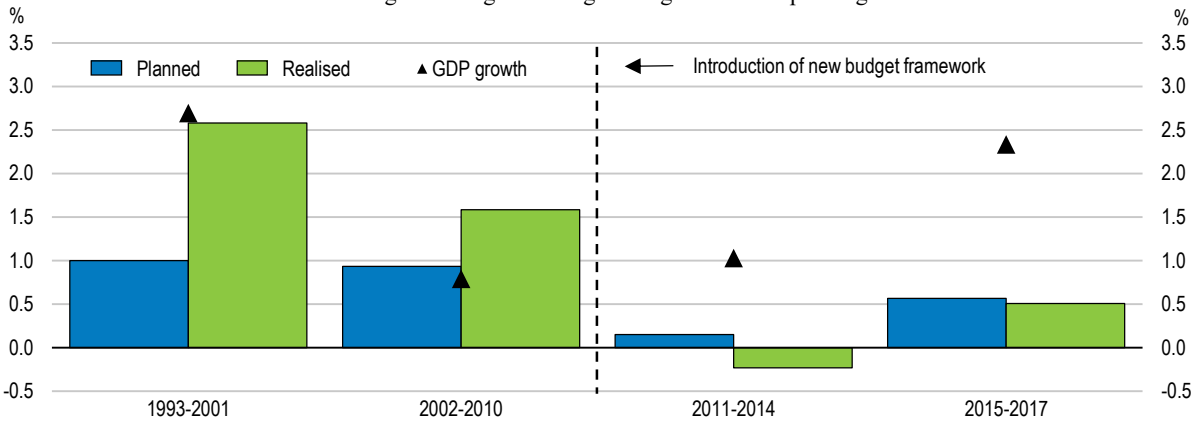
The Budget Law has been effective, but could be refined

OECD countries are increasingly relying on legally-based fiscal rules such as medium-term expenditure frameworks to maintain sound and predictable fiscal policies (OECD, 2019[30]). On this matter, the Danish experience has been impressive. Since the introduction of automatic sanctions on municipalities for spending above budgets in 2010 and later the national Budget Law in 2012, budget overruns have been eliminated (Figure 16). Some initial challenges of under-spending and money-burning towards the end of a budget year have evaporated as proficiency in budget planning improved in municipalities (Bæk, Andersen and Krahn, 2016[31]).

Figure 16. The national Budget Law has eliminated public spending overruns

Average annual growth of general government spending



Note: Planned government spending are taken from medium-term fiscal plans and revised according to national convergence programmes submitted to the European Commission. Realised growth of government spending differs slightly from national account figures. The reason is that planned spending rely on input methods, while standard national account measures rely on output measures.
Source: Danish Ministry of Finance (2014[32]); Danish Government (2010-2016); Statistics Denmark.

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The Danish medium-term expenditure framework is one the most comprehensive across OECD countries in terms of scope and targets (OECD, 2019[30]), and includes a structural budget deficit limit at 0.5% of GDP, four-year expenditure ceilings, automatic sanctions on municipalities and regions in case of overspending and an obligation to maintain long-term fiscal sustainability. Nonetheless, the planned evaluation in 2019 should explore potentials for improvements. For example, the budget operated very close to the deficit limit during 2014-17. This raises concern that fiscal space could be unduly limited in a future economic downturn if fiscal buffers are inadequate, even more crucial given muted monetary policy. Within the current framework the deficit limit can be exceeded in exceptional circumstances, including severe economic downturns. The evaluation could consider the level of the lower limit, which according to EU estimates could be relaxed, potentially up to 1% of GDP. Over the longer term, this would allow public spending to respond to temporary demographic headwinds towards the middle of this century or public investment needs to address weak productivity growth (see Chapter). A drawback is that a lower limit may become a new focal point with the risk that policy makers relax the practice of maintaining sound public finances.

The upcoming evaluation of the Budget Law should also consider how to strengthen focus on efficiency and quality of spending at the different levels of government. For instance, performance budgeting is compulsory in most OECD countries, but is optional for ministries and agencies in Denmark and reported to be only medium effective (OECD, 2019[30]). Developing a more integrated approach to connect fiscal planning to evaluations and strategic goals should be pursued, among others by benchmarking public institutions to each other to facilitate adoption of best practices.

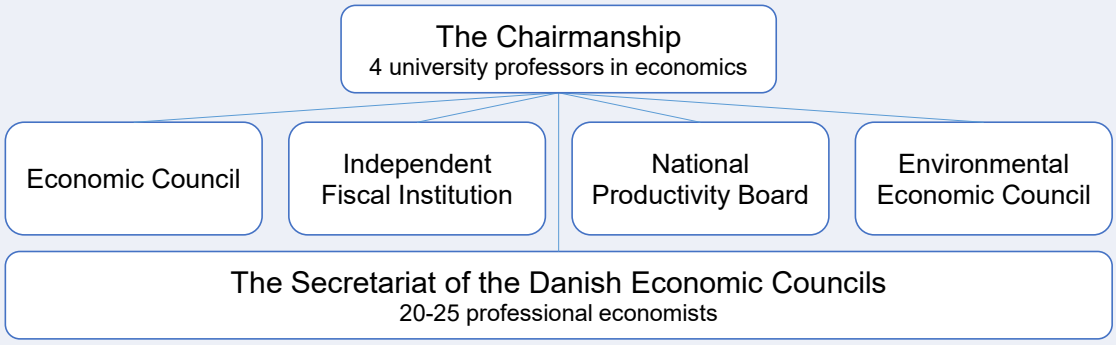
Comply-or-explain procedures can ensure enforcement of the budget framework. In Denmark, this is put into practice in connection with an annual assessment by the Danish Economic Councils in its role as an independent fiscal institution (fiscal council) (Box 3). The Government's decentralisation programme includes moving the Secretariat of the Danish Economic Councils from Copenhagen to Horsens in the western part of Denmark from 2019. A recent adjustment created a six-person satellite unit in Copenhagen, in part to help the Secretariat fulfil its role as fiscal council. However, this geographical split of an institution with a total staff of 30-35 people complicates the establishment of effective workflows and reduces the attractiveness of the institution.

Experience from similar moves of high-skilled public sector jobs in other countries has been mixed. The Office of National Statistics (ONS) in the United Kingdom lost 90% of its staff when its London site was moved to Newport with a detrimental effect on the quality of its work (Bean, 2016[33]). The Norwegian competition authorities also lost most of its staff, when it was moved from Oslo to Bergen, although operation resumed relatively fast (Asplan Viak, 2009[34]). Lessons from a large set of relocations in Scotland point to the need for careful consideration of the choice of location and implementation of such reforms to result in gains for regional economic development (Audit Scotland, 2006[35]). Against this background, the Government should ensure that the new setup allows the Secretariat to deliver high-quality analysis and advice.

Box 3. The Danish Economic Councils

The Danish Economic Councils is an independent public institution with the mandate to critically assess and advice on fiscal policy and the economy more broadly. The institution was established in 1962, making it one of the oldest of its kind (von Trapp and Nicol, 2016[36]). The Chairmanship is assigned four distinct tasks and is supported by a relatively small secretariat (Figure 17). The integration of different areas and split between a chairmanship and a secretariat facilitates independent policy advice, creates synergies and ensures consistency. The Chairmanship reports to the Councils, which are comprised of high-level representatives from the Government, the Central Bank, social partners, non-governmental organisation and academic experts.

Figure 17. The institutional setup of the Danish Economic Councils integrates four tasks



Source: www.dors.dk

- *Economic Council* monitors the economy and analyses the long-term economic development. The Chairmanship delivers two reports per year to the Council. These reports include recommendations on macroeconomic and structural policies as well as economic projections.
- *Independent Fiscal Institution* assesses the soundness of public finances and compliance with the national Budget Law. A comply-or-explain requirement on the Government and the strong credibility of the institution ensures that recommendations are adhered without any formal power.
- *National Productivity Board* monitors and analyses productivity developments in an annual report, which also comprises assessment and recommendations on productivity-enhancing policy initiatives.
- *Environmental Economic Council* examines the interaction between the environment and the economy and assesses the efficiency of Danish environmental policies in an annual report.

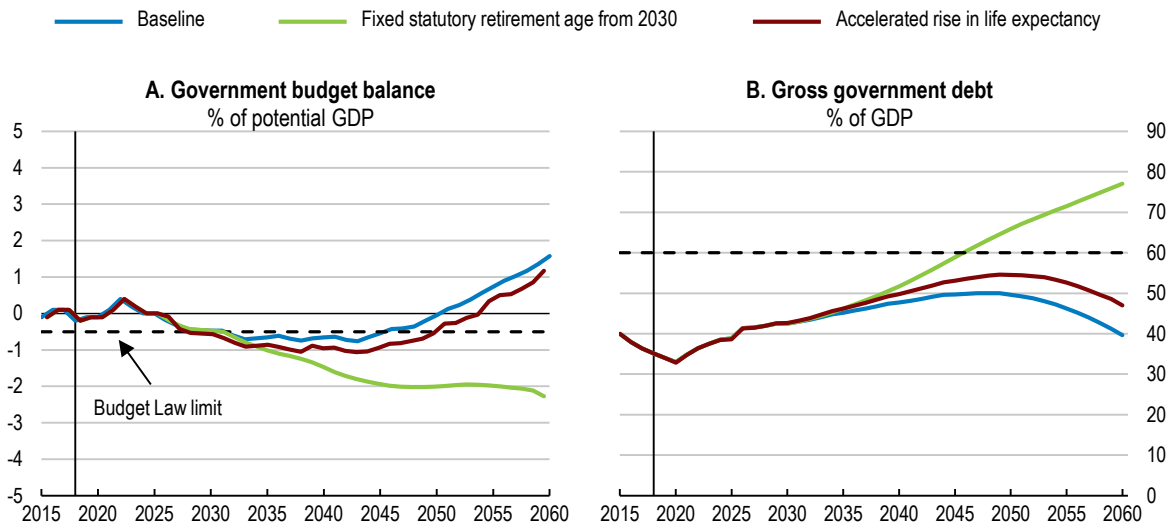
Over time, the institution has acquired a strong independent voice on economic policy, resulting in significant media coverage and political attention, reflecting a solid reputation that rests on the quality of analysis and the power of arguments.

Higher public sector efficiency could add to fiscal sustainability

Linking retirement ages to life expectancy underpins fiscal sustainability

Fiscal policy is considered to be sustainable (Danish Economic Councils, 2018[37]; Danish Government, 2018[38]; European Commission, 2018[39]) and public debt, at 36.1% of GDP in 2017, will remain well below the 60% limit of the Stability and Growth Pact in the long term (Figure 18). This reflects earlier reform, particularly linking the statutory retirement age to life expectancy as discussed in the 2016 *Survey*.

Figure 18. Public finances will be sustainable if the retirement age increases as expected



Note: The baseline scenario shows public finances under current and adopted policy rules, in particular that the statutory retirement ages are increased every five years as life expectancy increases (Figure 19, Panel A). The first alternative scenario assumes constant statutory retirement age at 68 and constant early retirement age at 65 from 2030. The second alternative scenario assumes that life expectancy rises by an additional year from 2026 compared to the baseline.
Source: OECD calculations based on Danish Ministry of Finance (2018[40]).

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Nonetheless, maintaining sound public finances will require prioritisation to avoid tax increases or spending cuts. As ageing accelerates resources are set to be reallocated towards healthcare and long-term care spending, which combined are projected to rise from 9.4% to 12.6% of GDP in the long term (European Commission, 2018[41]), potentially away from productive spending such as education. Implementing tax reform and other recommendations from this *Survey* would have a broadly neutral impact on the budget balance in the medium term (Box 4).

Box 4. Quantifying fiscal policy recommendations

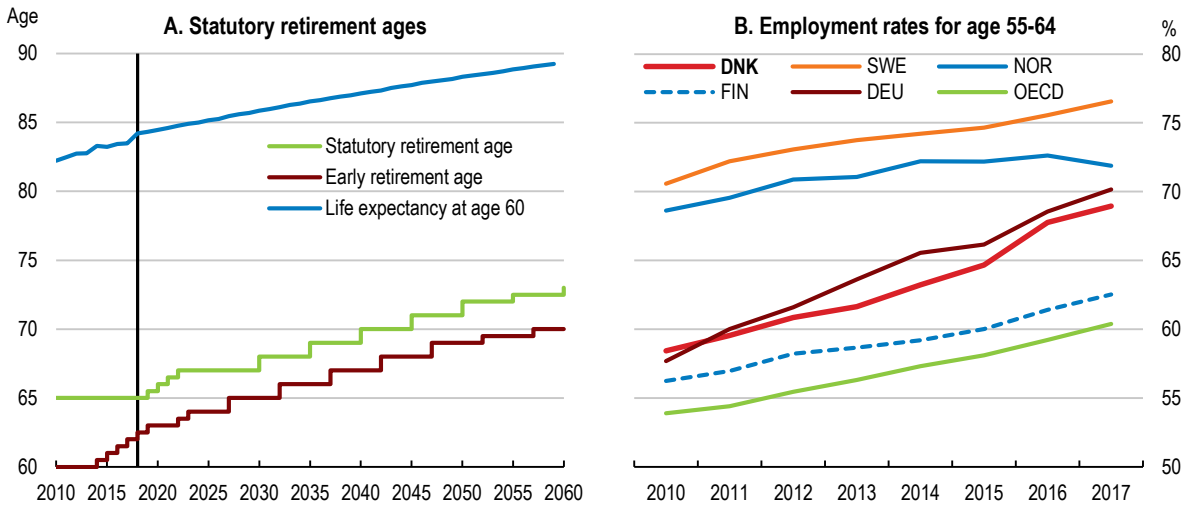
The following estimates roughly quantify the fiscal impact of selected recommendations within a 5-10 year horizon, using simple and illustrative policy changes. The reported fiscal effects include behavioural responses when estimates are available.

Table 5. Illustrative fiscal impact of recommended reforms

Policy	Measure	Impact on the fiscal balance, % of GDP
Deficit-increasing recommendations		
Personal income taxation	Reduce the top marginal tax rate by 5 percentage points (from 56 to 51%).	-0.13
Taxation of dividends and realised capital gains	Reduce the highest tax rate by 5 percentage points (from 42 to 37%).	-0.03
Corporate income taxation	Implement an allowance for corporate equity (ACE).	-0.08
R&D business support	Increase spending on business R&D support by 10%.	-0.01
Early childhood education and care	Increase total spending by 5% to extend opening hours.	-0.06
Deficit-reducing recommendations		
Tax relief for interest expenses	Reduce the tax relief of interest expenses in personal income taxation to a uniform rate around 25% (from about 33% for expenses below EUR 6 700).	0.15
Inheritance taxation of family-owned businesses	Raise the tax rate from the reduced level at 5% to the regular inheritance tax rate at 15%.	0.05
Student grants	Reduce student grants for higher education by 20% combined with better options for public student loans.	0.06
Total fiscal impact		**-0.05**

Fiscal surpluses emerge in the second half of the century (Figure 18, Panel A), but are quite uncertain given the very long horizon and the sizeable rise in the effective retirement age needed to make this happen. The indexation mechanism lifts the statutory retirement age by up to one year every five years and targets a reduction in the expected retirement period to 14.5 years (Figure 19, Panel A). With current projections, this will imply an eight year rise in the retirement age (from 65 to 73) between 2018 and 2060, reaching the highest planned retirement age across OECD countries (OECD, 2017[42]). As additional years lived are generally in good health (OECD, 2017[43]), such a rise is achievable, but is quite ambitious as it implies that future retirees will have fewer expected years in retirement, both in absolute terms and as a proportion of their lifetime, compared to today's elderly.

Figure 19. Higher early retirement age has contributed to rising senior employment



Source: Danish Government (2018[38]); OECD Labour Force Statistics.

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The main challenge is to ensure that seniors stay longer in the labour market so that the effective retirement age actually rises along with longevity. Experience from the first adjustment of the voluntary early retirement pension age starting in 2014 has been encouraging (Danish Ministry of Finance, 2017[44]) and has supported a significant increase in the employment rate among 55-64 year olds (Figure 19, Panel B). Measures have also been taken to encourage people in work to opt-out of the early retirement scheme; in the labour force below age 50, less than 10% will be entitled to early retirement when they reach the relevant age. Nevertheless, the senior employment rate remains below those of Norway and Sweden. Retaining the group of seniors above age 65 in the labour market may require additional measures such as ensuring greater age-neutrality in the functioning of the labour market (OECD, 2015[45]). Thorough evaluation of the upcoming rise in the statutory retirement age towards 2022 will thus be vital to assess the credibility of the long-term fiscal strategy.

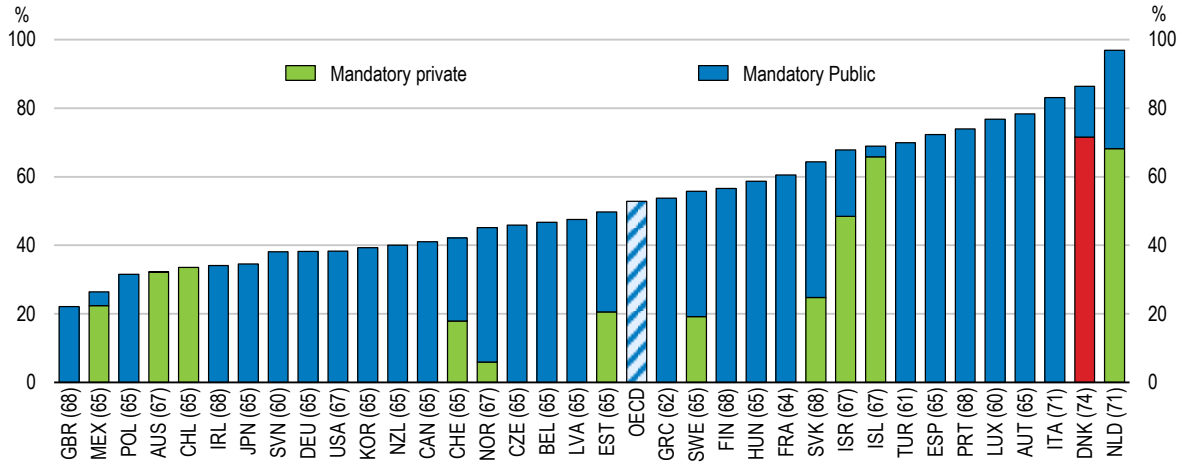
At the same time, a rising group of people is likely to be in need of alternative support as the early retirement scheme is de facto being phased out. Entry into benefit schemes targeted to people with reduced work capacities (e.g. *ledighedsydelse* and flexi-jobs) has already increased among seniors (jobindsats.dk). By contrast, overall entry into the permanent disability scheme has declined significantly, following a reform in 2013 (2016 *Survey*). An evaluation of the reform detected large differences in the administration of rehabilitation programmes across municipalities and resulted in some adjustments in early 2018. Consideration should be given to develop better tools to identify those people with reasonable capacity to work at all ages and improve targeting of rehabilitation programmes. Data-driven profiling tools developed for active labour market programmes could form a useful starting point. This would also allow for removing the arbitrary lower-limit at age 40 for assigning permanent disability pension.

Getting pension savings right for all remains a challenge

The funded occupational pension scheme is a vital pillar of the long-term sustainable public finances. While the system is still maturing, households have already accumulated aggregate pension savings of almost 200% of GDP in 2018. Combined with tax-financed public pensions this ensures that average pension payments could reach almost 90% of average earnings by 2070 from a full career of contributions (Figure 20), a figure surpassed only in the Netherlands. The Danish pension system is thus exceptionally robust to ageing, yet consideration should be given to address at least three issues, which will become more pressing as pension savings rise further.

Figure 20. The pension replacement rate is projected to reach almost 90% by 2070

Gross pension replacement rate upon retirement for workers with average earnings



Note: Sum of all pension benefits in per cent of average earnings over working life, reported for person with average earnings. Expected retirement age in year 2070 reported in parenthesis.
Source: OECD Pensions at a Glance 2017.

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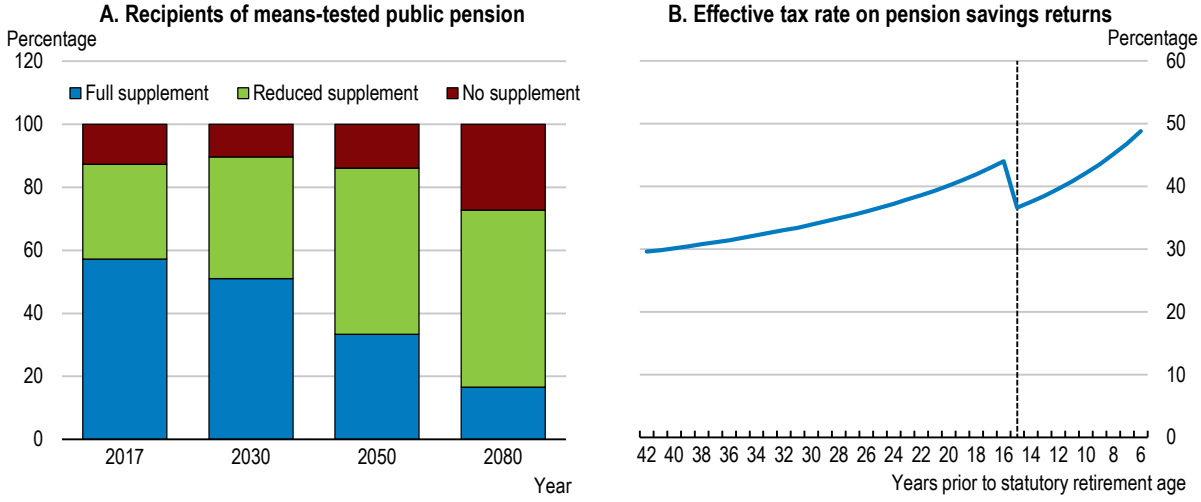
First, balancing protection from public means-tested pensions against incentives to work and save for individual pensions, as discussed in the previous *Survey*, remains a challenge. The public pension system provides a basic benefit and a means-tested supplementary benefit (OECD, 2017[42]). Projections indicate that more than half of pensioners by 2080 will be in the phase-out income interval of the public supplement (Figure 21, Panel A), thus facing high marginal taxes on continued work and pension savings prior to retirement. To address this, the Government recently introduced additional tax deductions for pension contributions (Table 6), with deductions rising 15 and five years prior to the statutory retirement age (Figure 21, Panel B). While this is welcome, consideration should be given to reform means testing as well to better target those with high disincentives. Moreover, a rising group of high-income pensioners, approaching 30% by 2080, will not receive the supplement (Figure 21, Panel A), implying they will profit from favourable taxation of additional pension savings (Figure 13). The new measures also amplify the complexity of the tax and pension system further with the risk that people focus e.g. on reducing tax payments rather than setting pension savings at a desirable level.

Figure 21. Age-dependent tax deductions address high marginal taxes from means testing



Note: The full public pension supplement benefit amounts to EUR 11 100 per year before taxes in 2019 (received by the blue bar shares in Panel A). It is reduced by 30.9% of income from contributory pensions above EUR 9 700 (green bars) and is fully phased out at EUR 45 800 per year (red bars). Panel B shows the effective tax rate on returns to private pension savings for an average earner facing reduced public supplement benefits upon retirement. It includes the tax deductions at the time of contribution, recurrent taxation of pension returns at 15.3%, income taxation of benefits and the reduced public supplement benefit as a result of means testing. The kink reflects an increase in tax deduction for pension contributions 15 years prior to the statutory retirement age.
Source: Danish Ministry of Finance (2017[20]); Danish Ministry of Taxation (2018[46]).

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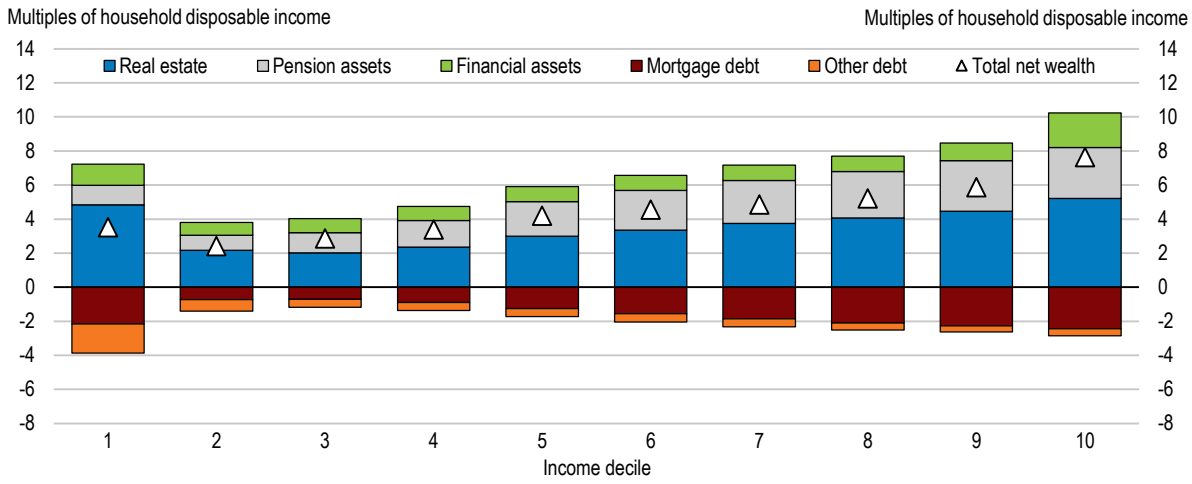
Second, a non-negligible group will still have no or very little pension savings in the future. By 2080, 17% of pensioners will receive the full public pension supplement according to projections (Figure 21, Panel A). They risk retirement with relatively low income and modest consumption possibilities. Nonetheless, as long as they qualify for full public pension they will benefit from high replacement rates upon retirement. Public finances could come under pressure to preserve an inclusive society, in particular as immigrants often face reduced public pensions because of a residence requirement (Danish Ministry of Finance, 2017[20]). In the fiscal bill for 2019, the Government decided to adjust public pensions fully to wage growth in the future, moving away from slightly reduced uprating (*satsreguleringen*). It also took a welcome first step to introduce mandatory pension savings for all by increasing uprating of public cash transfers for those out of work and reserving the increase for individual pension saving (Danish Government, 2018[47]).

Third, pension savings comprise a sizeable part of household assets (Figure 22), which can create maturity mismatches for household balance sheets. This vulnerability is a particular concern for Denmark since households hold the largest gross debt level across OECD countries (Figure 9). Household leverage is highest among the more affluent households and in the bottom of the income distribution, while buffers in the form of financial assets compose a relatively small part of total assets across the income distribution (Figure 22). Substantial balance sheets create exposure to short-term asset prices and interest rate shocks. For instance, large drops in house prices during 2008-09 caused technical insolvency among 10% of homeowners (Skak and Bloze, 2013[48]). In these cases sudden loss of income, e.g. due to unemployment, family breakdown or disability can create severe

economic distress. Pension savings are not usually unlocked ahead of time to use as buffer in such circumstances, and are taxed at 60% if they are.

Figure 22. Household net wealth is sizeable across the income distribution, but assets are mostly illiquid

Household assets and liabilities in multiples of household disposable incomes by deciles, 2017



How to read this figure: The bars show the composition of household assets and liabilities across the income distribution as a multiple of disposable income for each decile. The first decile covers households with the lowest incomes and as a result assets and liabilities are very large when measured in multiples of disposable incomes. Net wealth spans from around three times disposable income in the bottom to more than seven times in the top of the income distribution. Yet, wealth that can readily be converted into cash (financial assets) is on average less than annual disposable income across the distribution.
Note: Real estate includes cars. Pension assets are recorded net of taxes.
Source: OECD calculations based on Statistics Denmark.

StatLink https://doi.org/10.1787/888933898501

A first step to reduce such vulnerabilities have been taken on the liability side by lowering the number of households with large debt-to-income ratios as discussed above. However, balance sheet expansion is, for people free of means testing, implicitly subsidised since pension saving returns are taxed at a 15.3% rate, while interest rate expenses are deductible at a rate of 33.5 or 25.5% (see above). Steps should also be taken to increase liquidity of the asset side as a means to reduce cyclical vulnerabilities. This could include better options for unlocking pension savings in exceptional circumstances. More fundamentally, adjustments of the uniform mandatory pension contribution rates over the lifetime could be considered. Social partners set the rates through collective bargaining, reaching 12-18% of gross earnings across different occupational groups since around 2010 (Danish Ministry of Finance, 2017[20]). As working lives and contribution periods expand with the indexation of retirement ages to life expectancy, it is likely that some groups could reach excessive pension savings. This is emphasised by the model-based average replacement rate approaching 90% by 2070 (Figure 20), a high level if households e.g. hold sizeable housing wealth in addition.

In sum, getting work and pension savings incentives right for all is a complex and difficult task with no perfect solution. A Pension Commission was appointed in 2014 to deliver in-depth analysis and recommendations, but it was stopped a year later without finalising the

work. Even without a wholescale re-evaluation of the pension and tax system, a review to consider ways to reduce complexity and ease personal financial planning for all should be considered.

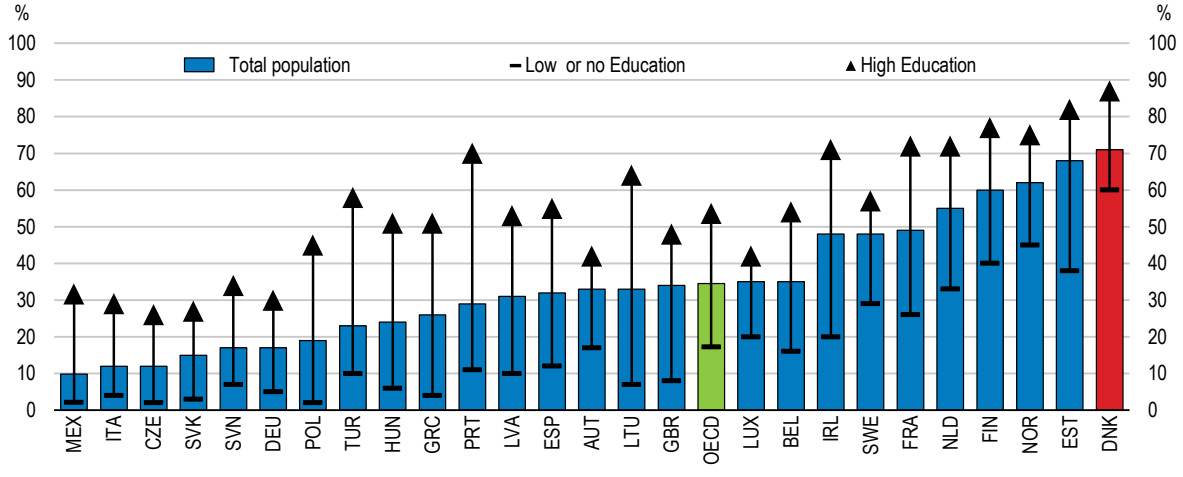
Barriers to foster public sector innovation persist

Sound public finances rest not only on well-designed tax and pension systems with clear employment incentives. Promoting public sector innovation and productivity gains are essential to raise prosperity and free up increasingly scarce labour resources (OECD, 2017[49]). In this respect, the use of new technologies and digitalisation are already among the highest across OECD countries. Initiatives cover a broad range such as:

- The use of digital solutions and digital communication with all public authorities became mandatory by a decision in 2012 with a few exceptions for vulnerable groups (Figure 23).
- Tele-medicine, among other in ulcer care and of patients with chronic obstructive pulmonary disease (COPD), and roll-out of assistive technology in social and elderly care are boosting quality and cutting costs (OECD, 2016[50]).
- Data is starting to drive innovation and public sector reform. Register-based data on hours worked and earnings facilitated unemployment benefit insurance reform in 2017, including digital access to detailed labour market history for both the unemployed and caseworkers (Danish Unemployment Benefit Commission, 2015[51]).

Figure 23. Digital communication with the public sector is high

Individuals using the Internet for sending filled forms via public authorities' websites in the past 12 months, by education level, 2016



Source: OECD Government at a Glance 2017.

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Nevertheless, developing and implementing digital solutions are not without risks and costs. Over the last five years, almost 30% of all larger ongoing ICT projects in the public sector received a yellow or red light from the surveillance board (Danish Council for ICT,

2018[52]), indicating budget overspending or project delays, or significant risk hereof. Reinforcing strategic planning and making better use of existing tools should be pursued (OECD, 2017[53]). Further initiatives have been taken by the Government in order to improve public sector efficiency, including a focus on digitisation-ready legislation. Still, a more integrated approach is needed and should among other focus on complementing technical ICT skills with cognitive skills that are crucial for labour-intensive public services.

Since 2016, a dedicated minister for public sector innovation has been tasked to simplify procedures and reduce bureaucracy under a broad "Collaboration" reform agenda (Table 6). A key challenge is to improve integration of public systems to raise quality for citizens and ensure consistency across different social and health services. This could free up time and resources for employees to focus on their core tasks through better information sharing, while avoiding overlaps and duplication across services and administrative levels. The first leg of the reform process has simplified processes in long-term care to free more time to actual care. Initiatives also reduced high administrative costs from extensive use of applications for smaller grants and funds throughout the public sector. The collaboration reform agenda is welcome and the gradual implementation will provide for achieving successful results.

Enhancing management is key to improve efficiency in the public sector. On this matter, a Management Commission identified the use of centralised and detailed collective agreements for each occupation as one obstacle for efficient management at the workplace level (Danish Management Commission, 2018[54]). The Commission also pointed to a weak culture for dismissing poor performing managers and recommended a stronger focus on deliverables based on data to quantify the impact of core tasks. This should be pursued within the broader context of reforming the budget framework to focus also on quality of spending discussed above.

Centralised wage bargaining and low wage dispersion is also likely to work as a barrier for innovation and productivity growth within the public sector (Danish Productivity Commission, 2013[55]). Only 10% of total compensation of employees is negotiated at the workplace, while the main part is allocated through centralised bargaining. This contrasts with the organised decentralisation used in the private sector, characterised by general sector-level agreements with substantial room for lower-level agreements, and found to deliver good labour market performance (OECD, 2018[56]). While performance is more difficult to measure in the public sector and delivery of good services often depends on the effort of a group of people, further decentralisation of wage bargaining should be considered.

This would give managers and employees an incentive to formulate clear objectives and could motivate employees to improve performance. A more decentralised wage setting would also strengthen recruitment opportunities, supporting reallocation of labour resources geographically and across occupations as demand for welfare services change, among other due to ageing and technological development. Implementation would need to address and monitor some likely downsides. Mechanisms are needed to ensure that bargaining at the institutional level comply with the fiscal spending ceilings. Gender differences is also a particular concern since public sector employees are dominated by women, who tend to achieve poorer economic results than men do in bargaining.

Table 6. Past OECD recommendations to ease public expenditure pressures

Recommendation	Action taken since the 2016 Survey or planned
Allocate a permanent disability pension only to those with permanent incapacity to work regardless of age.	No specific action taken.
Reduce disincentives and barriers to work at older ages originating from public and occupational design.	A reform of the pension system from June 2017 and a tax reform from February 2018 strengthen incentives for older workers to stay in the labour market by: - An opening to opt-out of voluntary early retirement scheme and have contributions returned free of taxation. - Tax deduction for pension annuity savings raised for workers five years or less from statutory retirement age. - Additional tax deduction for pension savings targeted to workers 15 years or less from statutory retirement age. - Earned income tax credit broadened to cover pension contributions.
Use autonomy of local governments better for drawing lessons from the diversity of approaches in providing social services, which should also strengthen accountability for outcomes.	A second round of the "Free Municipality" initiative is ongoing. Lessons from first round in terms of rule simplification and more efficient procedures is being implemented via knowledge transfer or change in legislation.
Integrate welfare, prevention and rehabilitation services to improve provision of public services.	Further integration and coordination of welfare policies (e.g. social, employment, and education policies) is made possible by giving citizens with complex and transverse problems one coordinated plan for the delivery of social services.
Make general practitioners more responsible for the continuity of care.	A collective agreement for general practitioners from September 2017 improves the responsibility for continuity of care in general and specifically for patients with COPD, Type 2 Diabetes and patients treated for cancer.
Encourage the private supply of welfare services to offer more choice while at the same time reaping efficiency gains.	An examination on the potentials from increased public-private cooperation in new areas has been initiated with Local Government Denmark and Danish Regions.

Ensuring equal opportunities to benefit from technological changes

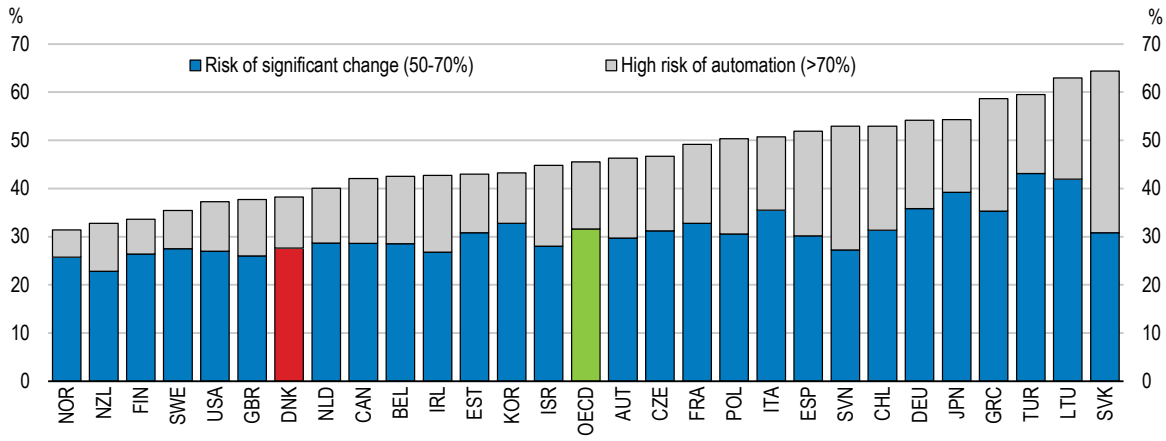
Labour market policies need to adapt to the future of work

New technologies and globalisation are changing labour markets, creating new opportunities and new forms of work, but also displacements and a need for adapting policies (OECD, 2017[57]). Manufacturing employment has declined by around one third since the mid-1990s, which is among the largest declines across OECD countries. At the same time, globalisation and trade have had an uneven impact across regions (Deloitte/Kraka, 2017[58]), although the current gap in unemployment rates across regions is among the smallest across OECD countries.

Automation and disruptive technologies could fundamentally change many jobs in the future. While projections should be taken with much care, cross-country analysis suggests that around 10% of jobs in Denmark face high probability of automation, which is among the lowest in OECD countries (Figure 24). This partly reflects an already high level of digitalisation and use of industrial robots compared to other countries (see Chapter). So far the pace of automation has been similar to previous waves of technological change (McKinsey & Company, 2017[59]), but the impact of artificial intelligence, Internet of Things and other technologies is hard to gauge and could turn out to change the nature of work quite fundamentally in many areas – as have previous waves of technological innovations.

Figure 24. Jobs at risk of automation is lower than in other OECD countries

Percentage of jobs at risk by degree of risk



Source: Nedelkoska and Quintini (2018[60]).

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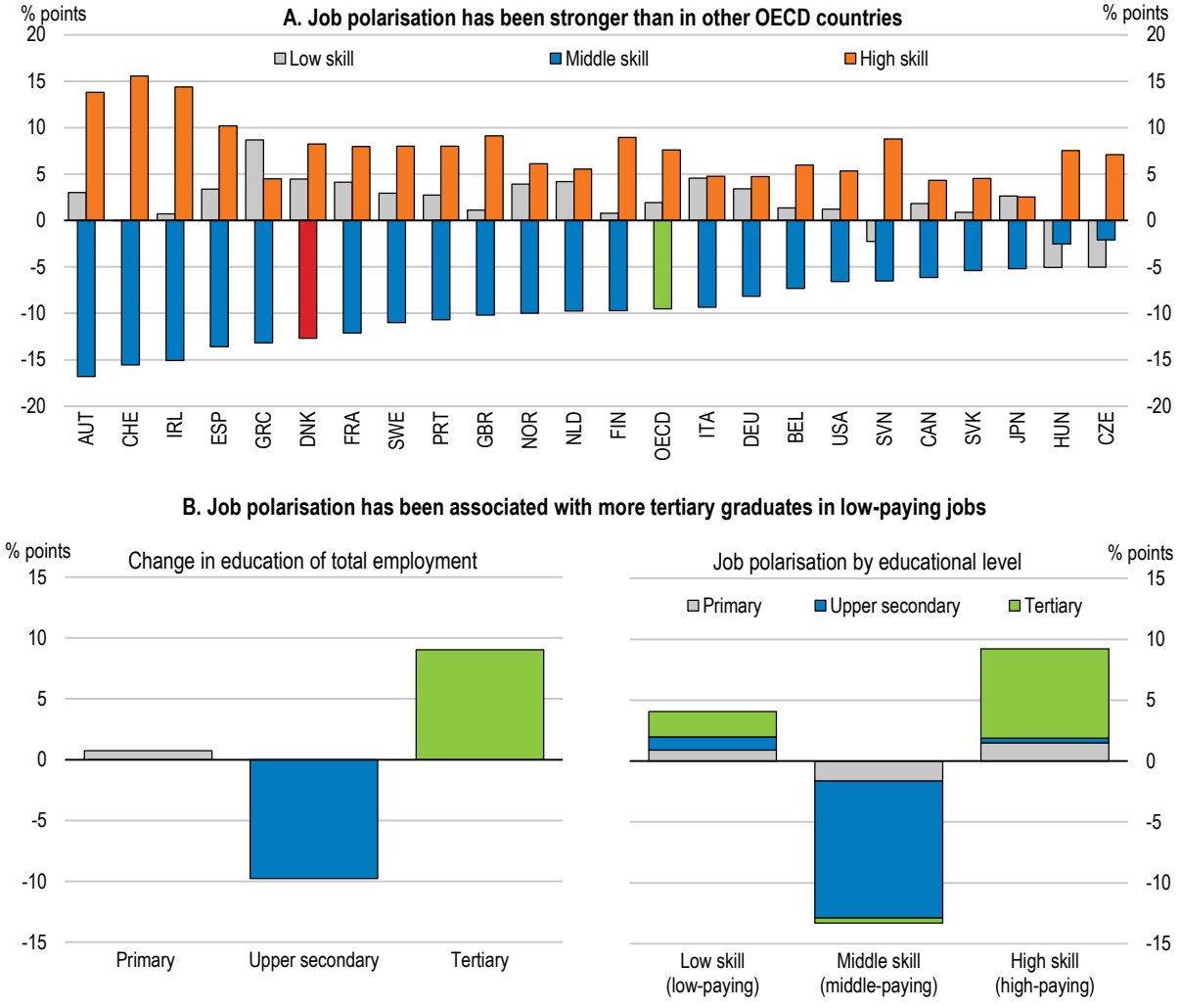
Middle skill occupations have declined substantially since the mid-1990s and resulted in a polarisation of the labour market into high-skill/high-paying jobs and low-skill/low-paying jobs like in most OECD countries (Figure 25, Panel A). While this would indicate a growing market for low-paying jobs, it conflicts with a relatively stable earnings distribution and relatively high sectoral minimum wages, enforced through extensive coverage of collective agreements. Closer examination of the jobs labelled as low-skilled shows that tertiary graduates fill about half of the four points rise in the employment share during 1995-2015 (Figure 25, Panel B). This may reflect rising skill mismatches and misalignment between education supply and labour market demands as persistently high unemployment rates in some fields indicate (Danish Ministry of Higher Education and Science, 2018[61]). Further steps should be taken to better align educations towards future labour market demands (see Chapter).

Figure 25. Job polarisation largely reflects educational upgrading, but high educated have filled more low-skill jobs

Percentage point change in share of total employment, 1995 to 2015



How to read this figure: The share of workers employed in middle skill jobs, classified according to broad occupation groups and ranked by average wages, has declined in all available OECD countries (Panel A). In return, the share in high-skill jobs has increased sizeably, but in some countries, including Denmark, the share in low-skill jobs has also risen significantly, causing polarisation. The left figure in Panel B shows the underlying educational upgrading for Denmark, with more tertiary graduates and fewer with upper secondary education only. The right figure in Panel B replicates Denmark's job polarisation from Panel A and shows how the change in education levels is distributed across skill levels. Noteworthy, tertiary graduates drive half of the (small) rise in low-skill jobs, raising concerns for skill mismatches. See OECD (2017[57]) for detailed definitions.
Source: OECD Employment Outlook 2017; Eurostat.

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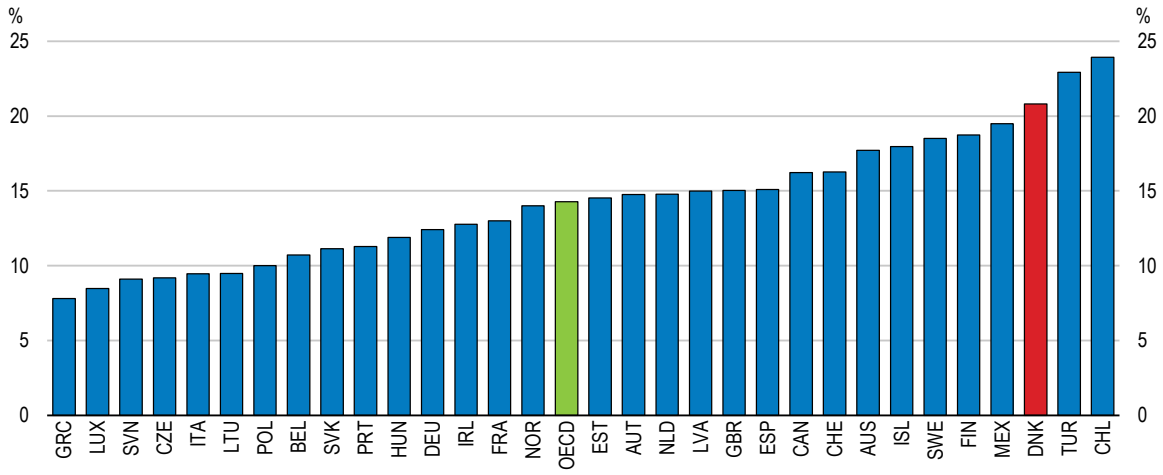
Inclusiveness is high, but active labour market policies are costly

Labour market performance is among the best in OECD countries according to the OECD *Jobs Strategy* dashboard (OECD, 2018[62]). Denmark is a top performer in inclusiveness

along with the other Nordics and scores high in terms of job quantity and job quality. This is all the more impressive given the high turnover in the labour market (Figure 26), a key characteristic of the Danish flexicurity model (see 2016 *Survey*). Ensuring a dynamic and inclusive labour market is at the core of the most recent OECD *Jobs Strategy*, focusing on the challenges of changing labour markets and facilitation of new forms of work (OECD, 2018[62]).

Figure 26. High turnover supports strong and inclusive labour market performance

Job separation rate, 2017



Note: Data refer to the difference between the hiring rate and the net employment change.
Source: OECD Employment and Labour Market Statistics; Statistics Denmark.

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A number of steps have been taken to adapt labour market policies to the future of work:

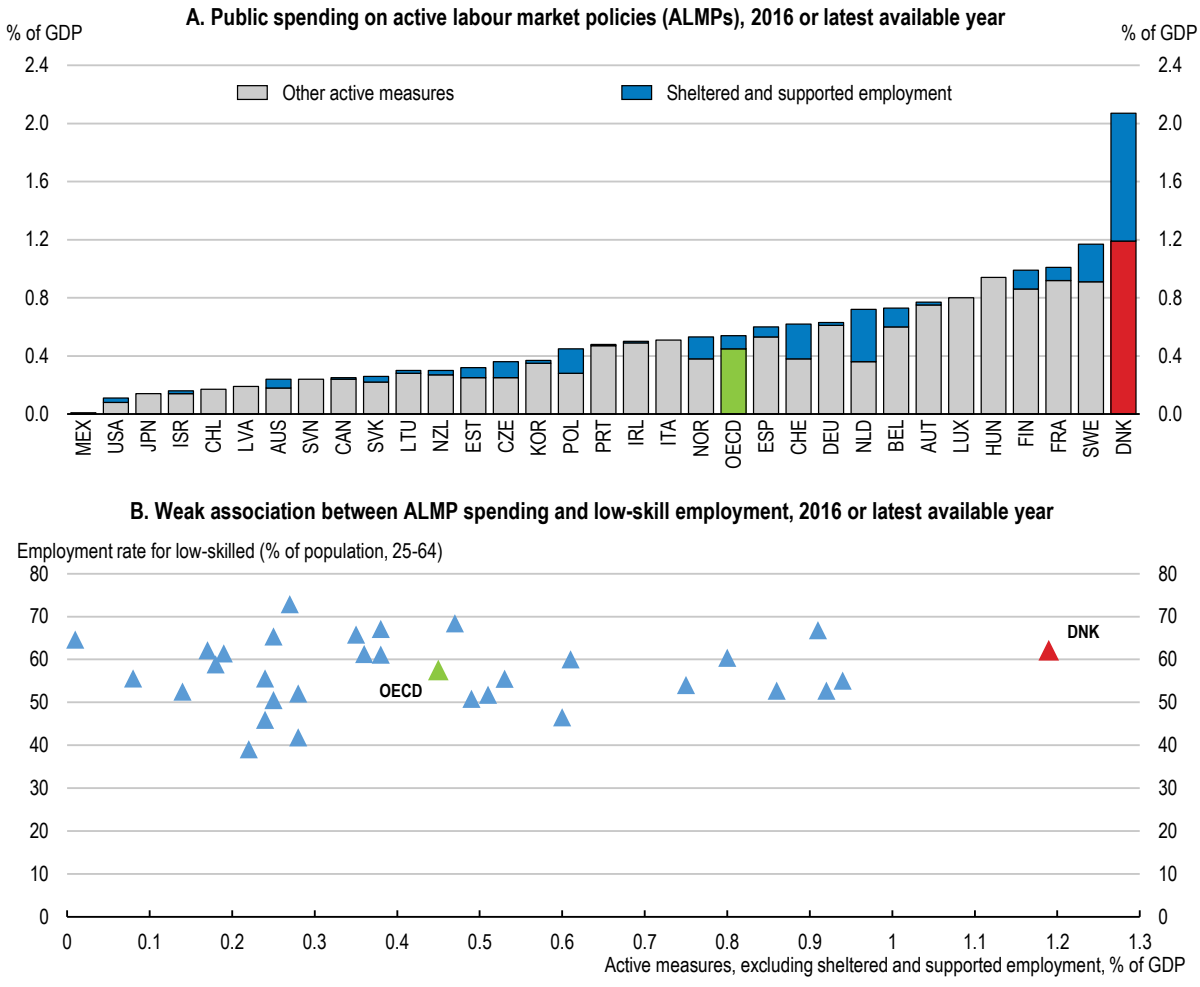
- A new unemployment insurance system for self-employed and non-standard workers has been implemented from October 2018. The main idea is to align the system as much as possible with unemployment insurance for standard workers by basing entitlement on past income to achieve neutrality across all forms of employment. To claim unemployment insurance, self-employed still have to close their business, but this has been simplified by digitalisation.
- An opening for unskilled adults to enrol in vocational education for up to two years and receive compensation at 80% of unemployment insurance benefits was introduced in 2015. Yet, uptake has been very low, which could reflect vast employment opportunities and some resistance towards formal education within this group (EVA, 2017[63]).
- A tripartite agreement between the social partners and the Government was reached in 2017 with the aim to make adult education, training and upskilling more flexible and accessible (Danish Government, 2017[64]). Initiatives include resources to facilitate reallocation and to ensure basic skills for all, higher compensation during training and a one-stop entry to programmes facilitated by a digital platform.

Participation in the unemployment insurance system is voluntary, albeit strongly subsidised by tax revenues, with the risk that mainly non-standard workers with high unemployment risk will enrol in the new scheme (adverse selection). Encouraging widespread enrolment will be important to ease cost-pressures in a future with more non-standard workers, for instance by relying on nudging measures.

Likewise, maintaining high participation in lifelong learning is crucial in a changing labour market, but a stronger focus on cost-efficiency is needed. ALMP spending amounts to more than 2% of GDP, much more than in Sweden in second place (Figure 27, Panel A). The gap to other countries is largely driven by extensive use of sheltered and supported employment for people with reduced work capacities, especially flexi-jobs that are granted for five years at a time for people below age 40, but can be made permanent for those above age 40. But even without this spending item, Denmark still spends the most on ALMPs, while the employment rate for low-skilled is not far from the OECD average and countries spending much less on ALMPs (Figure 27, Panel B). Activation of sick-listed workers is one area in need of reform, or at least further analysis, as a randomised controlled-trial finds no or even negative effects on subsequent labour market outcomes (Rehwald, Rosholm and Rouland, 2018[65]).

Wage subsides for private sector jobs is a favoured ALMP measure as evaluations find it to be the most effective tool (jobeffekter.dk). Nevertheless, used in large scale it raises the risk that jobs that would have been created in any case receive tax-financed subsidies. In this respect, the tradition of evaluating different ALMP programmes through randomised experiments to improve quality and targeting should be continued. Currently, evaluations take place against a baseline of relatively extensive use of ALMP measures, which should be broadened to also test reductions from the current high level of active support and potential crowding-out effects should be quantified. This could be implemented by making some mandatory ALMP measures voluntary for a random group of people in order to preserve the legal right to support.

Figure 27. Spending on support to find new jobs is very high



1. Below upper secondary education.
Note: Sheltered and supported employment includes rehabilitation. For Denmark, the flexi-job scheme makes the bulk of this spending category.
Source: OECD Labour Force Statistics; OECD Education at a Glance database.

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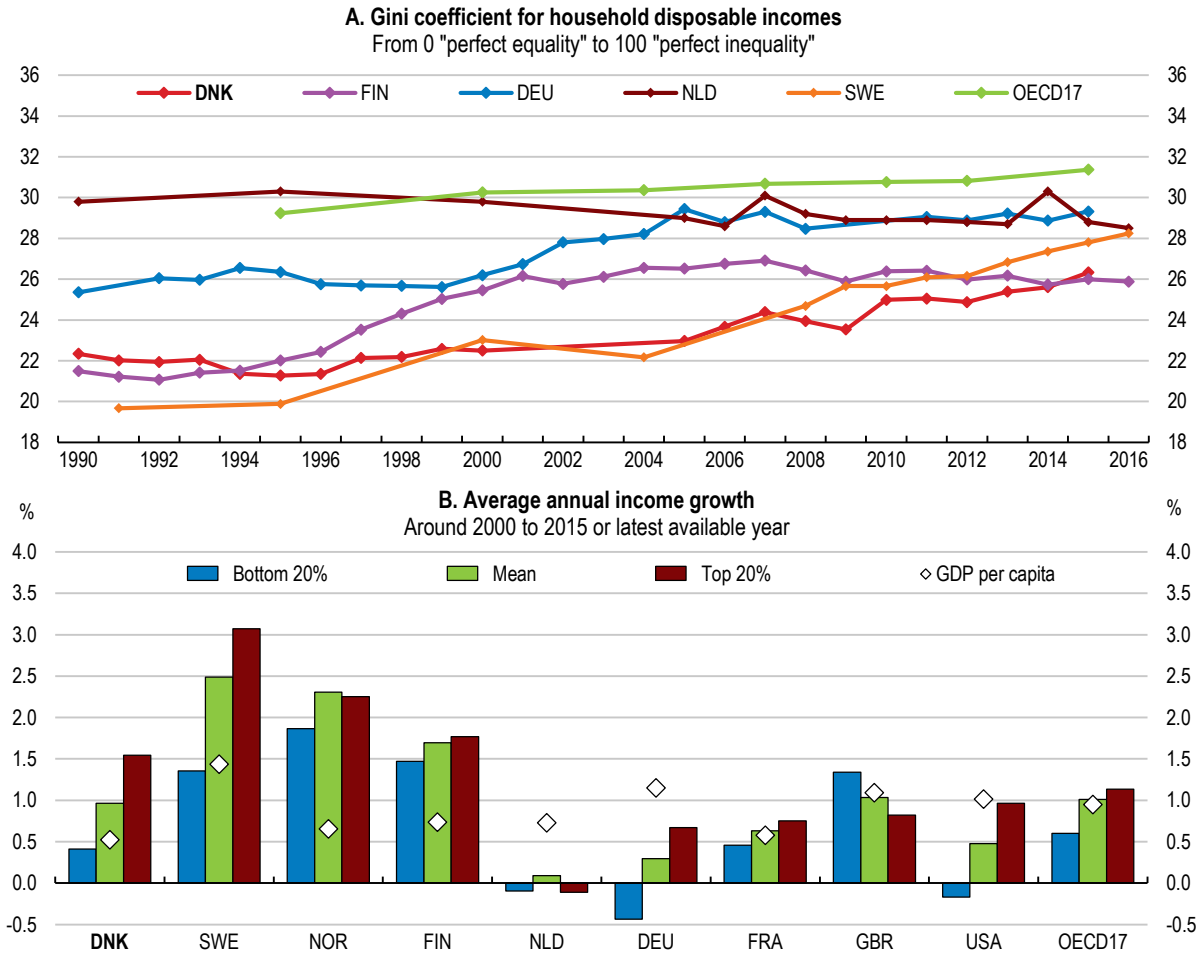
Balancing work incentives and redistribution from taxes and transfers

Income inequality is at a very low level and Denmark remains among the most equal countries. Income inequality has risen faster than in most OECD countries from the particularly low level in the early-1990s (Figure 28, Panel A). Nonetheless, thanks to a well-functioning labour market as well as systematic uprating of public transfers to wages and prices (*satsreguleringen*), incomes have risen for all income groups, which contrasts with developments in Germany and the United States where real incomes in the bottom 20% have declined over the period 2000-2015 (Figure 28, Panel B). This is also reflected in a stable, or even rising, labour income share in Denmark (OECD, 2018[56]).

Figure 28. Inequality remains low, despite its increase since the mid-1990s



Note: OECD17 is a simple average across 17 OECD countries (Australia, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Israel, Italy, Japan, the Netherlands, Norway, New Zealand, Sweden, the United Kingdom and the United States).
Source: OECD Income Distribution Database.

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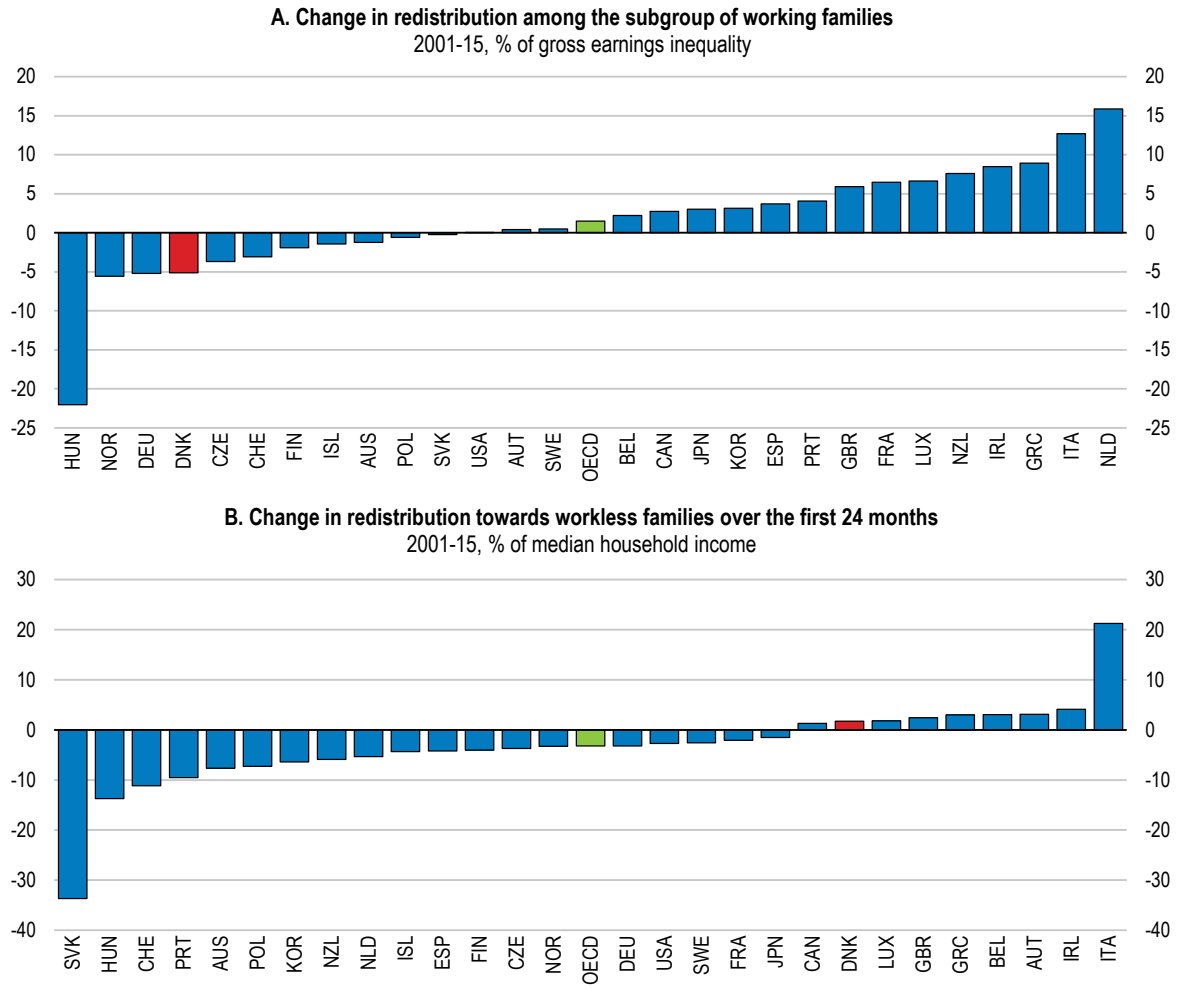
Changing household structure, in particular more students and single-adult households, increasing immigration and ageing can explain a sizeable part of the rise in household income inequality (Pareliussen and Robling, 2018[66]). Nevertheless, Denmark has also been subject to some of the same drivers observed in other OECD countries (Pareliussen et al., 2018[67]), such as skill-biased technological change and globalisation, creating greater dispersion of earnings (Dahl, le Maire and Munch, 2013[68]; Danish Economic Councils, 2016[69]). A high degree of unionisation and coverage of collective wage bargaining agreements have, however, limited the widening of earnings inequality and the wage distribution in Denmark is still much more compressed than in other countries.

OECD Tax-Benefit models indicate that the redistributive effect of taxes and benefits among working families at different earnings levels has been reduced over the period 2001-2015 (Figure 29, Panel A) (Browne and Immervoll, 2018[70]). In contrast, redistribution from working families towards families in unemployment has remained stable and not

declined as in the majority of OECD countries (Figure 29, Panel B). Combined, these results suggest that tax-benefit reforms have upheld the social safety net, notably in the initial period of unemployment, while higher inequality through lower and less progressive taxes may have been traded off with policies to strengthen work incentives. Still, Denmark started from a high and progressive level of taxation and the top marginal tax rate remains among the highest across OECD countries (see Chapter).

Figure 29. Taxes and transfers have become less redistributive between working families



How to read this figure: Among the group of working families at different income levels (Panel A), direct taxes and cash transfers reduce inequality less in 2015 than in 2001 in Denmark, when fixing population structure and the earnings distribution. The decline in redistribution amounts to 5% of gross earnings inequality. In contrast, redistribution from working to workless families is unchanged or slightly higher in Denmark in 2015 compared to 2001 (Panel B), when fixing population structure and earnings distribution and considering only the first 24 months of unemployment. The increase in average out of work benefits amounts to 1.7% of median household incomes.

Note: Indicators for incomes and inequality of working and workless families are constructed as a weighted average of multiple family types from OECD TaxBen models, seeking to explain the maximum amount of variation across countries and time in a single index. The results should be interpreted as suggestive since they are based on a limited number of family types and a stylized modelling of tax and transfer systems. See Browne and Immervoll (2018[70]) for further details of the methodology.

Source: Browne and Immervoll (2018[70]).

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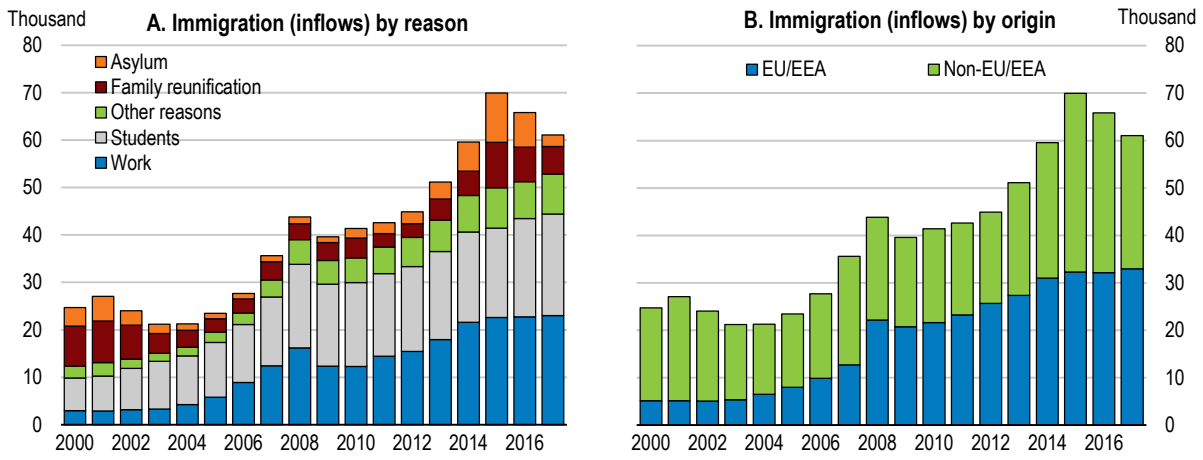
Integration of refugees and migrants can be improved

Immigration to Denmark has increased substantially during the recent decade, primarily driven by a sizeable rise in the inflow of EU citizens with a work purpose and foreign students (Figure 30). Most of these groups only stay for a limited period before leaving the country again. By contrast, integrating the sizeable number of refugees and family reunifications arriving during 2014-2016 into the labour market remains a challenge. The employment rate for refugees and related family reunifications with at least three years of residence has risen from 20% in 2015 to 45% in 2018, but remains as low as 20% for women (integrationsbarometer.dk). Moreover, weak labour market participation also persist for those arriving prior to 2015.

Figure 30. Immigration has increased substantially due to foreign workers and students



Note: Classification according to residence permit upon arrival. Other reasons include au pair and interns under study programmes.
Source: Statistics Denmark.

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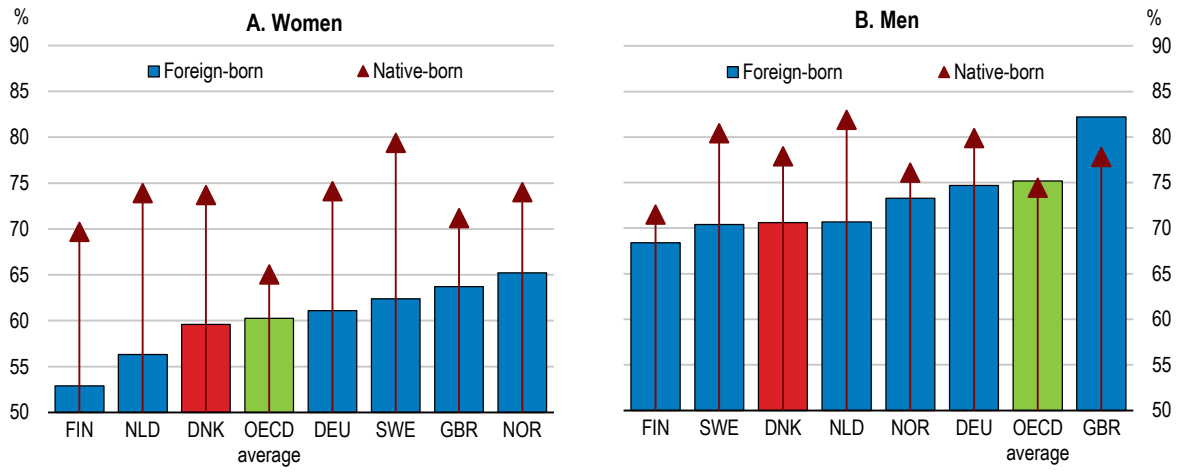
The overall employment rate for foreign-born at 65% is close to the OECD average at 67.1% and higher than in Finland and in the Netherlands for women (Figure 31). But high employment rates for natives, especially for women, implies a sizeable employment gap, which is larger than in most OECD countries. Strengthening labour market integration would foremost improve wellbeing and living standards of migrants, but would also have a sizeable impact on public finances in the Danish welfare model with extensive tax-financed public services (Danish Ministry of Finance, 2018[71]).

Figure 31. High employment rates for natives drive the gaps to foreign-born

Employment to population rage, age 15-64, 2017



Source: OECD Migration Statistics.

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Policy measures have been taken to boost the use of traineeships and wage subsidies as these are the key instruments found to have positive effects on employment (Arendt et al., 2016[72]). A tripartite agreement between the Government and social partners in 2016 focused on raising firms' demand for foreign-born with low skills using apprentice entry wages and bonuses for firms employing refugees and family-reunifications for more than two years. The first evaluation points to some success of the integration-training programme (Rambøll, 2018[73]), but uptake has been relatively low and dropout rates are high, albeit dropout also reflects some transition to regular employment and education. There is scope to extend the programme to a broader group of immigrants, but also a need for more intensified language training and improved coordination and administration of the programme according to the evaluation. Implementing these adjustments in collaboration with social partners and making the programme permanent should be considered when the trial phase expires in June 2019.

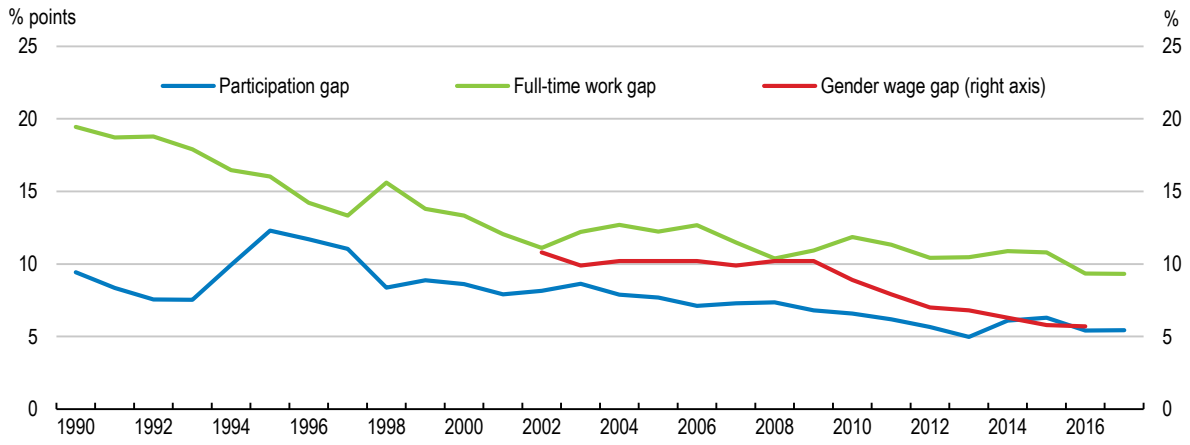
Benchmark analyses of the overall integration outcomes across municipalities show a substantial gap between the least and most successful municipalities (Arendt et al., 2016[72]). This is not found to be linked to the spending level (Bolvig et al., 2017[74]), suggesting that best practices could be better spread across municipalities. In this respect, better co-ordination of language training, education, subsidised work and recognition of foreign competencies within municipalities should be pursued. Germany has been successful in integrating refugees and migrants, among others due to the vast opportunities to find low-wage jobs, good coordination of housing, language and job training, and since policies have been adapted to local conditions (Joyce, 2018[75]).

Gender gaps are closing, but challenges remain

Denmark has moved further along the path to gender equality than most OECD countries. Gender gaps in the labour market are small and continue to narrow (Figure 32). The female employment rate has increased from an already high level decades ago to 71.5% in 2017,

far above the OECD average of 60.1%. Illustrative calculations show that increases in female employment account for 15% of total GDP per capita growth over the past 40-50 years (OECD, 2018[76]).

Figure 32. Gender gaps are slowly closing



Note: The participation gap is defined as the difference in labour force participation rates for men and women aged 15-64. The full-time work gap is defined as the difference between men and women in the shares working full-time (at least 30 hours per week). The (unadjusted) gender wage gap is defined as the difference between men and women in median earnings for full-time employees, expressed as percentage of median earnings for men.
Source: OECD Labour Force Statistics; OECD Employment database.

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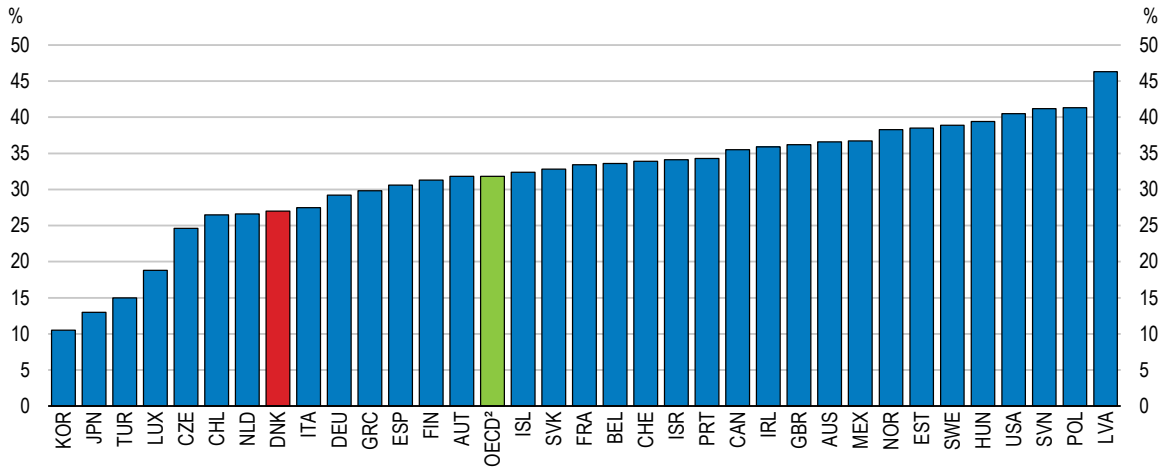
Nevertheless, the labour market remains gender-segregated across occupations and underrepresentation persists with respect to women in management positions (Figure 33). Comprehensive public services, including in childcare, have attracted many women to the public sector and almost 70% of all public sector employees are women (Figure 34), a level similar to the other Nordics. Despite this, women only fill 22% of senior management positions in central government, which is among the lowest across OECD countries (OECD, 2017[77]), albeit very few female managers in police and defence occupations mask a more balanced representation in other parts of central government.

Figure 33. The share of women in management positions is low

Female share of employment in managerial positions[1], 2017 or latest available year



1. Employment in management is defined based on the International Standard Classification of Occupations (category 1 of ISCO-08 or ISCO-88).
2. OECD average of available countries.
Source: ILO, ILOSTAT database; OECD Labour Force Statistics.

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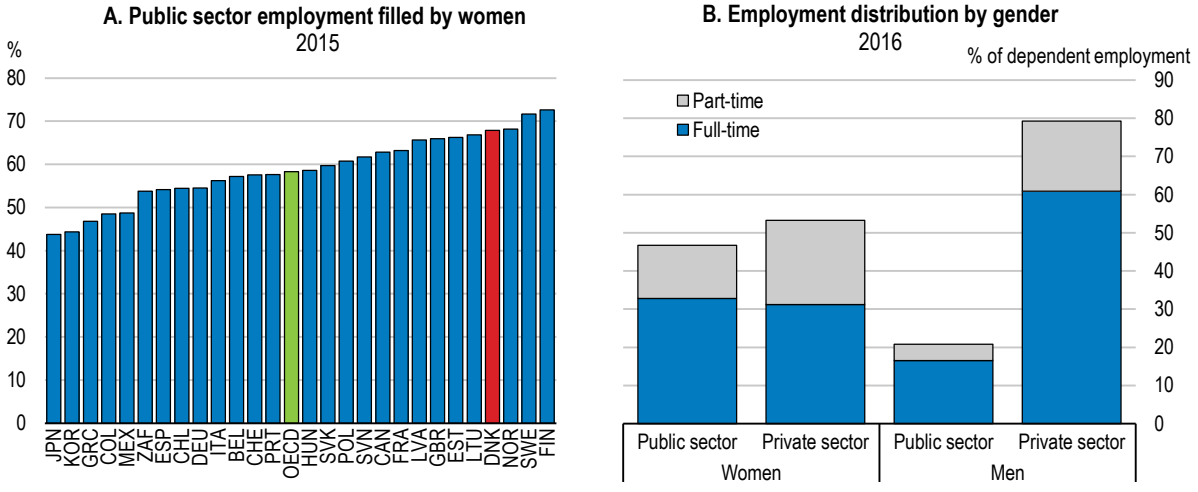
Figure 34. Women are more inclined to work in the public sector and part-time



Note: Full-time work is defined as at least 32 hours per week.
Source: OECD Government at a Glance 2017; Statistics Denmark.

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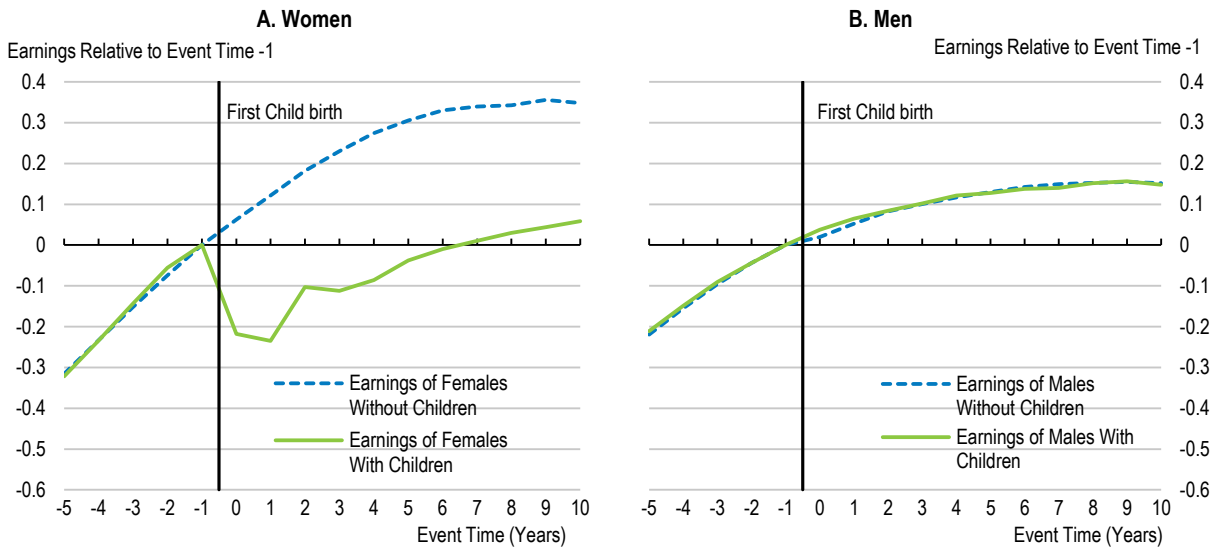
The arrival of children tends to interrupt the road to senior positions and higher earnings to a much larger extent for women than for men (Figure 35). In fact, extensive research shows that the larger burden women take on in primary childcare can explain most of the remaining gender inequality in the Danish labour market (Lundborg, Plug and Rasmussen,

2017[78]; Gallen, Lesner and Vejlin, 2019[79]; Kleven, Landais and Søgaard, 2018[80]). After giving birth to the first child, women tend to move to more family-friendly jobs, with reduced hours and often in the public sector, thus losing a potential wage return from on-the-job experience (Kleven, Landais and Søgaard, 2018[80]; Pertold-Gebicka, Pertold and Datta Gupta, 2016[81]). Danish mothers also use flexible work arrangements (working from home) more than in any other OECD country (Figure 36). By contrast, a wage premium from becoming a parent has been found for men (Simonsen and Skipper, 2012[82]), likely reflecting a perception as being more stable employment compared to non-fathers.

Figure 35. The impact of children on earnings differs widely across women and men



How to read this figure: The estimated impact of becoming a parent on earnings is shown by normalising earnings the year before the first child is born to zero and comparing the subsequent earnings path with a comparison group that never has children (using placebo births). This is done separately for women and men, revealing a large impact on earnings for women and no significant effect for men. The analysis uses an event study approach to capture the total effect of children, including changes in labour supply, earnings, occupation, sector etc. See source for details.
Source: Kleven, Landais and Søgaard (2018[80]).

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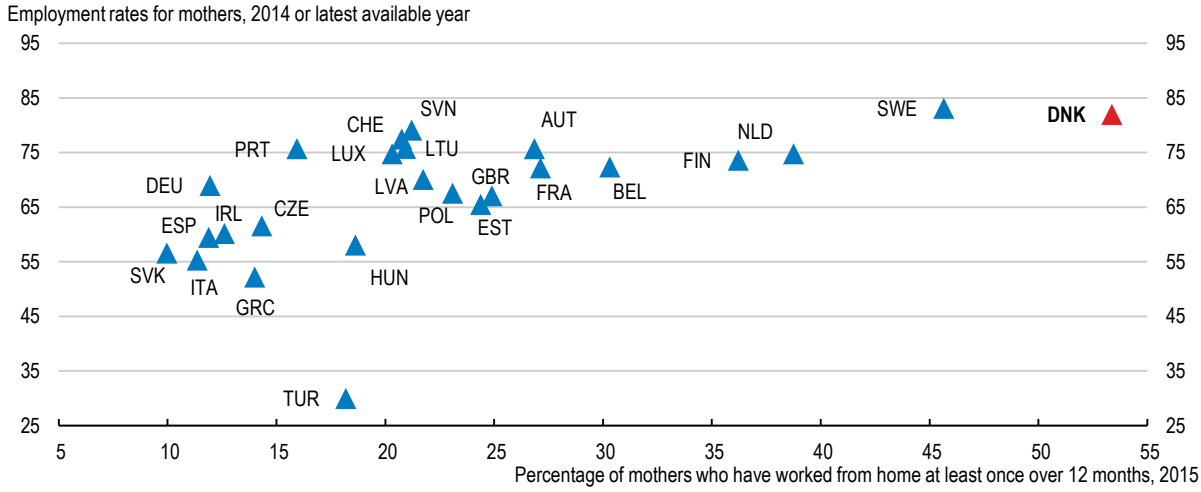
Figure 36. Most mothers work and use flexible work arrangements

Employment rate among mothers vs. percentage of mothers who have worked from home



Note: Mothers with at least one child aged 0-14.
Source: OECD (2017[83]).

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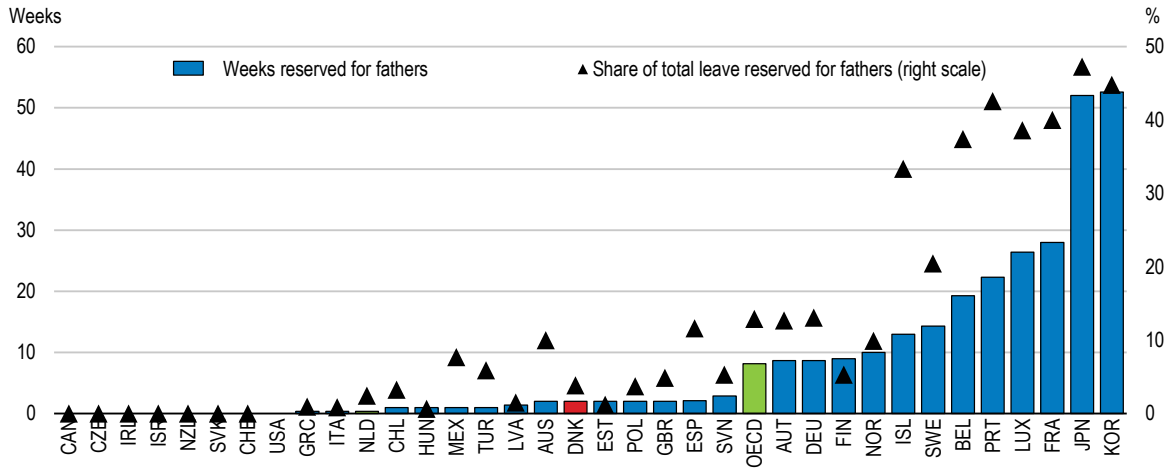
Reducing segregation and stereotypes in the labour market, in education choices and in family roles would not only improve equality, but might also improve firms' performance and thus economic growth (Smith and Smith, 2015[84]). Increasing flexibility in the provision of childcare services should be considered, for instance by longer opening hours, to reduce the pressure on caregivers (preponderantly women) to take family-friendly jobs. Public childcare centres normally close at 17h00 or earlier and on average each centre is closed about ten working days per year when demand is low (Danish Ministry for Children and Social Affairs, 2018[85]). Provision of alternatives with extended opening hours is generally limited, although demand is also reported to be low (Krahn, Nøhr and Andersen, 2017[86]).

Strengthening incentives to take shorter periods of maternity leave would mitigate the effect of long workforce absences on mothers' earnings. On average mothers took 300 days of maternity leave in 2015, while fathers only took 30 days (Statistics Denmark, 2018[87]). This reflects a system that only reserves two weeks of leave for the father, lower than in many other OECD countries (Figure 37), and lets the family allocate 32 shared weeks. In many cases, mothers have stronger economic incentives to take the shared leave because of differences in wage compensation during parental leave, arising from the occupational segregation (Figure 34, Panel B). Collective agreements for employees in the public sector secures the right to full wage compensation during the parental leave, while most private sector agreements provide significantly less, hence tending to hold back fathers. Reserving part of the shared leave exclusively for fathers would ensure a better balance in parental leave and should be considered. Nevertheless, this could reduce labour supply since women tend to work shorter hours than men do, but the reverse is also possible if fathers do not take up all of such extended leave.

Figure 37. Parental leave reserved exclusively for fathers is low

2016



Source: OECD Family database.

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Table 7. Past OECD recommendations to maintain inclusive growth

Recommendation	Action taken since the 2016 Survey or planned
Reduce the effective taxation of returning to work by reforming benefits in order to make work pay.	A tax reform in February 2018 introduced a targeted earned income tax credit to low-income households. The integration benefit targeted to immigrants has been reduced and extended to cover a larger group.
Improve the quality and implementation of integration programmes for migrants.	In spring 2016, the government agreed with the municipalities and the social partners upon securing a more job related and company focused way of integration. An integration-training programme (*IGU*) has been established, which over the course of two years offers practical work experience and skill development for refugees and family-reunifications whose qualifications are not yet sufficient for a job with ordinary Danish salary and terms of employment.
Monitor work requirements for social assistance recipients.	No specific action taken.

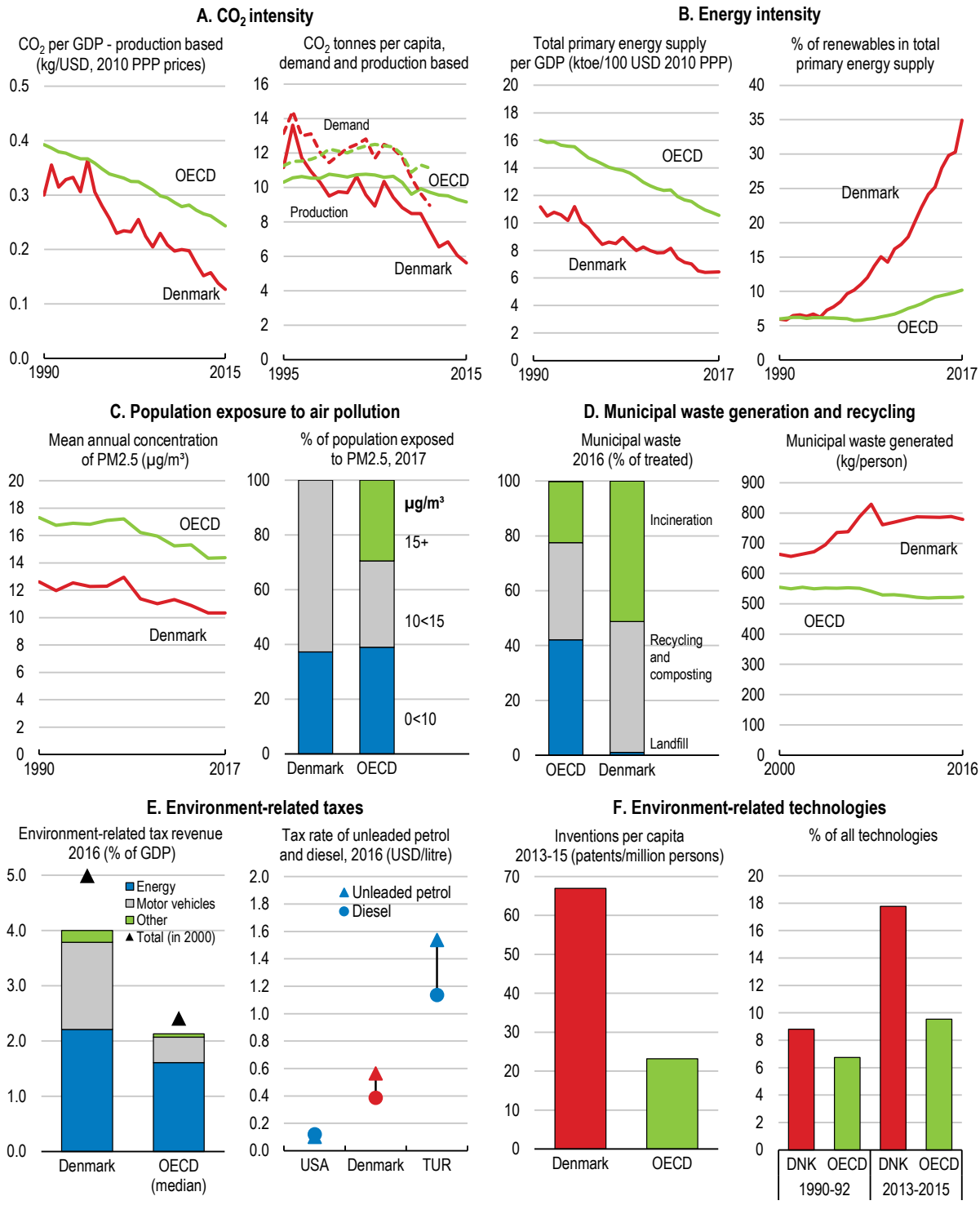
The transition to a low-emission economy could be more cost-efficient

Denmark has a long history of strong support for renewable energy, leading to renewables representing 35% of total energy supply in 2017 (Figure 38). Nevertheless, there is substantial scope to make the transition to a low-emission economy more cost-efficient. Biomass (including wood, waste and straw) consumption more than doubled between 2000 and 2016 and now accounts for 70% of all renewable energy consumption. A development driven by favourable subsidies, tax exemptions and the heating sector regulation (Danish Climate Council, 2018[88]). Biomass is part of a CO_2-neutral burning/growing cycle as long as it is produced sustainably or has no other use. However, more than 40% of the biomass burnt in Denmark is imported, primarily from Estonia and Latvia, which makes it difficult to verify CO_2-neutrality and to tax emission from transport of biomass. The favourable treatment of biomass should be removed and only documented CO_2-neutral biomass counted as renewable energy, as the Danish Climate Council has recommended.

In June 2018, a political agreement was reached on the future energy policy with a strong focus on cost-efficiency. On the subsidy side, the idea is to move towards a technology-neutral scheme. This is welcome since it will ensure the lowest prices and help to drive innovation of green technologies. Unfortunately, sizeable direct subsidies for offshore wind power are to be maintained with the risk of low value for money. On the tax side, the main element is a reduction of electricity taxes, which will support the transition away from fossil-based heating and a better use of the rising Danish production of renewable energy. Nevertheless, more needs to be done to equalise the price of CO_2-emission across all types of energy use and across households and businesses (OECD, 2018[89]; OECD, 2018[90]). This could be achieved by implementing a recent reform proposal by the Danish Climate Council (2018[91]).

Similar asymmetries are present in other parts of the incentive system, notably the EU emission trading system (ETS), which does not apply to the transport nor the agricultural sector, which has the fastest growing emissions. The Government's recent proposal to fulfil EU reduction targets for 2030 in the non-ETS sectors focuses narrowly on the transport sector (Danish Government, 2018[92]). By subsidies and tax exemptions for zero emission vehicles, the goal is to end all sale of new gasoline and diesel cars by 2030. Such shift of technology in a relatively short time horizon is likely to be very costly, especially since 99.5% of all cars in 2018 are fossil fuelled. A CO_2-tax, levied on most fuels in proportion to their carbon content, already rectifies part of the gap to the ETS for transport. In addition, private transport is heavily taxed both through fuel excise duties and through high taxes on purchase of new vehicles. It would be more cost-efficient to target larger emission reductions in the agricultural sector, responsible for 20% of total greenhouse gas emissions in 2016, but not subject to any emission regulation by taxes (Danish Economic Councils, 2018[93]). Incentives for farmers to adopt more emission-friendly production methods should be promoted by economic instruments. This should take into account the impact on global emissions.

Figure 38. Environmental performance is strong



Source: OECD Green Growth Indicators database.

StatLink https://doi.org/10.1787/888933898805

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Annex 1.A. Progress in structural reform

This Annex reviews actions taken on recommendations from previous Economic Surveys that are not covered in tables within the main body of the Key Policy Insights. Recommendations that are new to this Survey are listed at the end of the Executive Summary and the relevant chapter.

Recommendations	Action taken since May 2016
Financial sector risks	
When assessing systemic risks, include the whole financial sector, including the pension and insurance sector.	Insurance and pension companies are a regular part of the Systemic Risk Council's considerations and reports.
Maintain strong cross-border cooperation in supervision and resolution issues.	In February 2018, the Nordic-Baltic Stability Group signed a memorandum of understanding on cooperation and coordination regarding cross-border financial stability.
Encourage a further decrease of the maturity mismatch in variable-rate mortgage bonds.	From 2020, the share of lending which is refinanced each quarter must be less than 12.5% of the total lending portfolio. Annual refinancing must be less than 25% of the total lending portfolio.
Housing market	
Establish a commission to investigate the scope for developing a bigger private rental market.	No specific action taken.
Introduce local comparison rents for rent adjustments of existing contracts.	No specific action taken.
Social institutions	
Review existing exceptions, and reassess eligibility to disability benefits on a regular basis.	No specific action taken.
Assess the lifetime pattern of benefit recipients and the costs of their inactivity.	No specific action taken.
Promote diversity in firms with information campaigns, audits on management policies, programmes for early identification and prevention of work-related health issues.	In spring 2017, the government set up an expert committee to reconsider efforts in the field of occupational health and safety. In spring 2017, the government launched a joint effort in agriculture with the social partners to prevent accidents in the industry. In November 2017, the government launched a new type of inspection in the construction industry, including unannounced visits and checks of all companies on construction sites.
Implement initiatives to increase the pension savings among individuals not covered by occupational pensions.	The reform of the tax system of June 2017 introduces a new tax credit conditional on pension savings, which increases the incentive for pension savings for everyone, including those that are not covered by occupational pensions. The fiscal bill for 2019 increased the uprating of public cash transfers and reserved the increase for mandatory individual pension saving.
Support competition on welfare services, notably by revising exemptions to the Competition Act in the public sector and relaxing regulation in the pharmaceutical sector.	No specific action taken.
Improve employability of older workers and develop initiatives to adapt working environment to an ageing work force.	In May 2018, the government launched a think tank with the aim of improving the possibilities for older workers to extend their work life.
Consider diversifying funding sources of healthcare and long-term care by raising co-payments, mean-testing public support for home care, and expanding "sin taxes".	No specific action taken.
Productivity	
The government should reintroduce overall quantitative targets for the effects of productivity measures on GDP.	The government has introduced an overall quantitative growth target. This includes an aim to increase national GDP by DKK 35 bn by 2025 through policies that increases productivity in the private sector.
Further analysis of productivity enhancing measures should be carried out in some areas, while in others reforms could go further, notably in non-export oriented services and retail.	A national Productivity Council was established as of 2017 with the responsibility to analyse and advice on productivity-enhancing initiatives. Zoning and planning regulation have been liberalised from June 2017, easing rules concerning shop size and location as well as placement of production. A liberalization of the taxi act removes restrictions on the number of licenses and geographical restrictions with effect from 1st January 2018.
Climate change	
Promote international initiatives to limit the environmental damage on air quality, resulting from the lack of regulation in the shipping industry.	In 2016, the International Maritime Organization agreed to establish NOx emission control areas in the Baltic Sea and the North Sea, following years of preparations and negotiations. The new regulation will reduce the emission of NOx from new engines with 75% from 2021.

Ensure that overall environmental performance is taken into account in car taxation. Introduce dynamically priced congestion charge in the most affected cities to reduce pollution and make for a better use of infrastructure.	The registration tax has been reduced and the limits and penalties for poor fuel efficiency have been increased. The periodic tax on car ownership has been increased to reflect the increase in fuel efficiency. Furthermore a political agreement on introducing a general road tax on cars from 2020 has been reached.
Limit the use of retroactive tax deductions for improving energy efficiency of housing to credit constrained households and exclude other house-work such as cleaning and gardening services.	No specific action taken.

Annex 1.B. Incorporating downturn risk in fan charts for GDP growth projections

Recent OECD research has shown how early warning indicators can be used to calibrate the uncertainty surrounding a central GDP forecast (Turner, 2017[94]; Turner, Chalaux and Morgavi, 2018[95]). Using a symmetric distribution of uncertainty based on historical forecast errors is insufficient as it ignores the inadequacy in predicting future severe downturns among macroeconomic forecasters. To address this shortcoming, the idea is to use a symmetric fan chart in normal times and a downward skewed fan chart when the estimated risk of a future downturn is high.

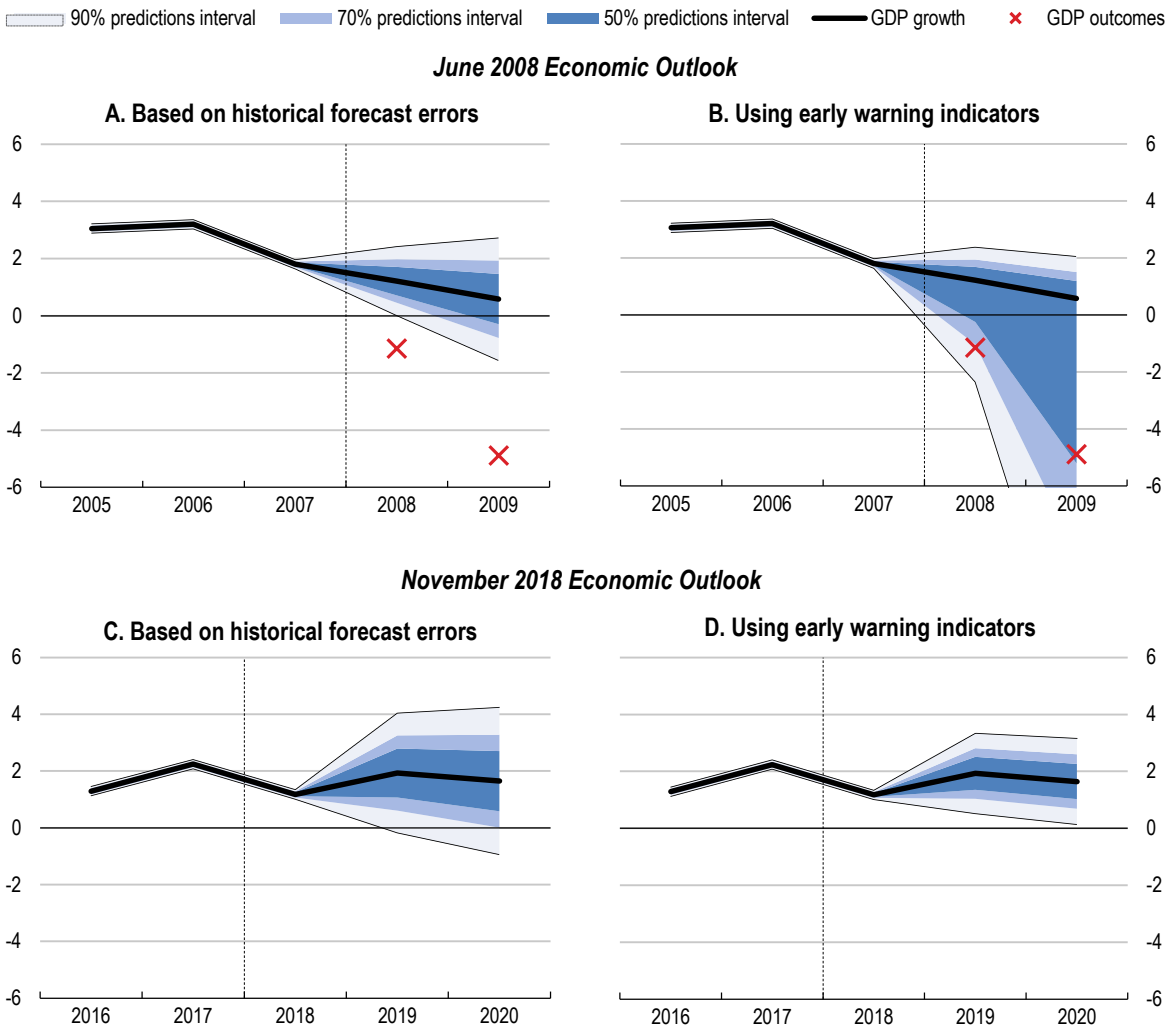
For illustration, the methodology is applied to *Economic Outlook* projections for Denmark published in June 2008. A first fan chart is constructed as a "straw man", being based on historical forecast errors assuming symmetry and ignoring early warning indicators. On this basis, the outturn for 2009 GDP growth at -5% is well outside even a 90% prediction interval on the fan chart (Figure 39, Panel A).

For the skewed fan chart, a probit model for the probability of a severe recession is estimated for Denmark over the period 1985-2017. The preferred model includes the changes in the house price-to-income ratio and slope of the yield curve as well as the change in OECD-wide credit-to-GDP ratio to capture the impact of international financial spillovers, shown to be useful as early warning indicators in OECD countries (Hermansen and Röhn, 2017[96]). In the next step, a two-piece normal distribution is calibrated to distinguish normal times, when the uncertainty distribution is symmetric, from periods of relatively high probability of a downturn, when the risk distribution is skewed to the downside. For the June 2008 projections, the fan chart then encapsulates the outturn (Panel B), which falls within the 50-70% prediction interval.

While this is still experimental work, the methodology has also been applied to the November 2018 projections. At the current juncture, the probit model indicates a low probability of severe recession, implying a symmetric fan chart (Panel D). In this case, the methodology has the advantage that the projection range is narrower compared to the "straw man" approach (Panel C) because the forecast errors associated with severe downturns are discarded in a low risk situation. Nevertheless, downturn risks could be understated if the trigger came from an atypical source, which is not within recent historical experience and cannot be captured by the model. This applies to the risk of an escalation of international trade tensions discussed in the main text.

Figure 39. Using probit probabilities of a future downturn to design fan charts

Economic Outlook projections for Denmark, June 2008 and November 2018



Source: OECD calculations based on Turner (2018[95]).

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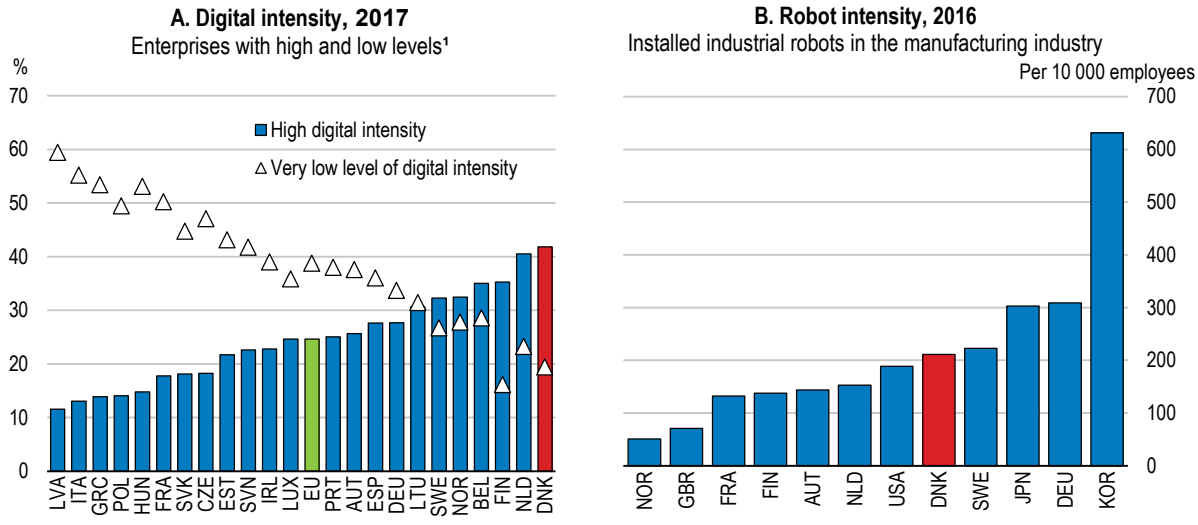
Chapter 1. Adapting business framework conditions to deal with disruptive technologies

Danish firms are close to the technological frontier compared to other OECD countries, making the introduction of new – potentially disruptive – technologies key to boost productivity growth. Despite a high level of digitalisation and good framework conditions, aggregate productivity growth in Denmark has been only average compared to other advanced OECD countries and lags behind in less knowledge-intensive service industries. Policy needs to embrace innovative technologies by leaning against attempts to discourage or exclude them and by tackling unintended or outmoded obstacles in legislation and regulation. Analysis based on Danish firm-level data suggests that digital adoption through investment in ICT capital increases firm productivity and contributes to business dynamics and firm growth. Improving economic incentives for such investment as well as facilitating adoption of new business models require a shift of taxation away from capital and labour income. Ensuring supply of the right skills and maintaining effective upskilling will help workers cope with disruptive changes and ensure that economic growth benefits all.

Challenges and opportunities for Denmark's business sector

Businesses in Denmark, like around the world, are in the midst of a technological transformation. Compared to other OECD countries, Danish firms have been frontrunners in adopting digital technologies (Figure 1.1, Panel A) and extensive use of industrial robots underpins a high level of automation (Figure 1.1, Panel B). The economic environment is one of the most favourable to businesses, entrepreneurship and innovation across OECD countries (Figure 1.2). This reflects a flexible and well-functioning labour market, low regulatory barriers and high public spending on R&D among others.

Figure 1.1. Danish firms are at the frontier in using new technologies



1. Share of firms using at least 7 out of 12 digital technologies (high intensity) and no more than 3 out of 12 technologies (very low level) in enterprises with 10 or more employees. Digital technologies are: usage of internet by a majority of the workers; access to ICT specialist skills; fixed broadband speed >30 Mbps; mobile devices used by more than 20% of employed persons; has a website; has some sophisticated functions on the website; presence on social media; does e-sales for at least 1% of turnover; exploit the B2C opportunities of web sales; pay to advertise on the internet; purchase cloud computing advanced services; send e-invoices.
Source: European Commission, Digital Scoreboard; International Federation of Robotics, World Robotics 2017.

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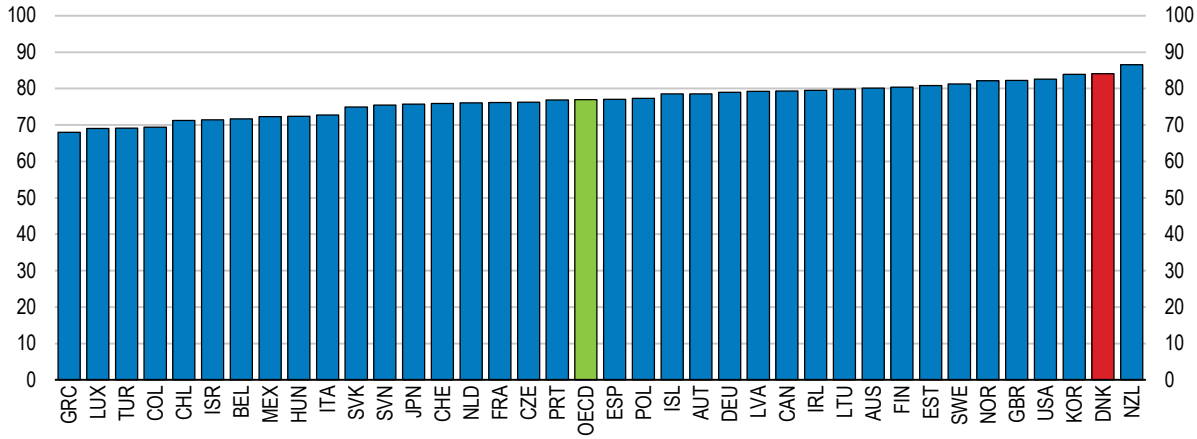
Figure 1.2. The business framework is among the most favourable across OECD countries

World Bank index for Ease of Doing Business, 2018



Note: The index measures the distance of each economy to the "frontier," which represents the best performance observed on each of the indicators across all economies. The distance to frontier is reflected on a scale from 0 to 100, where 0 represents the lowest performance and 100 represents the frontier.
Source: World Bank, Doing Business 2018.

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A strong business sector with the capacity to exploit opportunities in globalised markets is key to sustain Denmark's well-performing welfare model. As advanced technologies and digitalisation continue to evolve, businesses are facing new opportunities as well as new challenges. Disruptions that reduce or even wipe out the market shares of incumbent firms or render some production processes or services obsolete are likely to become more frequent. For example, a smartphone app to facilitate electronic payments (MobilePay) was used by more than half of the population in Denmark just three years after its introduction and processed more than 170 million payments in 2016 (Danmarks Nationalbank, 2017[1]). At the same time, the scope for incumbent firms to prevent entries of new firms can rise as technologies facilitate economies of scale, while disruptors themselves can become dominating through winner-takes-most dynamics.

The size and type of disruptions (or shocks) to the economy are likely to be different compared to previous episodes of technological change and globalisation. First, the reduced costs of advanced technologies enables their wider diffusion, including to SMEs (such as cloud computing and online sales to consumers), even though this requires complementary investments in skills, process changes and innovation. Second, the ability to combine new advanced technologies (such as sensors, advanced robotics and 3D printing), new processes (such as data-driven production and artificial intelligence) and new business models (exploiting mass customisation, the collaborative and platform economies) enables new types of applications. This is expected to trigger complex changes in the way goods and services are produced and consumed (OECD, 2018[2]), widening the scope and markets for doing business and inducing firms either to capture large returns from business openings or to miss out.

In Denmark, a successful cluster of robotic businesses and a startup hub have emerged in Odense, initially fostered by robotic welding in a now closed shipyard and successful

collaboration with nearby University of Southern Denmark. While major impacts of disruptive technologies are not yet visible at the aggregate level (Box 1.1), the Government needs to act proactively by adjusting policies and regulatory framework conditions to ensure that households benefit the most from new technologies. In a nutshell, the challenge is to deliver inclusive growth by creating conditions for firms to boost productivity, while maintaining high employment and job quality to enhance wellbeing. This chapter takes a broad view on the Danish business sector and discusses how policies need to adjust for society to make the most of disruptive technologies.

A future with larger uncertainties will also require adjustments of labour market policies as disruptions can be painful for workers, requiring additional support. In this respect, the Danish labour market is in a favourable position as it combines high flexibility with ample passive and active support, including high participation in lifelong learning. Nevertheless, reforms are needed to improve cost-efficiency and better include rising non-standard work in protection systems (see Key Policy Insights).

Box 1.1. A disrupted economy? Snapshot shows characteristics close to OECD averages

Key characteristics of the Danish economy and businesses

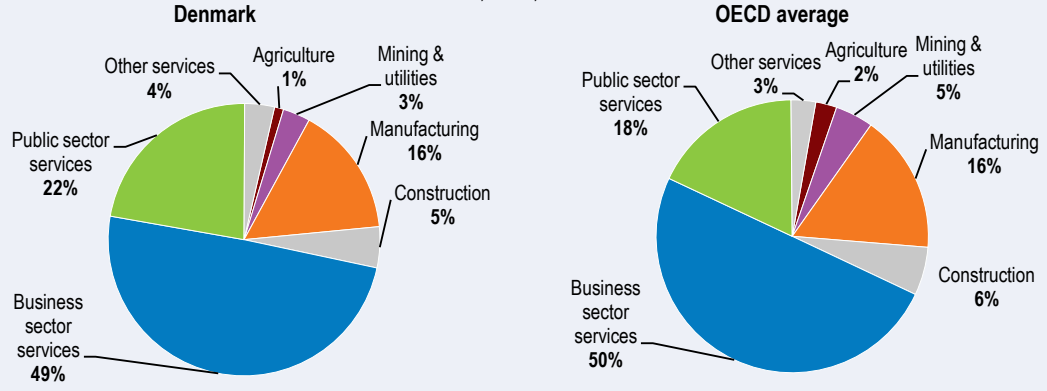
- The industrial structure is close to the OECD average (Figure 1.3, Panel A). Public and private services account for more than three quarters of economic activity, wholesale and retail trade as well as financial and insurance activities being proportionally more important than in neighbouring countries.
- Agriculture and fishing represent a small share of total activity, yet arable and cropland cover more than half of total land area, the highest share across OECD countries, and more than 20% of total greenhouse gas emissions arise from agriculture. Still, the technological advancement in agriculture is high and productivity growth has been substantial compared to other sectors.
- Oil and gas production from the North Sea has peaked and with lower oil prices, related energy tax revenue has declined from more than 1% until 2013 to 0.2% of GDP in 2017.
- The firm size structure is similar to Sweden and Finland (Panel B). Small and medium-sized firms (less than 250 employees) account for around 60% of business sector activity, slightly more than in larger countries like Germany and France. Micro-firms (1-9 employees) represents a relatively small share, reflecting that Denmark has one of the lowest self-employment rates (9%) across OECD countries.

- Employment in manufacturing has declined substantially over recent decades as in most advanced countries, while it has increased in services with the exception of public administration (Panel C).
- The public sector absorbs almost 30% of employment, more than in other OECD countries, but similar to the other Nordics. Gender differences across occupations prevails with women filling more than two thirds of public sector jobs (see Key Policy Insights).

Figure 1.3. A snapshot of the Danish economy and businesses

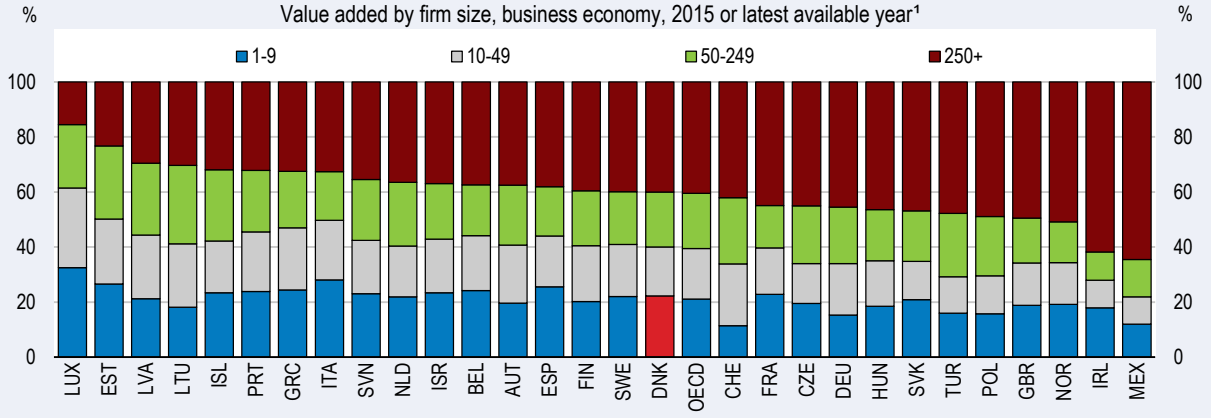
A. The industry structure is close to the OECD average

Value added, 2016, % of total



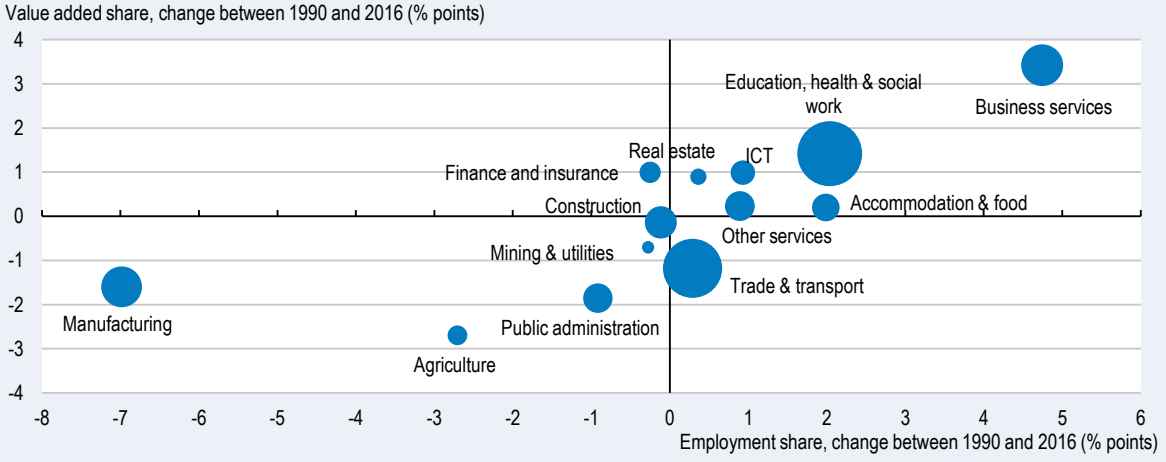
B. The firm size distribution is similar to other OECD countries

Value added by firm size, business economy, 2015 or latest available year[1]



C. Employment has shifted from manufacturing towards services

The size of the circles represents the employment share in each sector in 2016



1. Data cover business economy excluding financial intermediation.

Source: OECD STAN database and OECD SDBS Structural and Demographic Business Statistics.

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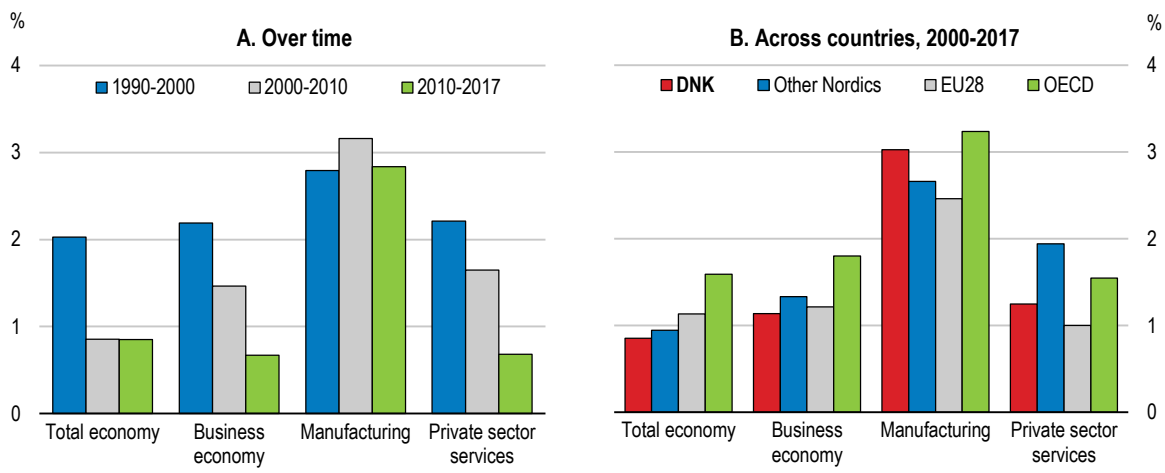
Productivity growth lags behind in less knowledge-intensive services

Despite widespread digitalisation and favourable conditions for doing business, productivity growth has weakened in Denmark. In the business sector, productivity growth has slowed down from more than 2% per year in the 1990s to around 0.7% per year since 2010 (Figure 1.4, Panel A). This may reflect that the productivity level is high and pushing the frontier further becomes increasingly difficult (Gordon, 2012[3]). Moreover, Denmark has not lost ground to neighbouring countries since most advanced countries have experienced a similar slowdown (Figure 1.4, Panel B). Private sector services have been the main driver of the slowdown in Denmark, with the exception of the ICT sector. Moreover, mining and utility has also dragged down aggregate productivity growth despite its relatively small share of the economy (Box 1.1), reflecting declining extraction of oil and gas in the North Sea as resources are being depleted.

Figure 1.4. Productivity growth has slowed down in Denmark driven by services

Average annual growth in labour productivity



Note: Business economy covers non-agriculture business sector excluding real estate. Other Nordics is a simple average across Finland, Norway and Sweden; OECD is a simple average across 25 OECD countries with available data.
Source: OECD Productivity database.

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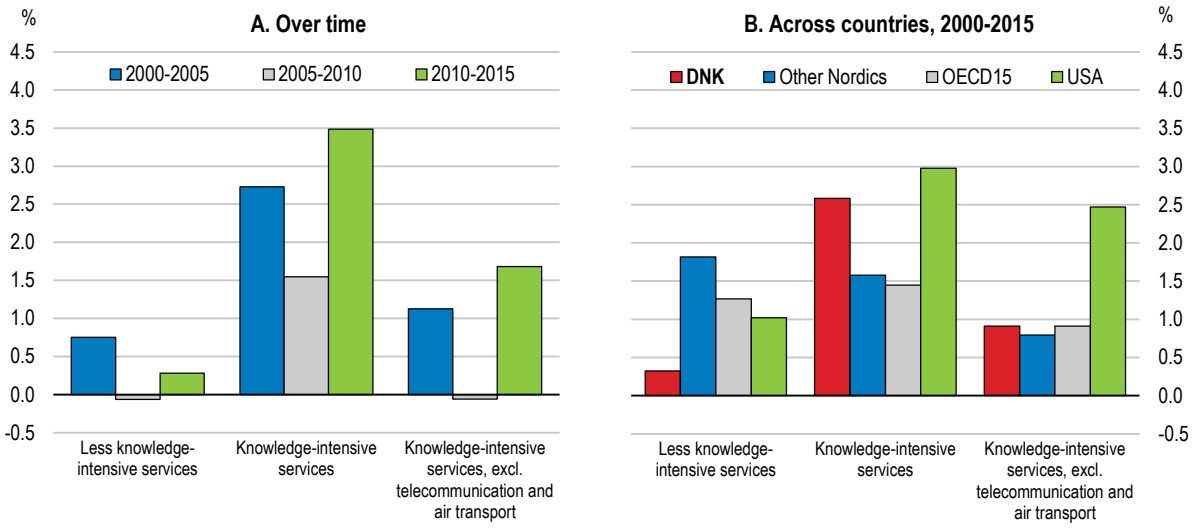
Productivity growth has been particularly weak in less knowledge-intensive services and lags behind the other Nordics (Figure 1.5). Less knowledge-intensive services comprise traditional services with a high content of non-routine manual labour such as wholesale and retail trade, land transport, accommodation and food services (Box 1.2). By contrast, in knowledge-intensive services, typically with a high share of tertiary graduates and/or high R&D activity, productivity growth has been stronger than in most neighbouring countries. However, the impressive productivity growth in knowledge-intensive services is largely driven by more than 15% average annual growth in telecommunication and air transport over the period 2000-2015 (Figure 1.5). Productivity growth in these sectors is difficult to measure since technological developments have boosted quality and at the same time lowered costs and prices substantially. Nonetheless, excluding the two industries does not change the finding that weak productivity is concentrated in less knowledge-intensive services, both over time and compared to other countries.

Figure 1.5. Less knowledge-intensive services industries lag behind other countries

Average annual growth in labour productivity



Note: Business sector services, excluding real estate, finance and insurance. Industry knowledge-intensity (at the 2-digit NACE level) is based on the Eurostat classification. Other Nordics is a simple average across Finland, Norway and Sweden; OECD15 is a simple average across 15 OECD countries with available data (Austria, Czech Republic, Denmark, Estonia, Finland, Greece, Ireland, Italy, the Netherlands, Norway, Slovak Republic, Slovenia, Spain, Sweden and the United States).
Source: OECD calculations based on OECD STAN database.

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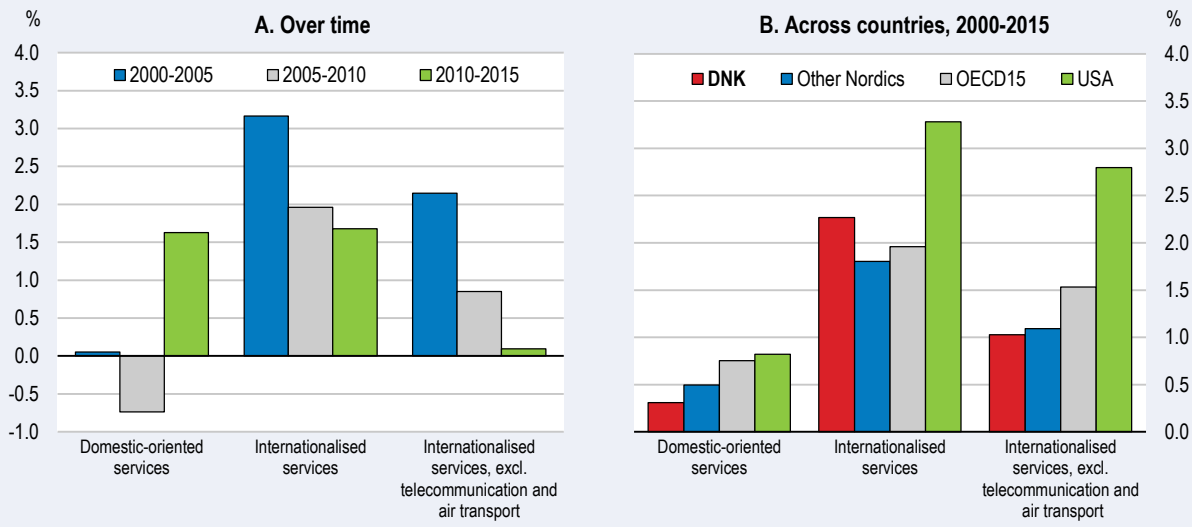
Box 1.2. How to group service industries to detect weaknesses?

Previous *Surveys* for Denmark (OECD, 2013[4]; OECD, 2016[5]) and the European Commission (2018[6]) have highlighted weak productivity growth in domestic-oriented services in contrast to internationalised services (defined as industries with a large export content or foreign-ownership share). This *Survey* applies a grouping by knowledge-intensity motivated by two reasons:

- First, major data revisions and the addition of more years modify earlier conclusions (Figure 1.6). Productivity growth has picked up in domestic-oriented services since 2010, whereas internationalised services have been on a downward trend since 2000 (Panel A), especially when excluding telecommunication and air transport. At the same time, the gap to other countries is mixed in both domestic-oriented and internationalised services (Panel B), suggesting no particular Danish productivity problem in either sector.
- Second, the substantial gap in growth rates between domestic-oriented and internationalised services is a less relevant comparison since reverse causality is likely as already pointed out by the Danish Productivity Commission (2013[7]). Internationalisation tends to increase competition and thus productivity growth, but industries with high productivity growth are also more competitive and thus more likely to operate in international markets. This can also be an issue for knowledge-intensity, but the extent of R&D activity or share of high-skilled workers tend to be more closely related to the nature and output of the service industry than to productivity growth.

Figure 1.6. Productivity growth in internationalised services is showing weaknesses

Average annual growth labour productivity growth



Note: See Table 1.1 for the grouping of services and Figure 1.5 for country coverage.
Source: OECD calculations based on OECD STAN database.

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Although internationalisation and knowledge-intensity have some overlaps, the two approaches are complementary as can be seen from the list of sectors (Table 1.1).

Table 1.1. Business services grouped by knowledge-intensity and internationalisation

Share of value added in business services for 2015 reported in each cell

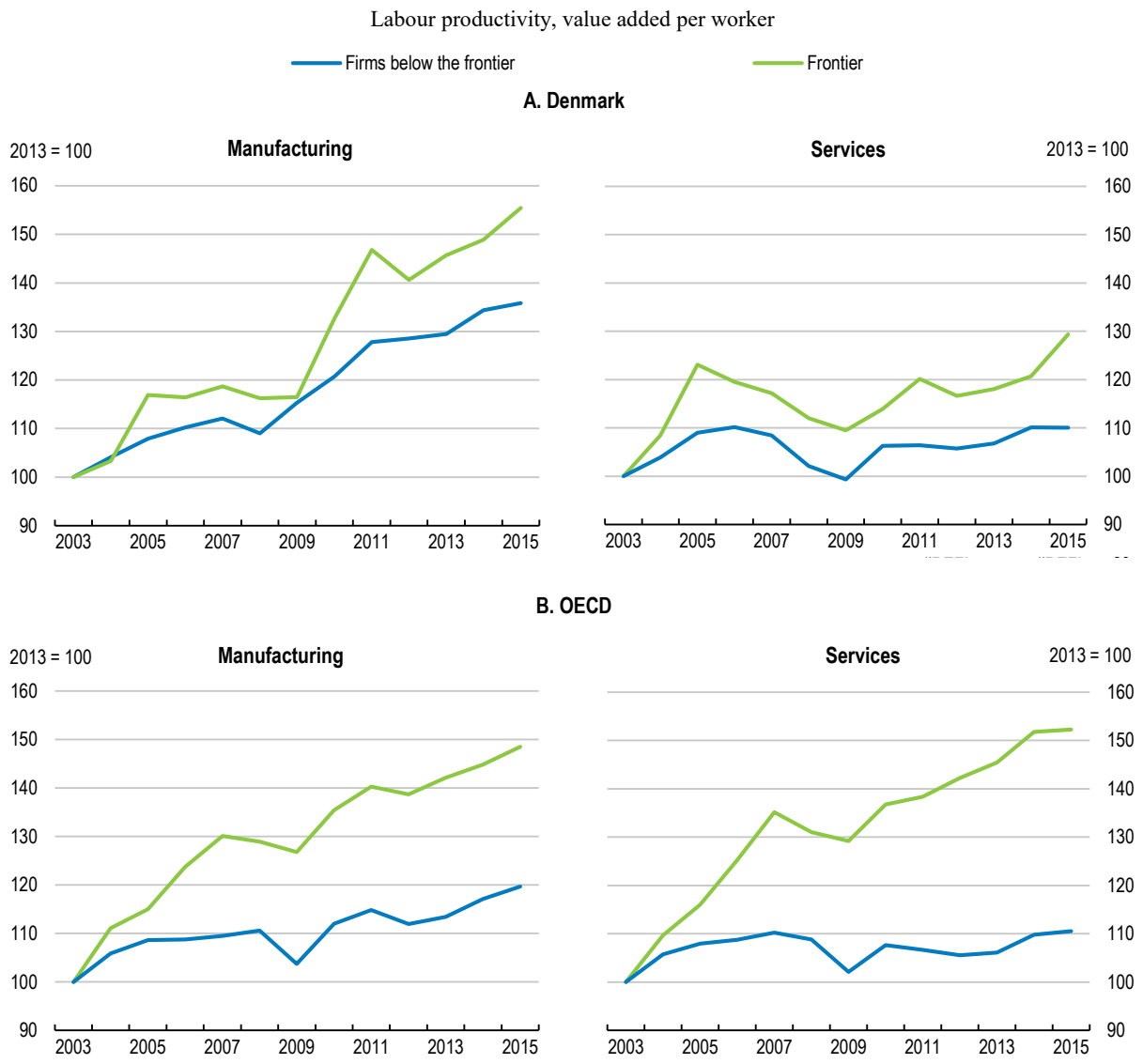
	Internationalised services	Domestic-oriented services
Knowledge-intensive services	Water and air transport Publishing activities Audiovisual and broadcasting activities Telecommunication Computer programming, consultancy and related activities Security and investigation activities (18.7% of value added)	Information service activities Legal and accounting activities Activities of head offices, management consultancy activities Architectural and engineering activities Scientific research and development Advertising and market research Other professional, scientific and technical activities Veterinary activities Employment activities (20% of value added)
Less knowledge-intensive services	Wholesale trade Postal and courier activities Travel agency, tour operator reservation service and related activities Services to buildings and landscape activities (31% of value added)	Trade and repair of motor vehicles and motorcycles Retail trade Land transport Warehousing and support activities for transportation Accommodation and food services Rental and leasing activities Office administrative, office support and other business support activities (30.3% of value added)

Note: Classification by ISIC Rev. 4 of business services (45-82). Financial and insurance activities (64-66) and real estate activities (68) are excluded. Knowledge-intensity follows the definition by Eurostat. Internationalised services are defined by the Danish Productivity Commission (2013[7]) and compose industries with an export share of more than 25% and industries with foreign-ownership share above 25% in terms of value added.

Weak growth in services even at the productivity frontier

The global productivity slowdown has coincided with an apparent increasing performance gap between firms at the frontier and other firms at the global level (Andrews, Criscuolo and Gal, 2016[8]; Berlingieri, Blanchenay and Criscuolo, 2017[9]). A similar widening gap has been found within countries in Germany and Switzerland and to some extent in Belgium (OECD, 2018[10]; OECD, 2017[11]; OECD, 2017[12]). Such a development has not been observed in Denmark (Kristoffersen, Spange and Malthe-Thagaard, 2017[13]; Danish Economic Councils, 2017[14]). The gap in labour productivity between firms at the frontier and other firms has not increased substantially both in manufacturing and in services (Figure 1.7).

Figure 1.7. The gap to firms at the productivity frontier remains small in Denmark



Note: In panel B, the "frontier" is measured by the average of log labour productivity for the top 5% of companies with the highest productivity levels globally across 24 countries, separately within each 2-digit industry and year. "Firms below the frontier" capture the log productivity for all other firms, constructed in a similar way. The series are normalised to 100 in the starting year (2003=100) and the time variation is approximated by changes in the log measures x 100. In panel A, a similar approach is applied for Danish firms only. OECD series are based on ORBIS data, while series for Denmark are based on national business register data. The comparison is suggestive since data sources and methodologies are not fully comparable (Panel A uses weighted averages across 2-digits industries, whereas unweighted averages are used in Panel B).
Source: Danish Economic Councils (2017[14]); OECD calculations using Orbis data of Bureau van Dijk, following the methodology in Andrews et al. (2016[8]).

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Comparing productivity trends within Denmark to global developments points to two main differences (Figure 1.7): firms below the frontier in manufacturing have largely kept up with the frontier, while no frontier has emerged in services as even firms at the top have

experienced persistently slow productivity growth. In this respect, the micro-level perspective reinforces the challenges identified at the macro-level by pointing to strong and broad-based growth in manufacturing (albeit potentially distorted by integration in global value chains, see Key Policy Insights) and a worrying lack of innovation leaders to drive productivity growth in services (except for telecommunication and air transport), which will be increasingly critical as the economy transform further towards services.

Key challenges for reviving productivity growth through new technologies

Predicting future technological changes and their implications is impossible, but potential adverse shocks can be mitigated by being prepared. In this respect, the Government has launched a "Disruption Council" (Box 1.3) that brings together policy-makers, social partners and experts in Denmark to discuss how to seize opportunities of technological changes in the best possible way, so that all Danes take part in economic development.

Box 1.3. The Danish Disruption Council

In May 2017, the Danish Government established a "Disruption Council", a partnership between the social partners, businesses, experts and the Government. The Prime Minister chairs the Council with 29 members and seven ministers participating. The mandate of the Council is to analyse, discuss and make recommendations on future challenges from technological changes and globalisation with two objectives (Danish Government, 2017[15]):

1. Ensure a strong Denmark that seizes the opportunities of technological changes in the best possible way, so that all Danes take part in economic development.
2. Maintain and develop a labour market, which is dynamic and well organised and without social dumping.

The work is organised in a series of two-day meetings with presentations and discussions around five overarching topics:

- New technologies and business models
- Skills for the future
- Globalisation, free trade and foreign workers
- Framework conditions for businesses
- Flexicurity 4.0 – sustaining the Danish labour market model

Based on discussions and recommendations from the Council, the Government will launch a number of policy proposals and strategies. A final report reviewing the Government's initiatives is expected in the beginning of 2019.

Maintaining an inclusive labour market is at the core of the Council's work. In this respect, this chapter is complementary by focusing more on the business sector and the need to adjust related policies in response to new technologies and business models. The following key challenges are identified in the rest of this chapter:

- *Weak business dynamics in upscaling*: Only few young firms are able to scale up their businesses and gain export market shares. This may point to various market failures, including strong market power by incumbents or lack of risk capital.

- *Slow investment*: More investment should be expected given ultra-low borrowing costs and large corporate savings. The need for more market-based funding is rising as investment shifts towards intangibles and new business models emerge.
- *Highly concentrated innovation*: High aggregate R&D spending conceals a strong concentration of business R&D in a few large firms in a handful of sectors.
- *Limited use of advanced digital technologies*: Uptake and innovation in future key enabling technologies (e.g. artificial intelligence and the Internet of Things) is relatively low.
- *Skill shortages*: The share of graduates in science, technology, engineering and math is low compared to other countries, while businesses increasingly report shortages in these skills.

Addressing these challenges and preparing for disruption can go together and deliver synergies. Danish firms are close to the technological frontier compared to other countries, making disruptive innovation that raises the technology frontier key to boost productivity growth. Improving framework conditions to foster trials of new ideas and investment requires a multidimensional policy perspective to enable firms to exploit new opportunities. Most of all, policy needs to level the playing field by leaning against attempts to discourage disruptors or exclude them and by tackling unintended or outmoded obstacles in legislation and regulation. At the same time, policy needs to consider downsides for consumers and employees' welfare and to establish whether disruption marks a positive innovation, or for instance is founded on regulatory or tax loopholes.

Recent policy initiatives have further supported the already high level of digitalisation and embraced new business models and the collaborative economy (Box 1.4). A range of measures has also been taken to foster entrepreneurship and improve framework conditions for businesses. The Government developed many of the policy measures in collaboration with business CEOs and experts through the appointment of so-called growth panels (such as the Entrepreneurship Panel and the Digital Growth Panel), facilitating open discussion and knowledge sharing.

Most of the initiatives are welcome as they aim to remove barriers and adapt regulation with a technology-neutral focus. However, additional tax expenditures, such as tax deductions for investment in unlisted entrepreneurship SMEs, should be used with caution.

Box 1.4. Recent policy initiatives to enhance digitalisation and the business environment

- **Liberalised zoning and planning regulation** (June 2016). Rules concerning shop size and location as well as placement of production eased. More decision-making power on zoning and planning regulation transferred to municipalities.
- **Business and entrepreneurship reform package** (November 2017). Introduction of a tax-favoured stock account, implying an additional lower tax bracket for income from dividends and realised capital gains. New tax deduction for households investing in unlisted entrepreneurship SMEs. Gradually increased tax deduction of R&D expenditures from 100% to reach 110% in 2026. Extension of favourable tax scheme for certain high-skilled foreign employees from five to seven years. Life science growth strategy to promote and offer qualitative support to businesses in pharmaceuticals. Total resources allocated to the package amounts to EUR 2 billion (0.7% of GDP) during 2018-2025.
- **Ensure legislation supports digitalisation** (January 2018). Principles for simple and clear legislation to facilitate digitalisation adopted. New legislation to be assessed against them and ongoing revision to adjust existing legislation.
- **Digital growth reform package** (February 2018). Launch of a public-private partnership, Digital Hub Denmark, to strengthen growth and research in new digital technologies. Programme to support digitalisation of SMEs through guidance and knowledge sharing. A Technology Pact with businesses and the education sector to boost STEM skills and graduates, including more women. Measures to foster data-driven growth, among other development of a block chain solution for ship registration and free access to weather data. Initiatives to make business regulation technology-neutral and ready to support new business models.
- **Strategy for cyber and information security 2018-2021** (May 2018). Measures and resources to strengthen surveillance, coordination and improve competences for secure communication and data protection.
- **Growth and taxation of collaborative and platform economies** (May 2018). Review of legislation and regulation to remove unintended barriers for collaborative activities. New and simpler tax deductions for income from accommodation and rental of cars, boats and caravans conditional on automatic reporting to tax authorities through a third party. Clarification of the rules for short-stay rentals, restricted to maximum 70 days per year.
- **Simplification of business promotion services** (May 2018). The Danish Growth Fund (*Vækstfonden*) will be the one-stop for access to loan and equity to (knowledge-based) entrepreneurship, while subsidies for innovation and R&D will be facilitated through the Innovation Fund. Access to supervision, guidance and mentoring will be provided through 12 local business centres with links to all municipalities as well as through a digital business promotion platform.
- **Digital public service strategy** (October 2018). Individual access to all personal data records by the public sector. Appointment of an advising Data Ethical Council. Digitalisation of identity documents. Investment fund (EUR 55 million) to boost development of new technologies and artificial intelligence.

Additional reforms are needed to boost productivity and prosperity so that Denmark remains among the most successful OECD countries and champions in wellbeing. This chapter examines a broad set of policies to respond to the key challenges, centred on framework conditions and support of businesses when needed:

- *Promoting competition and reducing regulatory barriers*: Refining the competition framework and reforming regulation are needed to adapt to new business models and maintain high business dynamics.
- *Rebalancing taxation and improving access to finance*: Reducing top marginal tax rates on labour and capital income will improve economic incentives for labour supply and investment. Expanding the equity market requires corporate income tax reform and consideration of obstacles for pension funds to invest.
- *Fostering broad-based knowledge creation and R&D support*: Strengthening opportunities and incentives for more firms to engage in R&D and become innovative will broaden knowledge creation and productivity growth.
- *Enabling businesses to thrive in the digital age*: Mainstreaming the use of advanced digital technologies, also in the public sector, and building trust in the new digital economy will accelerate digital transformation.
- *Building skills and easing access to foreign workers*: Ensuring supply of the right skills is crucial to utilise advanced technologies and boost productivity. Maintaining effective upskilling and lifelong learning will help workers cope with disruptive changes, while not least ensuring that economic growth benefits all.

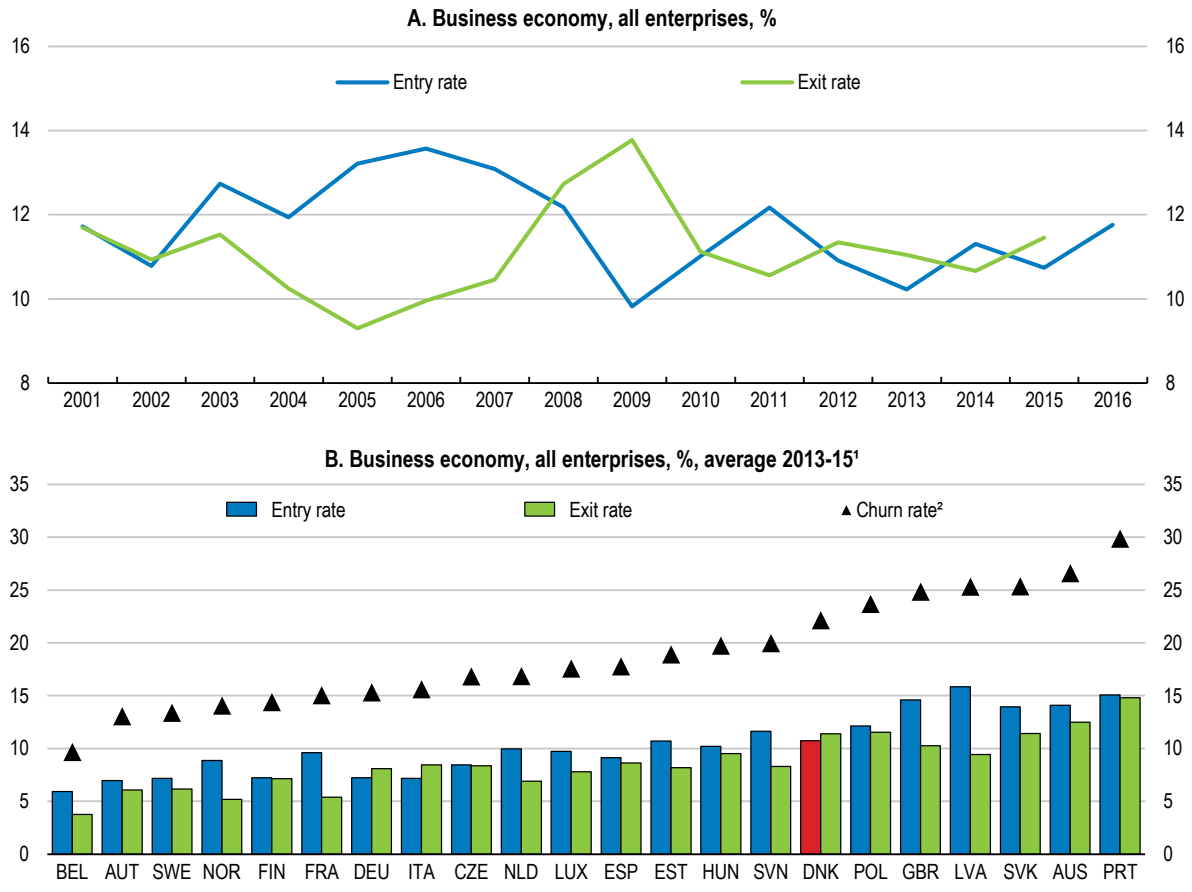
Refining competition and regulatory frameworks to promote business dynamics

Recent waves of innovations in digital technologies may have contrasting effects on business dynamics. While digital technologies are likely to lower barriers to entry and facilitate reallocation, some features of digital-intensive sectors, such as economies of scale and scope and network effects, can also favour winner-takes-most dynamics and the emergence of dominant firms (e.g. related to big data, platforms, computer algorithms, intellectual property), increasing concentration and market power (OECD, 2018[16]; OECD, 2017[17]; Bessen, 2017[18]). More generally, there is evidence that the rise of intangibles is associated with a rise in concentration (Crouzet and Eberly, 2018[19]). Competition and regulatory frameworks thus need to be refined to fit this new environment.

Few young firms grow large, but business dynamics has remained high

Business dynamics through entry and exit of firms is at a high level compared to other countries and has remained stable since the early 2000s (Figure 1.8), with the exception of cyclical movements around the financial crisis in 2008-2009. This provides a good foundation to support productivity growth via reallocation of resources from less to more productive firms. Indeed, over the last decades business dynamics has been the main source of (weak) productivity growth in services (Malchow-Møller, Munch and Skaksen, 2015[20]; Danish Ministry of Finance, 2016[21]).

Figure 1.8. Business dynamics has remained high compared to other countries



1. Data for Denmark and Poland refer to 2012-2014.
2. The churn rate is the number of enterprise births and deaths as a percentage of the number of active enterprises.
Source: Statistics Denmark; OECD Structural and Demographic Business Statistics.

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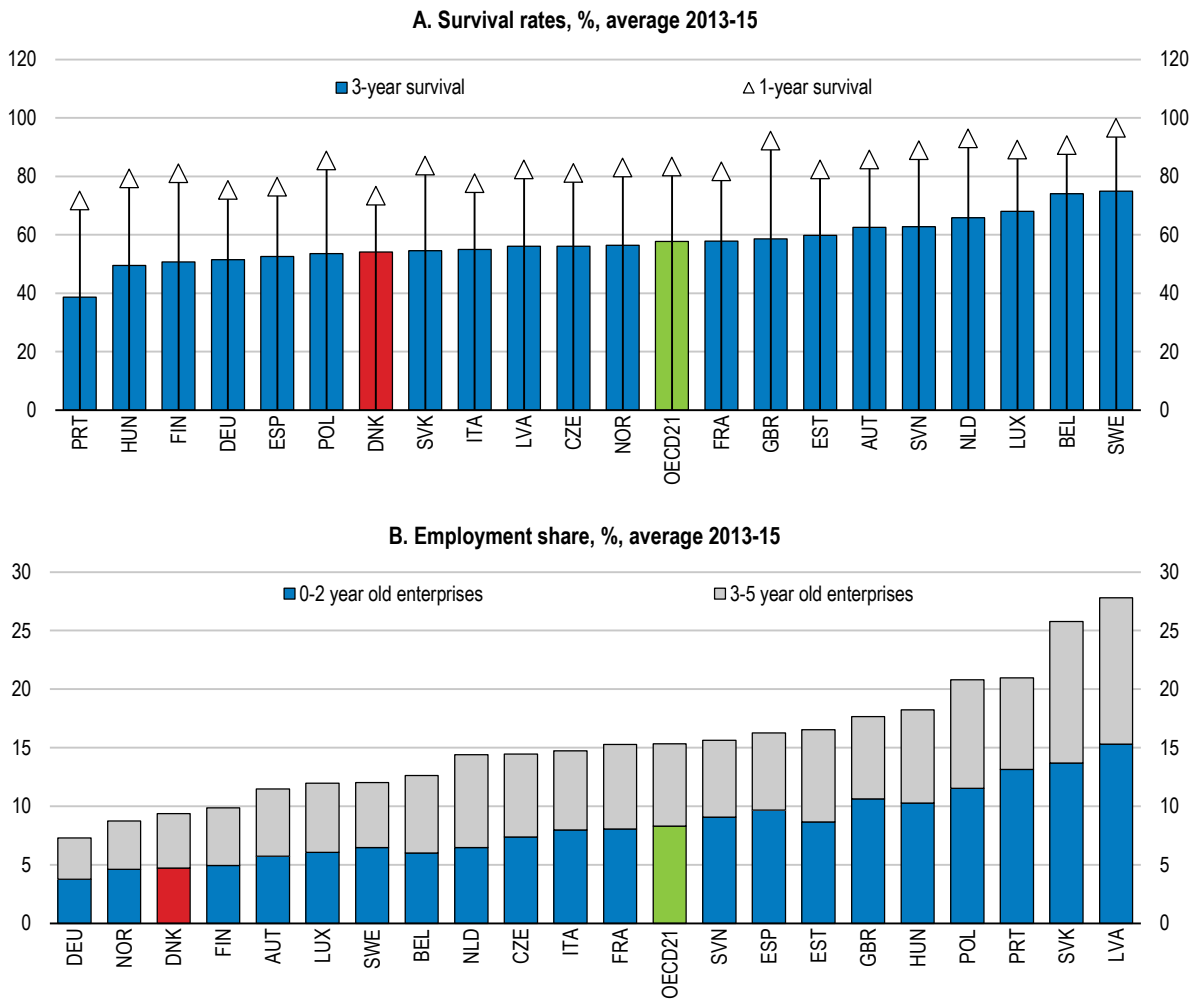
Nevertheless, business dynamics display weaknesses with respect to survival and upscaling compared to other OECD countries. Young firms exit at a higher rate than in Sweden and the Netherlands (Figure 1.9, Panel A), while surviving young firms account for less than 10% of total business sector employment (Figure 1.9, Panel B), less than in most other OECD countries. On the one hand, this can point to a flourishing startup environment with plenty of experimentation and risk taking combined with effective procedures for firm closure (Adalet McGowan, Andrews and Millot, 2017[22]). New technologies also facilitate "scale without mass", reducing the need to grow large to become productive in some service sectors (Berlingieri, Calligaris and Criscuolo, 2018[23]).

Figure 1.9. Many young firms exit and those remaining employ a low share of workers



Note: Business economy, all enterprises. Data for Denmark refer to 2012-2014.
Source: OECD Structural and Demographic Business Statistics.

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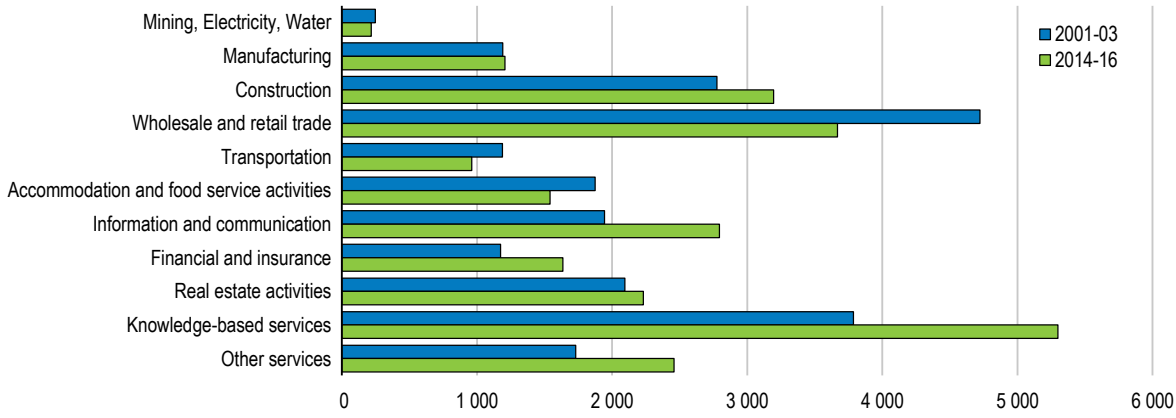
On the other hand, a low employment share in young firms can indicate barriers to growth such as lack of skilled workers and weak competition, protecting incumbent firms (Calvino, Criscuolo and Menon, 2016[24]). The technological transformation implies that many new firms are now created in knowledge-based services (i.e. professional, scientific and technical activities) and the ICT sector (Figure 1.10). If supply of high-skilled workers is insufficient or regulatory barriers excessive, successful startups will be more encouraged to move their businesses abroad; a concern that has been emphasised by the Danish Entrepreneurship Panel (2017[25]). Market size can also be a constraint as ICT startups typically aim for a global market and can be constrained by lack of integration in the EU digital market.

Figure 1.10. The composition of new firms has shifted towards knowledge-based and ICT services

New firms by industry, business sector only



Source: Statistics Denmark.

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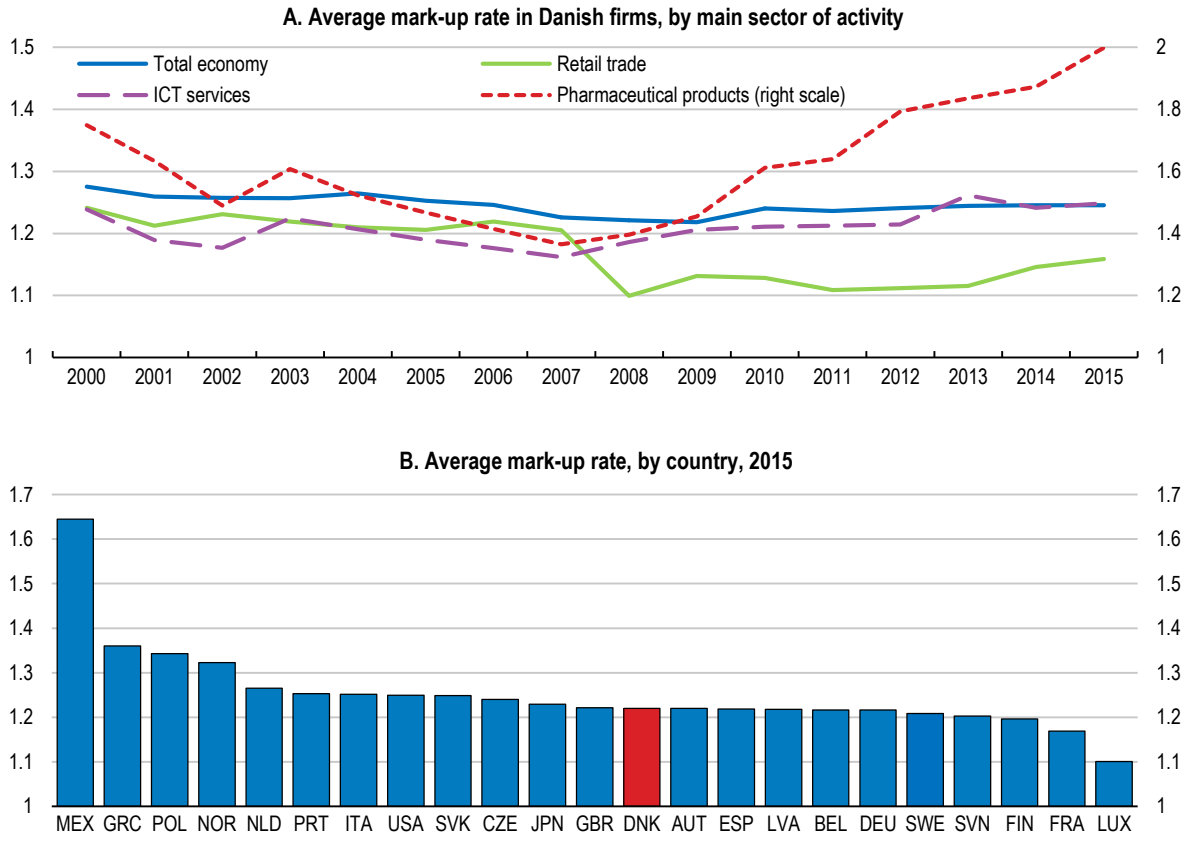
Promoting competition and reducing regulatory barriers

The low number of startups scaling up in Denmark may be seen as a result of low competition pressure and of the rising market power of a few dominant firms. Competitive pressure can be assessed by computing mark-ups, i.e. the ratio of unit price over marginal cost. This ratio is higher than one when markets are not perfectly competitive for example due to product differentiation or barriers to entry. Other factors can also contribute to high mark-ups, such as large fixed costs or a high degree of innovation (Calligaris, Criscuolo and Marcolin, 2018[26]).

Mark-ups have been stable on average over the past decades, but have displayed different patterns across sectors (Figure 1.11). In sectors like retail trade, where global competition and more recently online competition have put a downward pressure on prices, mark-ups have been steadily decreasing. The reverse pattern is observed in sectors relying heavily on intellectual property products, such as pharmaceuticals, or more recently in ICT services. The latter is consistent with patterns observed in other countries, where services and especially digital-intensive sectors have seen an important rise in mark-ups over time (Calligaris, Criscuolo and Marcolin, 2018[26]), which is consistent with winner-takes-most dynamics. While these effects so far remain limited in Denmark, they are likely to gain importance in the future to the extent that the digital economy will grow and disrupt additional sectors of the traditional economy.

Figure 1.11. Mark-ups are stable on average, but on the rise in certain sectors



Note: Mark-up rates are calculated at the industry level as the ratio between operating surplus and input costs. Input costs correspond to the sum of intermediate inputs and labour costs. This indicator takes a value above one if the mark-up is positive. In Panel B, figures for Sweden and the United Kingdom are for 2014.
Source: Égert and Vindics (2018[27]).

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General competition law provides the main instrument to combat anti-competitive practices aimed at shutting out disruptors. The Danish competition framework is generally in line with international recognised standards and practices, but the structure for competition enforcement and determinations is considerably different and more complex than in most EU countries (OECD, 2015[28]). Denmark is one of a small number of EU countries that make imposition of fines criminal penalties, which must be imposed by the courts. Moreover, the burden of proof is higher than in many other countries and court procedures tend to be complex and lengthy. While this unusual practice derives from Danish legal tradition, the high standards nevertheless involve the risk of weak deterrence if firms view the likelihood of prosecution and ruling as low. Consideration should be given to streamline the institutional setup to make determinations of anticompetitive practices more effective. Competition authorities should be provided greater authority to impose administrative fines and to use structural remedies (such as divesture of assets) (OECD, 2015[28]).

The Danish Competition Act is also unusual in having a specific provision that permits individual Ministers (and local authorities) to make exemptions where anticompetitive

practice is assessed to be "a direct or necessary consequence of public regulation". The clause is utilised on a regular basis (OECD, 2015[28]) and means that within a number of sectors, exemptions from the general competition law are applied and industry-specific regulation is used (such as for pharmacies and the taxi industry). Societal concerns can justify such exemptions, but clearer standards for identifying activities that should be subject to exemptions should be developed to reduce the risk of unfair high prices for consumers. For instance, the competition authorities could be assigned a greater role and authority in the determination of exemptions.

Specific adjustments of competition policy in the context of the digital economy will also become necessary as stressed in the Government's recent Digital Growth reform package (Box 1.4). Those challenges are common in OECD countries and recent OECD work suggests that most countries will have to: i) broaden the focus of competition policy beyond goods, services and revenues to also consider data as the most vital competitive asset in some markets (e.g. digital businesses that offer "free" services in exchange for customer data); ii) adjust the way relevant markets and market power are defined (e.g. to integrate the case of many online platform markets where products are free and markets are two-sided); iii) adapt competition policy tools to prevent companies from using algorithms for collusion; and iv) have a greater focus on international co-operation and co-ordination among competition authorities, as more and more businesses are born global and operate across jurisdictions (OECD, 2017[29]; OECD, 2016[30]; OECD, 2017[31]).

Promoting competition and flexible markets through the regulatory framework

Denmark's regulatory framework is currently one of the most favourable to competitive markets (Figure 1.2), with low restrictions in product market regulation as well as service trade. Since 2015 the Government has assumed a stop on new regulation that introduces additional burdens for businesses (Danish Government, 2018[32]), except for compelling reasons. It has also eased existing burdens for businesses by approximately EUR 0.2 billion during 2015-2018. Still, the number of regulated professions is higher than in some neighbouring countries (158 in Denmark versus e.g. 98 in Sweden and 132 in the Netherlands) (European Commission, 2018[33]). Moreover, some of the current regulations may not be appropriate for the digital economy (if for example they have been introduced due to market failures resulting from information asymmetry that are now reduced due to digitalisation) and unduly hinder the development of new products and services. The novelty of the digital economy may face a regulatory "vacuum", and the uncertainty created by the absence of regulation may discourage innovation (OECD, 2018[34]).

The government is currently revising regulations in various areas (e.g. finance, real estate and consumer protection), following a framework and principle-based approach to achieve technology-neutrality, which is a welcome initiative for competition as well. Continued monitoring of the development of market failures and need for revised regulation in fast-evolving sectors would moreover need to be strengthened, as such reviews currently take place on an ad hoc basis.

Emergence of new business models of the digital economy, such as online platforms relying on non-standard work, require adjustments in specific sectors. To date, challenges to taxi services by ride-share companies such as Uber have been among the most prominent internet-platform based disruptions. In January 2018, a revision of the regulatory framework of taxi services – which applies to all businesses operating in the taxi market, including through ride-sharing platforms – entered into force. It simplifies the license system with a plan to abolish restrictions on the number of licenses by 2020, but maintains

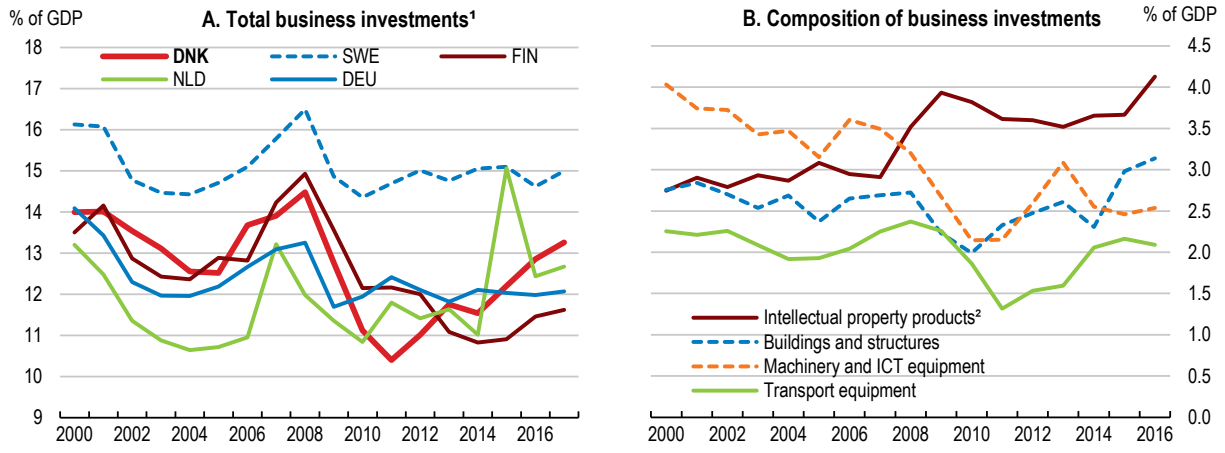
some restrictions on technical requirements (e.g. taximeter and seat sensors) and a price cap on taxi fares in order to protect consumers (OECD, 2018[35]). These restrictions, as well as the three-year transition period regarding the number of licenses, are likely to discourage ride-sharing platforms from operating in Denmark and creates barriers to entry for new players and new business models. Further deregulation and liberalisation would be welcome in the taxi market to provide consumers the benefits from new services.

Upgrading capital markets and rebalancing taxation to boost investment

Investment is shifting towards intangibles

Total business investment as a share of GDP is gradually rising, but remains below the pre-crisis level (Figure 1.12, Panel A). The slowdown in investment has been broadly consistent with the changes in output according to recent analysis (Danish Economic Councils, 2016[36]; European Commission, 2017[37]), although one study finds evidence of a temporary shortfall (IMF, 2018[38]).

Figure 1.12. Business investments are picking up and shifting towards intangibles



1. Private investment excluding residential buildings.
2. Intellectual property products include R&D, computer software and databases; mineral exploration and evaluation; and entertainment, literary or artistic originals and other intellectual property products.
Source: OECD Economic Outlook database; Statistics Denmark.

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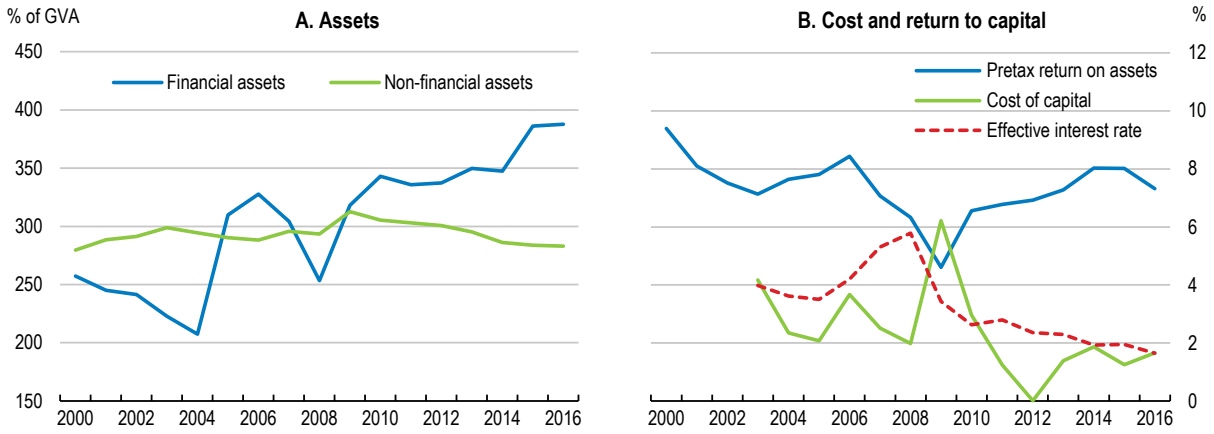
Nevertheless, stronger investment in recent years could have been expected given ultra-low borrowing costs. Non-financial corporations continue to accumulate low-yielding financial assets even though aggregate measures show that a wide gap has opened between the rate of return on non-financial assets and borrowing costs (Figure 1.13). High corporate savings may point to obstacles or lack of profitable projects, holding back firms from investing. Most firms report lack of skilled labour and uncertainty about the future as main impediments to invest (European Investment Bank, 2017[39]).

Figure 1.13. Corporations are accumulating financial assets despite a wide gap between return and cost of capital

Non-financial corporations



Note: Pre-tax return on assets is calculated as net operating surplus to non-financial assets. Effective interest rate for businesses is a weighted average of interest rates on new bank loans and new mortgage loans to non-financial corporations (average across all sizes, maturities and currencies). Cost of capital is effective interest rate minus the percentage change in the price deflator for non-residential fixed investment. A large increase in the deflator in 2012 temporarily drives cost of capital to zero.
Source: Statistics Denmark; OECD Economic Outlook database.

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At the same time, intellectual property products (intangibles, including R&D spending) has become the largest component of business investment, comprising about 35% (Figure 1.12, Panel B). Yet, this is a national accounts measure of intangibles and only records a subset of total intangibles. Adding spending on e.g. training of workers, market research and organisational capital could double investment in business sector intangible assets (OECD, 2017[40]). The growing importance of intangibles implies that the association between investment and output may have become weaker over time due to the specific nature of intangibles (Thum-Thysen et al., 2017[41]). In addition, the returns to knowledge-creating investment typically go well beyond the firm level and add to aggregate productivity-raising innovation.

New analysis for this Survey based on Danish firm-level data suggests that digital adoption through investment in ICT increases firm productivity and contributes to business dynamics and firm growth (Box 1.5). However, ICT capital-deepening was close to zero over the period 2006-2015 for the aggregate business sector, while both tangible and intangible capital-deepening stalled in services (Danish Economic Councils, 2017[14]). As such, policy should focus on further unlocking ICT and intangible investment. In particular, since the evidence indicates that ICT capital boosts productivity in both knowledge and less knowledge-intensive services.

Box 1.5. ICT investment benefits business dynamics and firm productivity in Denmark

Smeets and Warzynski (2018[42]) use rich Danish microdata to investigate the link between ICT investments, business dynamics and firm performance over the period 2000-2015. A novelty of the analysis is a distinction between the components of ICT investment (hardware, software and communication equipment) at the firm level.

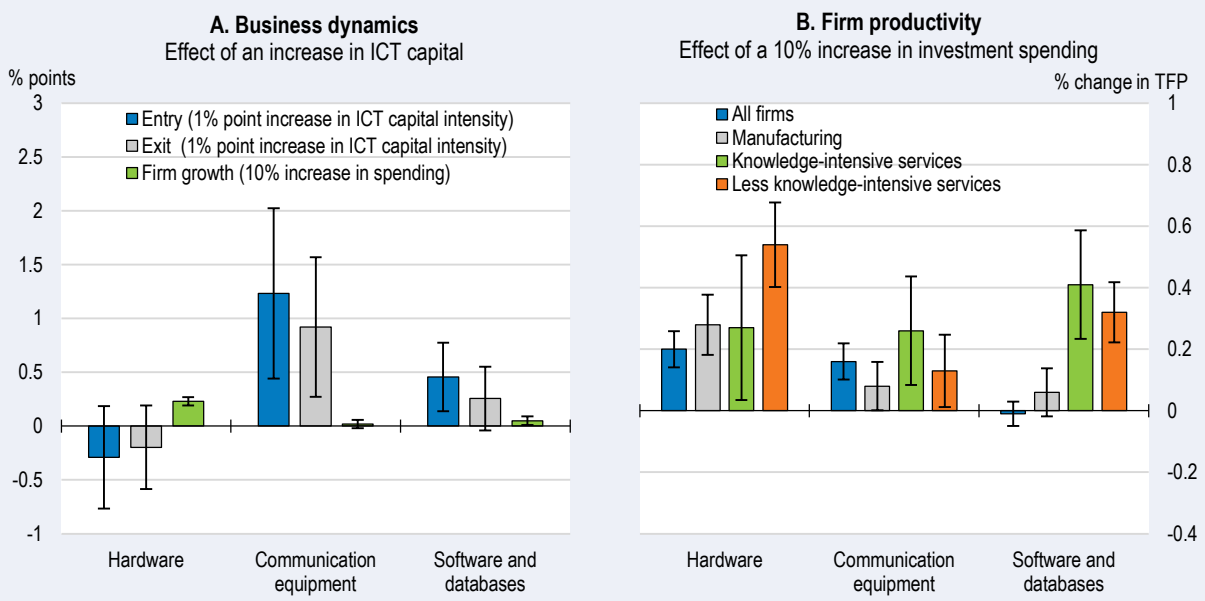
Industry-level analysis

Firm entry and exit rates are computed by industry using register-based data of all Danish firms, while information about industry level components of ICT capital and investment is obtained from EU KLEMS. Panel data analyses indicate that higher shares of software and databases as well as communication equipment in total capital at the sectoral level is associated with a more dynamic environment (higher rates of firm creation and destruction) (Figure 1.14, Panel A).

Firm-level analysis

At the firm level, hardware and software spending are found to be positively related to employment growth. Structural analysis is used to estimate firm total factor productivity taking into account the endogeneity of ICT investment. Subsequently, all three ICT components are found to be positively associated with firm productivity (Figure 1.14, Panel B). A split by sectors indicates that this holds for both manufacturing and services.

Figure 1.14. ICT investment is associated with higher business dynamics and higher TFP



Note: The bars show point estimates and lines report confidence bands at the 5% significance level. Effects on entry and exit rates include controls for number of firms, capital per worker, year and industry fixed effects. Effects on firm growth and firm productivity use lagged ICT spending and controls for employment, capital per worker, year and industry fixed effects. See source for details.
Source: Smeets and Warzynski (2018[42]).

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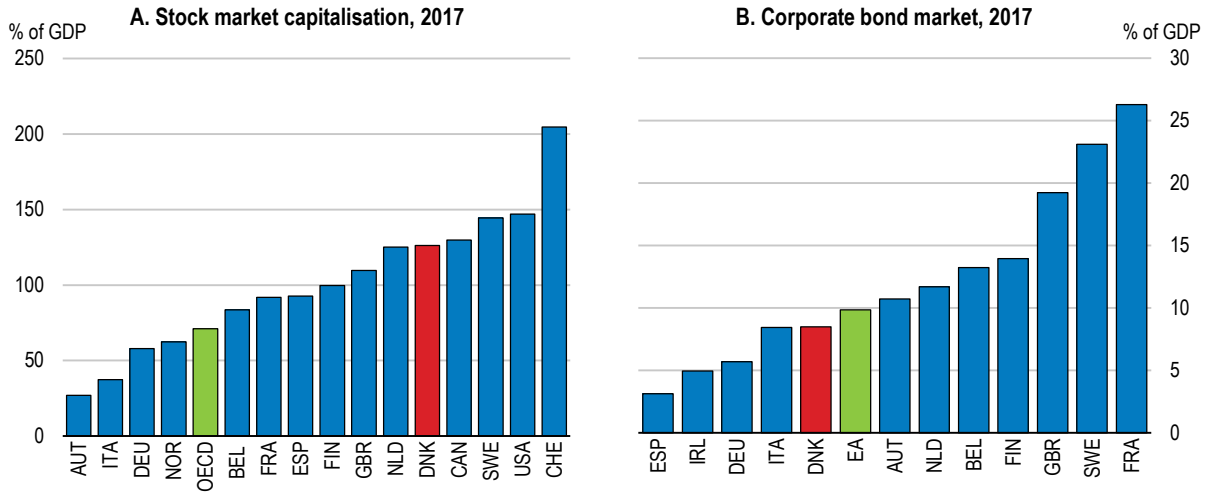
Upgrading firm financing to the knowledge economy

Investment in intangible assets is often constrained by lack of external finance (Arquié, Demmou and Stefanescu, 2018[43]). While patenting and licensing provide some means for collateralising, most intangibles, such as firm-specific human capital, cannot be used as collateral. In addition, intangible investments are typically riskier and the valuation more volatile, among others since they tend to be harder to transfer between firms. Ensuring that the financial system is able to channel finance to these kinds of investments is hence critical to accelerate productivity growth and the development of new business models (Thompson and Boschmans, 2018[44]).

On the surface, capital markets are well developed in Denmark (Figure 1.15). Stock market capitalisation is among the highest in OECD countries relative to GDP, while the corporate bond market has grown in size and is close to the euro area average. However, this masks the dominance of a limited number of very large firms and the bulk of Danish corporate bonds being issued abroad in foreign currency (Danish Ministry of Business and Growth, 2012[45]; Danmarks Nationalbank, 2016[46]). The equity market for smaller firms and the number of initial public offerings tend to be substantially smaller than in Sweden and other neighbouring countries (Copenhagen Economics, 2018[47]).

While the aggregate debt-to-equity ratio is lower than in most OECD countries (Figure 1.16, Panel A), debt – mortgage loans in particular – are critical financing sources for the majority of firms (Figure 1.16, Panel B). Firms with real estate have increasingly used the well-functioning mortgage market to obtain inexpensive financing as rising capital requirements have tended to raise the cost of bank credit. In this context, better access to risky capital would help small and young firms develop or implement innovative technologies as such firms are usually confronted with higher interest rates and credit rationing.

Figure 1.15. Capital markets are well developed



Note: Market value of outstanding shares listed on Copenhagen Stock Exchange in December 2017 (Panel A). Securities other than shares issued by non-financial corporations (Panel B).
Source: CEIC; European Central Bank.

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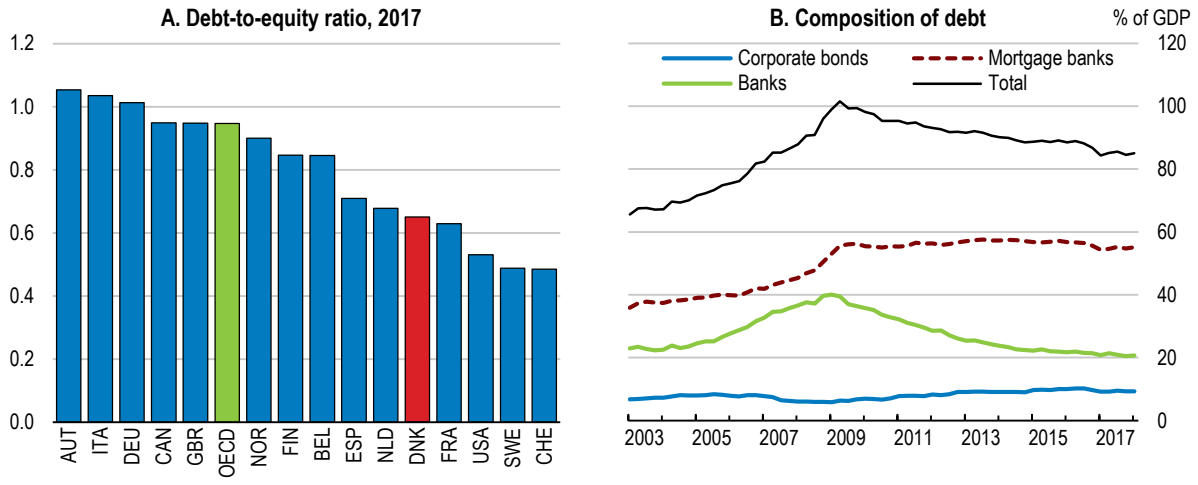
Figure 1.16. Debt-to-equity is low and dominated by mortgage loans

Non-financial corporations



Source: OECD Financial Dashboard; Danmarks Nationalbank; Statistics Denmark.

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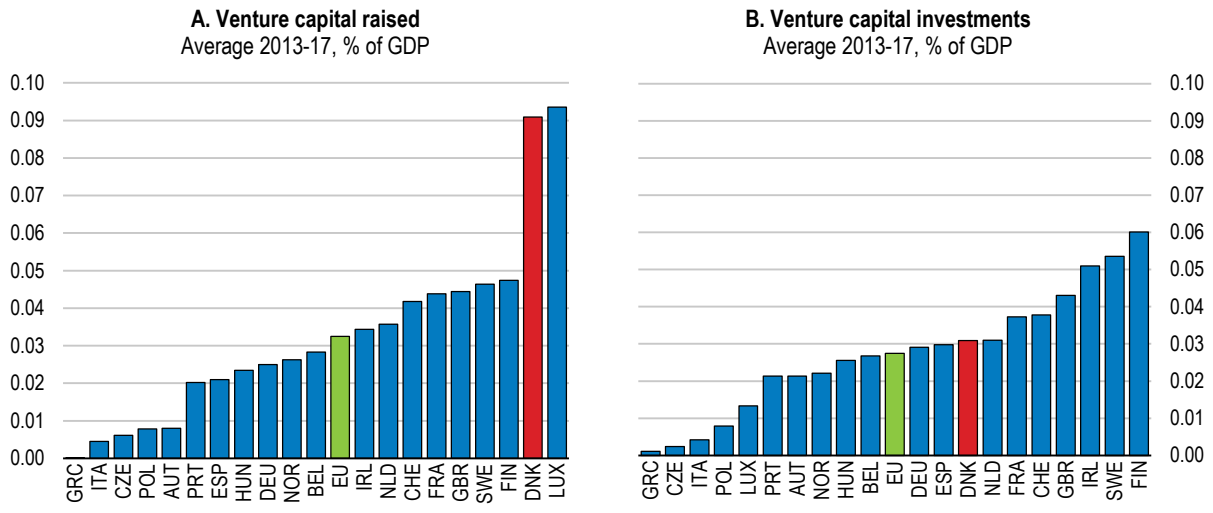
Financial markets in Denmark have seen some disruption as Fintech is evolving rapidly with a hub for Fintech entrepreneurs emerging in Copenhagen. Despite that, crowdfunding and peer-to-peer (or peer-to-market) lending occupy a small share of the market so far as in other countries (Havrylchyk, 2018[48]). Given uncertainties in how best to regulate new financial services, authorities have taken an open approach by developing a regulatory "sand box", similar to initiatives introduced in the United Kingdom and Australia. This allows businesses that fit certain criteria to validate their concepts, while supervisory authorities benefit from new insights.

In contrast, the venture capital market is sizeable in Denmark as only Luxembourg raises more venture capital relative to GDP in Europe (Figure 1.17, Panel A). However, the bulk of these funds are invested abroad, predominantly reflecting a few Danish pharmaceutical funds investing in the United States (Danish Growth Fund, 2018[49]). The inflow of venture capital is much smaller, implying that venture capital investments in Danish businesses are close to the EU average and rank below Finland and Sweden (Figure 1.17, Panel B).

More worryingly, the market for growth capital is among the smallest across EU countries (Figure 1.18). Growth capital covers private equity investments (often minority investments) in relatively mature companies that are looking for primary capital to expand and improve operations or enter new markets to accelerate the growth of the business (Invest Europe, 2018[50]). A weak equity market for firms at this stage in their development is a likely contributing factor for young firms growing slower and upscaling less frequently than in other countries.

Figure 1.17. Denmark raises plenty of venture capital but the majority is invested abroad



Note: Panel A records venture capital according to the location of the managing office and includes both domestic and foreign investments (industry statistics). Panel B records venture capital according to the location of the firms in the portfolio (market statistics) financed either by domestic or foreign venture capital funds.
Source: Invest Europe, European Private Equity Activity Data 2017.

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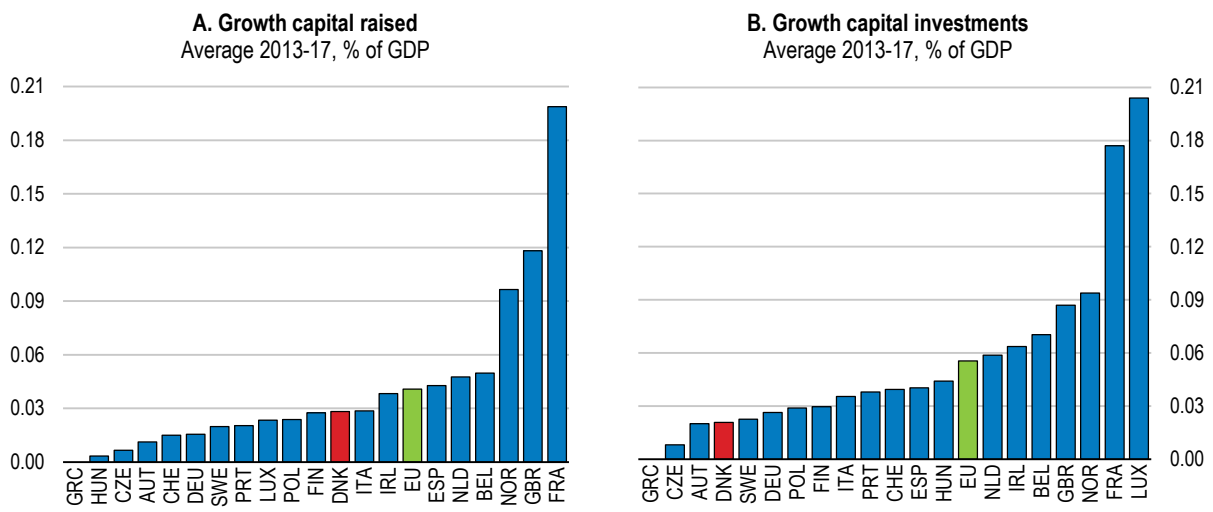
Figure 1.18. Growth capital for businesses to expand is scarce



Note: Panel A records growth capital according to the location of the managing office and includes both domestic and foreign investments (industry statistics). Panel B records growth capital according to the location of the firms in the portfolio (market statistics) financed either by domestic or foreign growth capital funds.
Source: Invest Europe, European Private Equity Activity Data 2017.

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Public business promotion services can address possible market failures by providing risky capital to firms with no other financing options, including through funds-of-funds support. As in most OECD countries, support schemes in Denmark are strongly focused on entrepreneurship and early-stage support to commercialise innovations (OECD, 2018[51]). In 2018, a welcome reform was approved to simplify the system significantly (Box 1.4). The new structure forms a good basis to initiate further measures to broaden financial as well as guidance support from startups to a stronger focus on survival and medium-term firm growth.

An alternative way to raise more capital is to enable pension funds to increase the share of investments in unlisted Danish equity, amounting to less than 2% of total assets in recent years (Insurance and Pension, 2018[52]). The mandate of pension funds is to deliver high and stable returns on people's savings and should remain so. However, as pension funds have jointly accumulated savings reaching almost 200% of GDP in 2018, sufficient resources are available to achieve risk diversification. This has allowed the funds to make sizeable and risky investments in large real estate projects, green energy and in firms in developing and emerging economies that seek to contribute to Sustainable Development Goals (SDGs).

At the same time, barriers for more risky investment have diminished in recent years as pension products have been transformed from delivering guaranteed returns to market-based returns (Financial Supervisory Authority, 2017[53]). Financial regulation of pension funds have also changed with the implementation of the European Solvency II directive in 2016. On the one hand, this replaces detailed regulation on portfolio composition with a prudence principle, providing more freedom in choice of investments. On the other hand, it has raised capital requirements and strengthened risk assessment, among others to combat shadow banking from emerging. In Sweden, pension funds have displayed larger appetite for investment in domestic equity (Copenhagen Economics, 2016[54]). Reviewing regulation for pension funds to identify remaining barriers for investments in the domestic equity market should be considered.

Pension funds have also joined forces with public resources in the Growth Fund to establish Danish Growth Capital I and II, a joint investment vehicle with resources of about 0.4% of GDP invested in entrepreneurs and SMEs through a fund-of-funds structure. Expanding this partnership may also be considered.

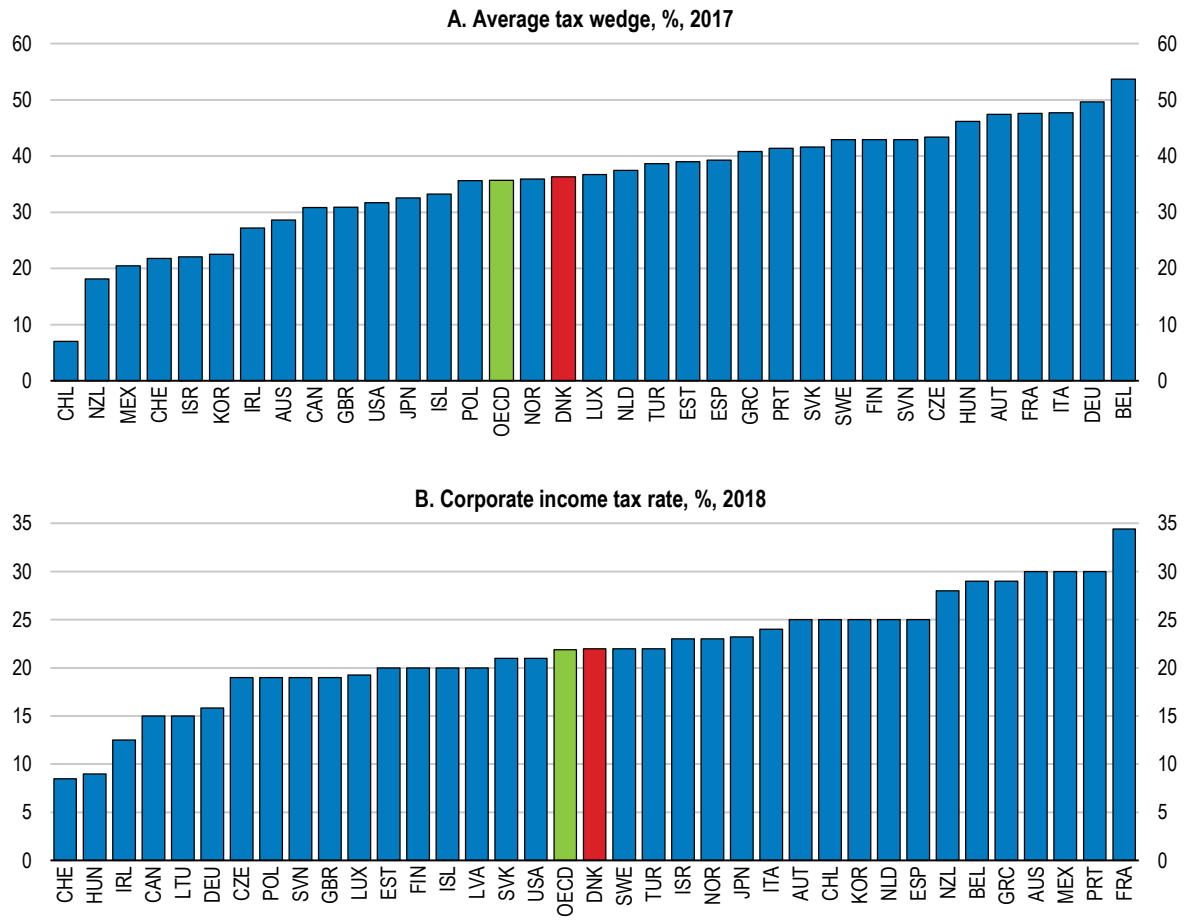
Rebalancing taxation to foster investment and entrepreneurship

Promoting more market-based financing and investment in new businesses and technologies should also be pursued through reforms of the tax system. At the same time, the tax system needs to adapt to ensure that it neither block disruptors, nor gives them undue advantages over incumbents. Steps have already been taken to include the collaborative economy in the regular tax system through automatic reporting of income (e.g. by an agreement with AirBnB) and increased deductions to raise incentives to report income from such activities (Box 1.4). Adjusting the existing tax system step-by-step to new technologies is a sound approach that should be continued.

Denmark's social model is one of an expanded public sector financed by large tax revenues, which are, in terms of GDP, among the highest across OECD countries. The tax system is overall well-designed and efficient, with a limited use of tax expenditures compared to other countries, amounting to about 2.5% of GDP in 2017 (Danish Ministry of Taxation, 2018[55]). A series of welcome tax reforms have shifted the tax mix more towards indirect taxes, including environmentally related taxes. As a result, the average tax wedge, the

difference between the gross pay of the employer and the disposable income of the individual, is close to the OECD average (Figure 1.19, Panel A), partly reflecting very low social security contributions in Denmark. Likewise, the corporate income tax (CIT) rate has been reduced in response to increasing international tax competition and currently stands at the OECD average of 22% (Figure 1.19, Panel B).

Figure 1.19. The tax wedge and the corporate income tax rate are close to OECD averages



Note: The average tax wedge comprises income taxes plus employee and employer social security contributions (including any applicable payroll taxes) less cash benefits, illustrated for a single household with average wages.
Source: OECD Tax database.

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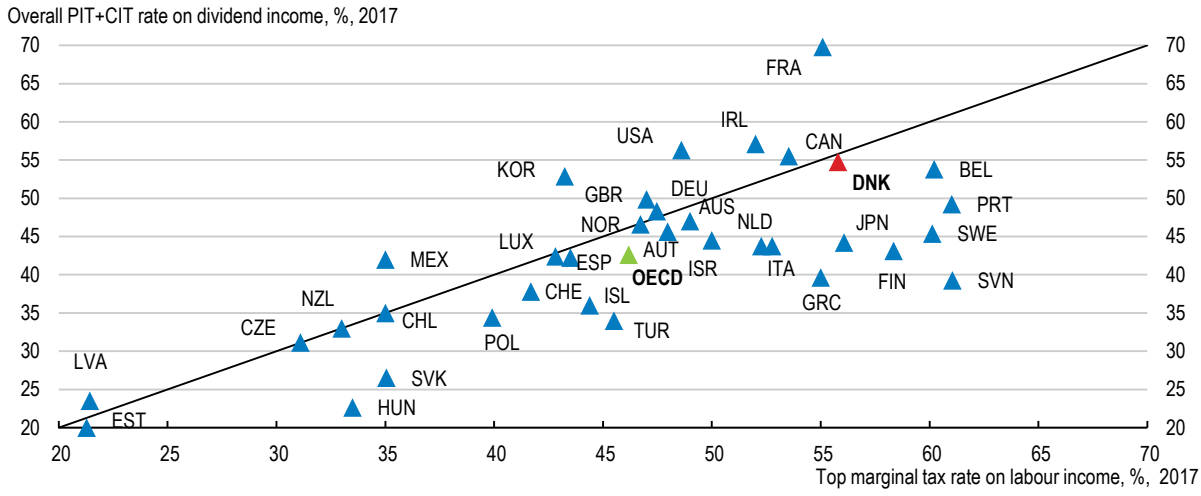
Nevertheless, decisions to work and invest are also driven by marginal and not only average tax rates. At 56%, the top marginal tax rate on labour income is among the highest across OECD countries (Figure 1.20). It affected almost 18% of employment in 2016, but only raised 2.7% of the total tax revenue. Reducing the top marginal tax rate would boost work incentives and also strengthen incentives for choosing higher-paying education fields with supply shortages (Kreiner, Munch and Whitta-Jacobsen, 2015[56]) and entrepreneurship more broadly. Such reform has to be weighed against its implications for inequality.

Calculations by the Government show that removing the top tax bracket could raise inequality by around one Gini point, which would add to the steady rise in inequality (around five Gini points since the early 1990s, reaching 26 in 2015). Still, compensatory measures could be taken through higher taxation of housing as well as by removing specific measures favouring high-income groups (see Key Policy Insights).

Figure 1.20. The top marginal tax rate and dividend taxation are high and aligned



Note: The top marginal tax rate includes personal income tax and employee social security contributions (All-in rate). The overall personal and corporate income tax (PIT+CIT) rate on dividend income reports the overall tax rate on distributed profit, taking into account taxation prior to distribution and at the household level and showing the highest rates.
Source: OECD Tax database.

StatLink https://doi.org/10.1787/888933899204

Marginal effective tax rates close to 60% on returns to savings in stocks and other assets also belong to the top across OECD countries (see Key Policy Insights). A business reform package from 2017 introduced tax measures to promote household investment in stocks and entrepreneurs (Box 1.4), but it will not mitigate the fundamental issue of high marginal tax rates on capital substantially. One element is a tax deduction (*investorfradrag*) provided to households (individual investors) for investments in unlisted entrepreneurship SMEs that comply with EU definitions and state aid regulation, e.g. being in the startup or growth phase and not in financial difficulties. While the objective to strengthen incentives to invest in startups and more risky projects is justified by market failures, individual households generally lack sufficient funds and information to achieve risk diversification. This is partly addressed by also making the tax deduction available for persons investing through specific investor funds (*investorfradragsfonde*), which can help to diversify the portfolio. In theory, such a policy could create a financing environment favourable to innovation and startups, but it is not without risks, with investors focussing more on the tax deductions than on returns to investment. Experience from France, which introduced a comparable tax credit, suggests that firms who benefit from the measure did not perform better than those who did not (Cour des comptes, 2015[57]).

The business package also introduced a new lower tax bracket on dividends and capital gains through a tax-favoured stock account inspired by Sweden and the United Kingdom.

These measures complicate the tax system significantly and a top statutory tax rate of 42% still discourages equity investments in startups by large individual investors. As the revenue raised from stock income taxation only amounts to about 2% of the total tax revenue, consideration should be given to reduce the top rate and simplify the tax scheme. Maintaining a high top dividend tax rate can partly be justified as a means to preserve neutrality across labour and capital income (Figure 1.20), preventing the manager-owner of a closely-held corporation from categorising income as capital rather than labour to reduce tax payments. Hence, the two tax rates should ideally be reduced in parallel to avoid the need for compensatory measures to prevent manipulation (IMF, 2018[58]).

Lowering the high dividend taxation would support a stronger private equity market, but the corporate income tax has a larger impact on firms' investment decisions and access to capital. With the CIT rate being close to the OECD average and neighbouring countries, there is no pressing need to reduce the CIT rate further (Figure 1.19). A more fundamental reform to introduce an allowance for corporate equity (ACE) (Box 1.6) is currently being considered by the Government. This would be a welcome reform to reduce the debt-bias in corporate income taxation and remove the double taxation of normal returns (both at the corporate and personal income level). The effective average tax rate on new equity is currently more than 8 percentage points higher than on debt, a gap larger than the EU average (ZEW, 2016[59]). Moreover, introducing an ACE could provide a useful boost to investment. The Government has estimated that an ACE could raise business investments by 6% in the medium term and lift GDP by 0.7% in the long run (Danish Ministry of Finance, 2017[60]).

Box 1.6. Reducing the tax bias to debt finance by an allowance for corporate equity

Corporate income tax systems generally favour debt finance over equity finance by allowing deductibility of interest payments, while the compensation of equity is not considered as a deductible cost. There is little economic or administrative arguments for this asymmetry (De Mooij, 2012[61]). An allowance for corporate equity (ACE) has been advocated as an attractive measure to achieve tax neutrality with respect to corporate finance structure (Mirrlees et al., 2011[62]). Implementation requires specifying the equity base used to compute the ACE and how it evolves over time as well as setting a "risk-free" rate of return on equity (e.g. the rate on medium-term government bonds).

Currently, Belgium, Italy, Portugal and Turkey apply variants of the ACE, while several other countries have experimented with it in the past (De Mooij, 2012[61]). The main impediment to a wider adoption is a potentially large revenue loss associated with the narrowing of the CIT base. However, a key argument of the ACE is that it stimulates investment, which can raise economic efficiency and mitigate budgetary costs.

The ACE poses advantages compared to a reduction in the CIT rate

CIT reform often focus on reductions in the tax rate since the CIT has been found to be one of the most detrimental taxes for growth, especially in small open economies. Introducing an ACE can be a more favourable reform to growth for a number of reasons:

- The ACE effectively transforms the CIT into a tax on economic rents. By allowing a deduction for both interest and the normal return on equity, the ACE system charges no tax on projects with a return that matches the cost of capital. In principle, the ACE can thus remove the tax distortion on the level of investment.

- Under the ACE the tax base does not depend on details of the depreciation schedule used. The ACE can thus offset distortions associated with misalignment between tax and accounting books (e.g. from accelerated depreciation).
- The economic benefits of the ACE will likely accrue primarily to employees. The main effect of the ACE is to boost investment, which will in turn increase labour productivity and wages.

Implementation requires addressing financing and potential abuse issues

Reforming the CIT system to apply an ACE represents a large reform with two main practical issues to be addressed:

- *Tax revenue loss*: The short-run fiscal cost can be reduced substantially by applying the ACE only to new investment (as in Italy and Portugal). This will not reduce the effect on investment, as applying the ACE on existing equity creates a windfall gain.
- *Tax planning abuse by multinationals*: Equity injections in ACE countries can be passed on as intra-group loans to another country, resulting in double tax deductions. An anti-avoidance framework targeting transactions between related parties is therefore needed (Hebous and Ruf, 2017[63]). Assessments suggest that such measures have been quite effective in Italy, while Belgium suffered from some abuse (Zangari, 2014[64]) and recently reformed the ACE to improve its design. Ultimately, a co-ordinated ACE implementation across countries would address the problem.

The ACE not only reduces distortions and boosts growth, it should also benefit workers as the larger capital stock raises labour productivity and wages. The fiscal costs would nonetheless be considerable in the long run (a revenue neutral implementation would require around an 8.2 percentage points increase in the corporate income tax rate) (ZEW, 2016[59]). Alternative more growth-friendly financing should be preferred to avoid additional distortions from a higher corporate income tax rate. The Government envisages an ACE that only applies to new equity, which reduces the medium-term costs substantially, estimated to about 0.1% of GDP. Italy appears to have implemented this type of ACE quite successful, with an effective anti-avoidance framework to avoid strategic tax planning (Box 1.6).

Corporate tax reform should also consider limitations on the use of losses carried forward. Small and high-tech companies often experience years of loss making before generating high profits in case of success. To foster more investment in this segment, limitations on the use of losses carried forward in corporate income taxation could be relaxed (Danish Productivity Commission, 2014[65]; IMF, 2018[58]).

Financing the tax cuts could consider a rebalancing of the tax system toward higher tax rates on immovable property (see Key Policy Insights). In addition, a recent reduction in inheritance taxation on family-owned businesses (from 15% to 5%) should be cancelled, which is desirable not just for financing reasons. Research has shown that managerial quality and profit rates tend to be lower when the offspring takes over (Bloom and Van Reenen, 2010[66]; Bennedsen and Nielsen, 2016[67]). Hence, such differentiated tax rates not only raises the risk of creating loopholes, but also lock in capital in poorly performing firms, harming reallocation to more productive use. Concerns for unwarranted firm liquidations can be addressed by giving family-owned businesses more time to pay

inheritance tax liabilities and subordinating the liability to other claims on the business during this period.

Fostering knowledge creation and R&D to boost business innovation

Denmark is among the "innovation leaders", its innovation system ranking second among EU member States in 2017, behind Sweden and just ahead of Finland (European Commission, 2018[68]). However, this very high performance masks a number of weaknesses in the application and commercialisation of innovation outputs. The innovation system is very efficient in some areas such as environment-related technologies where Denmark is a world leader. Innovation strategies launched by the recent Governments put an emphasis on innovation driven by societal challenges such as green growth or health, which will be key for future growth (OECD, 2016[69]). In May 2018, the Government appointed a growth team of CEOs in green energy and environmental technology to make recommendations to improve the business environment with the objective to use the green transition to boost growth and innovation. Yet, it is also crucial to sustain innovation and productivity growth in other areas, especially given recent evidence that innovation and productivity can provide synergies with environmental goals (Albrizio et al., 2014[70]; Johnstone and Kozluk, 2018[71]).

Strong innovation leaders mask weaknesses

R&D spending relative to GDP has significantly expanded over the past 20 years and is now among the highest across the OECD, close to the 3% target set by the Government for 2020 (Table 1.2). Denmark was the OECD country with the highest proportion of researchers in total employment in 2016. Although the budget was cut by 7% of total spending in 2016, public expenditure on R&D remains among the highest in OECD countries relative to the size of the economy. While the budget was raised again in 2017 and 2018 by 1% and 2%, respectively, these back and forth modifications of public research funding should be avoided to ensure stability.

Table 1.2. Denmark ranks high on most innovation measures

Innovation capabilities and performance indicators, 2016 or latest available year

	Gross domestic expenditure on R&D as a % of GDP	Researchers per th. employment	Public expenditure on R&D as a % of GDP	Higher education expenditure on R&D as a % of GDP	Business expenditure on R&D as a % of GDP	Top-cited publications per mil. population (2015)	Triadic patent families per mil. population
Denmark	**2.87**	**14.92**	**0.97**	**0.91**	**1.89**	**385.4**	**49.7**
Finland	2.75	14.27	0.91	0.69	1.81	255.3	52.1
Germany	2.93	9.19	0.93	0.53	2.00	166.4	55.7
Netherlands	2.03	9.24	0.88	0.64	1.16	305.8	76.7
Norway	2.03	11.55	0.95	0.66	1.08	255.1	18.4
Sweden	3.25	14.39	0.98	0.87	2.26	291.8	62.2
OECD	2.34	8.32	0.66	0.41	1.62	144.8	40.0
Maximum	4.25	14.92	0.98	0.91	3.64	442.3	144.0
Minimum	0.36	1.11	0.20	0.13	0.11	4.8	0.2

Note: Maximum (minimum) corresponds to the best (worst) performing country in the sample of OECD countries for which the indicator can be observed. OECD total is a weighted average, relying on estimates for countries for which the indicator is not available. Top-cited publications are the 10% most cited papers by scientific field and type of document (articles, reviews and conference proceedings). Triadic patent families are a set of patents filed at the three major patent offices: the European Patent Office (EPO), the Japan Patent Office (JPO) and the United States Patent and Trademark Office (USPTO), counted according to the country of residence of the inventor and to the date when the patent was first registered.
Source: Calculations based on OECD MSTI database; OECD STI Scoreboard 2017.

Looking at the scientific and innovation outcomes of R&D inputs, research has a high scientific impact, with one of the highest level of top-cited scientific publications per million population (Table 1.2). Five of Denmark's universities ranked in the top 500 of the Academic Ranking of World Universities (Shanghai ranking, 2015). The outcomes in terms of intellectual property rights are relatively lower, ranking only in the top middle range for triadic patent families per million population, and also showing a relatively low level of trademark and design right applications (OECD, 2015[72]). Compared to the very high level of research spending, this points to relatively low technological and commercial applications of research by businesses.

Indeed, although business expenditure on R&D is well above the OECD average (Table 1.2), few Danish firms consider themselves as innovative (Deloitte/Kraka, 2017[73]). Only 12% report introducing new-to-market product innovation (OECD, 2017[40]). Companies indicate that 7% of their turnover is provided through sales of innovative (either new-to-firm or new-to-market) products, which places Denmark below the EU average (European Commission, 2018[68]). Performance in terms of high-tech product exports is also below EU average, whereas knowledge-intensive service export performance is slightly above the EU average but has been decreasing over the recent years (European Commission, 2018[68]).

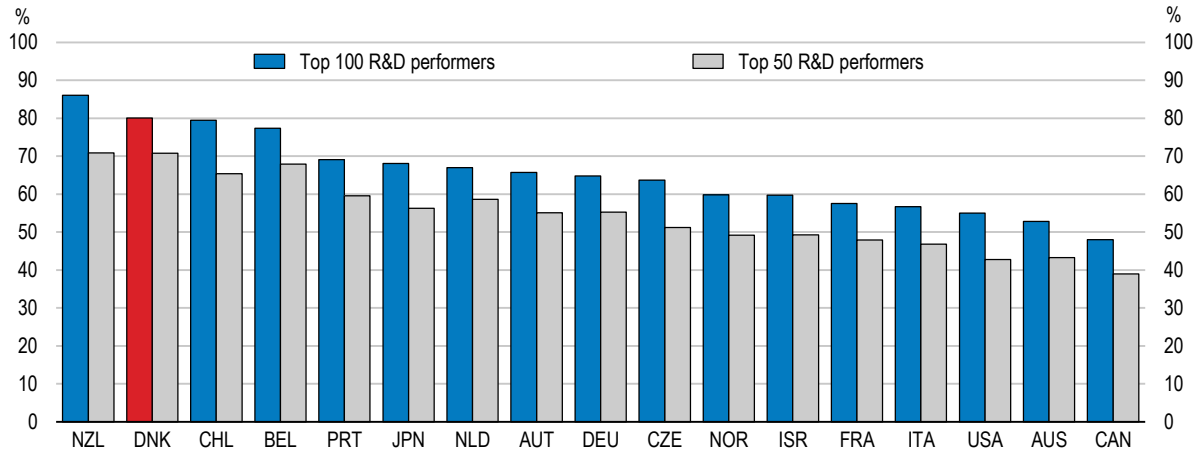
Business R&D and innovation are highly concentrated

The high level of overall business expenditure on R&D masks a high degree of heterogeneity across firms. In all countries, business R&D is generally concentrated in a small portion of the business population, typically in large firms (OECD, 2017[40]). This pattern tends to be particularly marked in Denmark, where only about 25% of the business enterprise expenditure in R&D are attributable to SMEs, less than in most OECD countries.

According to new experimental OECD indicators, the 50 largest R&D performers in Denmark account for more than 70% of all business R&D expenditure (Figure 1.21). The top Danish business R&D investor, Novo Nordisk, spends more than five times more on R&D than any other corporate group headquartered in Denmark (Table 1.3).

Figure 1.21. Business R&D is highly concentrated in a small number of firms

Top 50 and top 100 business R&D performers, as a percentage of domestic business R&D expenditure, 2014



Note: Experimental indicator based on a distributed approach to the analysis of microdata across different jurisdictions. For more information, see http://oe.cd/microberd. For Austria, Belgium, Germany, France and Italy figures refer to 2013. For Portugal, figures refer to 2012
Source: OECD STI Scoreboard 2017.

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Business research and innovation is moreover highly concentrated in a few industrial sectors and technological areas. Among the top 30 Danish corporate R&D investors, ten operate in the pharmaceutical and biotechnology sector, including three in top five (Table 1.3). This concentration is also prominent on the innovation output side, featuring a high and increasing level of specialisation in environment-related technologies (Figure 1.22). These high levels of concentration and specialisation result in Denmark being at the forefront of innovation in certain technologies such as health and environment, with a number of health- and environment-related patents compared to its population among the highest in OECD countries.

Table 1.3. Danish R&D investors is strongly dominated by pharmaceutical companies

Danish companies among the top 2500 R&D investors worldwide, 2017

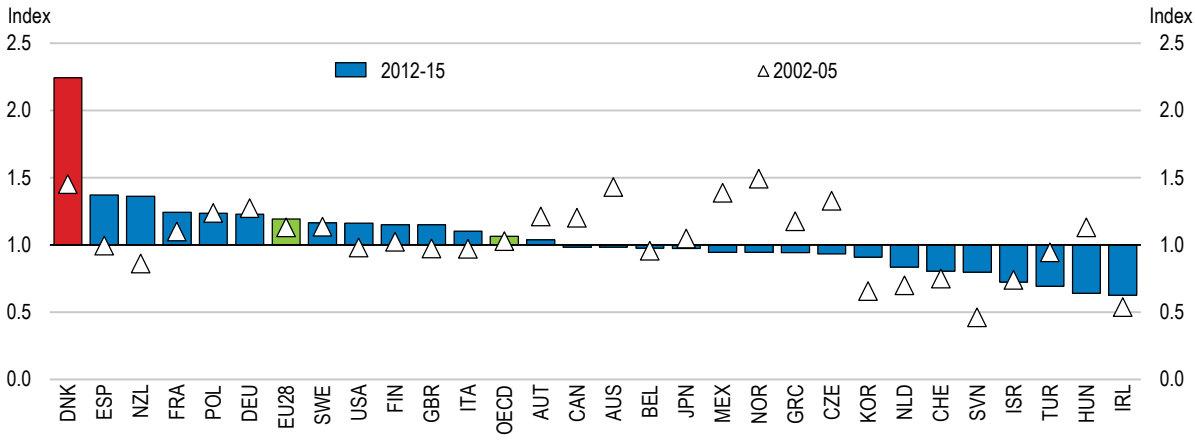
Company	World Rank	R&D (EUR million)	Industry
NOVO NORDISK	68	1931.7	Pharmaceuticals & Biotechnology
DANSKE BANK	287	416.1	Banks
H LUNDBECK	330	350.7	Pharmaceuticals & Biotechnology
DANFOSS	383	296.8	Industrial Engineering
LEO PHARMA	441	253.7	Pharmaceuticals & Biotechnology
NOVOZYMES	468	235.2	Pharmaceuticals & Biotechnology
VESTAS WIND SYSTEMS	487	225.0	Alternative Energy
FERRING PHARMACEUTICALS	654	155.3	Pharmaceuticals & Biotechnology
GRUNDFOS	702	143.1	Gas, Water & Multiutilities
WILLIAM DEMANT	890	107.9	Health Care Equipment & Services
GN STORE NORD	898	106.5	Technology Hardware & Equipment
ASCENDIS PHARMA	950	98.9	Pharmaceuticals & Biotechnology
ARLA FOODS	1032	87.0	Food Producers
LEGO	1128	78.3	Leisure Goods
COLOPLAST	1192	72.1	Health Care Equipment & Services
SIMCORP	1313	63.5	Software & Computer Services
CHR HANSEN	1338	62.1	Pharmaceuticals & Biotechnology
NKT	1406	58.2	Electronic & Electrical Equipment
BAVARIAN NORDIC	1471	54.7	Pharmaceuticals & Biotechnology
ALK ABELLO	1525	51.4	Pharmaceuticals & Biotechnology
TDC	1793	41.6	Fixed Line Telecommunications
MHI VESTAS OFFSHORE WIND	1993	36.0	Alternative Energy
BANG & OLUFSEN	2008	35.6	Leisure Goods
KMD	2053	34.4	Software & Computer Services
NILFISK HOLDING	2086	33.8	Real Estate Investment & Services
ROCKWOOL INTERNATIONAL	2180	31.9	Construction & Materials
ZEALAND PHARMA	2267	30.0	Pharmaceuticals & Biotechnology
DSV	2313	29.0	Industrial Transportation
FLSMIDTH	2335	28.5	Industrial Engineering
SITECORE HOLDING II	2384	27.6	Software & Computer Services

Note: Companies headquartered in Denmark among the top 2500 corporate R&D investors worldwide. World rank corresponds to the company rank in terms of R&D expenditure of corporate investors worldwide. R&D expenditure are consolidated at the group level and based on information taken from the companies' latest published accounts, corresponding either to calendar year 2017 or to financial year ending on 31 March 2018. Industry corresponds to the 3-digit Sector in the Industry Classification Benchmark developed by Dow Jones and FTSE.
Source: EU R&D Scoreboard data.

By contrast, Denmark is lagging behind in other technological areas such as ICT-related technologies (Figure 1.23; Figure 1.24). This may partly be a consequence of being a small economy, which has made the choice to specialise in certain technological areas. However, with innovation efforts concentrated in some sectors, Denmark may miss other technologies that will be key in the future, for example to step in the future waves of digital transformation. Widening the scope of innovation and allowing more firms to invest in these technological areas is therefore crucial to prepare for the future, especially as new ICT-related technologies can help address challenges in other areas such as health and energy.

Figure 1.22. Denmark's patents are highly specialised in environment technologies

Revealed technological advantage (RTA) in environment technologies, 2002-05 and 2012-15



Note: Index based on IP5 patent families. The revealed technological advantage index is calculated as the share of patents of an economy in a particular technology area relative to the share of total patents belonging to the economy. The RTA index is equal to zero when the economy has no patent in a given field, equals 1 when the economy's share in the technology field is equivalent to its share in all fields, and rises above 1 when specialisation is observed. Data refer to IP5 families, by filing date, according to the inventors' residence using fractional counts.
Source: OECD STI Scoreboard 2017.

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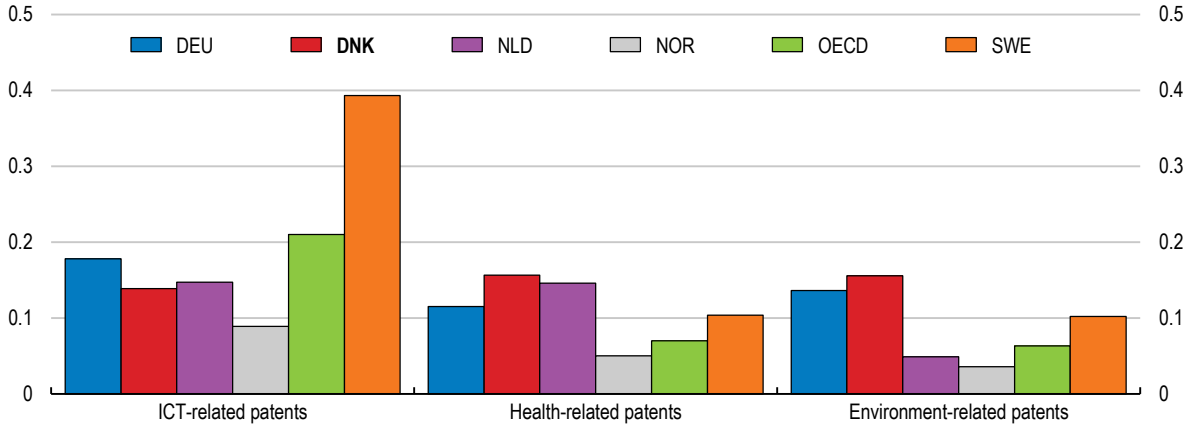
Figure 1.23. Denmark's relative performance in patent filings is unequal across different technological areas

IP5 patent families by technology per thousand population, 2012-2015



Note: Data refer to IP5 families, by filing date, according to the inventors' residence using fractional counts. The figures refer to patent families filed in 2012-2015 and population in 2015.
Source: Patent data from OECD STI Scoreboard 2017, and population series from OECD MSTI Database 2017.

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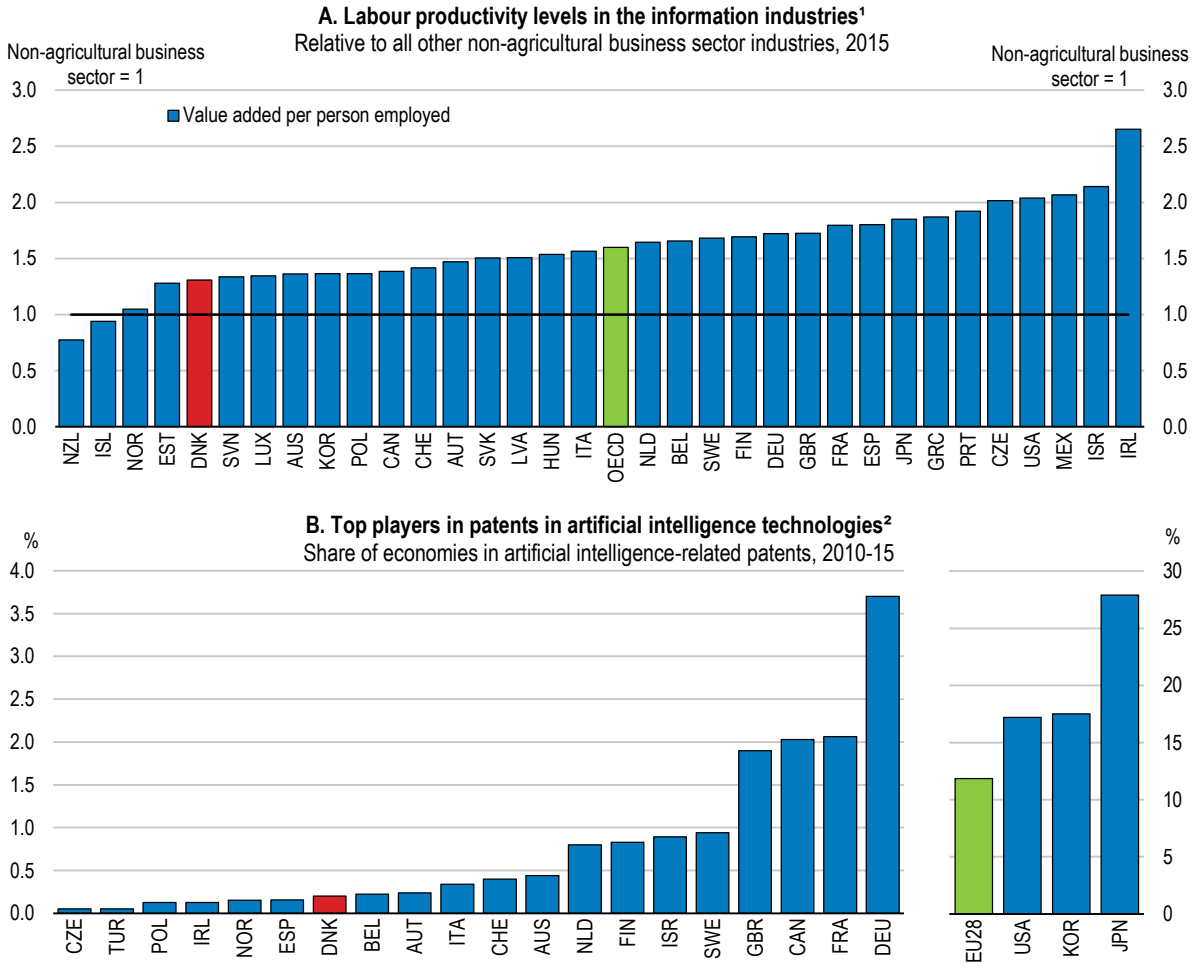
Figure 1.24. Information industries productivity and innovation performance relative to other sectors are lower than in most countries



Note: Panel A: Information industries are defined according to ISIC Rev.4: "Computer, electronic and optical products" (Division 26), "Publishing, audiovisual and broadcasting" (58 to 60), "Telecommunications" (61) and "IT and other information services" (62, 63). Panel B: Data refer to the number of IP5 patent families in artificial intelligence (AI), by filing date and inventor's country.
Source: OECD STI Scoreboard 2017.

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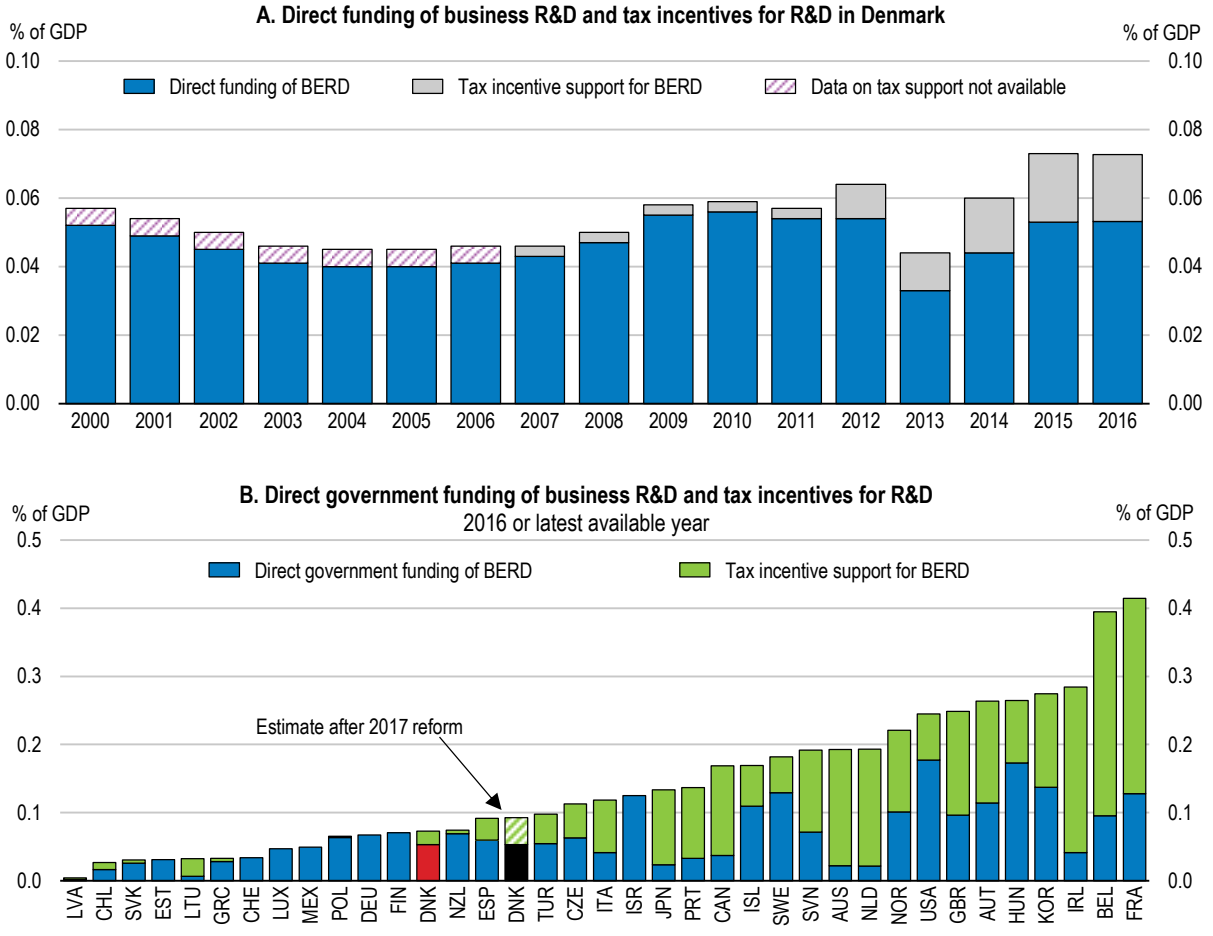
Improving instruments to foster innovation within firms

Denmark stands below the OECD median in terms of the overall generosity of its public support to business innovation as a percentage of GDP (Figure 1.25). Direct government funding of business R&D mainly benefits large firms, partly because SMEs and young innovative firms are less likely to undertake R&D-based forms of innovation. Initiatives like the creation of the Market Development Fund in 2012, which aimed to help firms to bring their new products to the market by supporting the development process just before commercialisation, have been effective in raising innovation returns in SMEs (Irisgroup, 2015[74]). A recent political agreement plans to simplify the existing range of business support schemes (Box 1.4), which will merge the Market Development Fund with the

Innovation Fund from 2019. This merger of the different funds is welcome as it will likely simplify public support for innovation, but the reform should make sure that the innovation expertise support provided to businesses is maintained.

Figure 1.25. The policy mix in public support for business R&D increasingly relies on fiscal incentives, although they remain at a moderate level



Note: Panel B shows two bars for Denmark, the first one (red bar) corresponds to the actual cost of public support to business R&D relative to GDP in 2016, whereas the second one (black bar) shows the estimated cost after the full implementation of the 2017 reform (from 2026), based on the projections of the Danish Government (2017[75]).
Source: OECD, R&D Tax Incentive Indicators, http://oe.cd/rdtax.

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Although direct government funding of business R&D still constitutes the bulk of public support to business R&D, an increasing share of public support is provided through R&D tax incentives (Figure 1.25, Panel A). The current level of tax incentive support for business R&D is, however, well below the OECD median (Figure 1.25, Panel B). Indeed, the current general tax deduction scheme offers an accelerated depreciation for machinery and equipment related R&D expenditure, but until 2018 no enhanced tax deductions (i.e. higher than 100%) or credits was offered for current R&D expenditures, whereas these typically constitute the largest cost component in other countries. Since 2012, a scheme for loss-

making firms has been in place (*skattekreditordningen*), where companies receive a refundable tax credit corresponding to 22% (corresponding to the corporate income tax rate) of any deficit-related R&D expenses up to a ceiling of EUR 3.4 million. This type of scheme tends to shift the support towards young firms facing liquidity problems in the start-up phase, when R&D activities have not yet resulted in income (CPB, 2014[76]). This is welcome as it avoids the common criticism made to R&D tax credits that, although they avoid the "picking winners" problem, which can be associated with direct grants, they may nevertheless favour incumbents at the expense of new firms (OECD, 2013[4]; Bravo-Biosca, Criscuolo and Menon, 2016[77]).

Recent reform (Box 1.4) will increase R&D tax incentives by introducing enhanced tax allowance for current R&D expenditure. The enhanced tax allowance rate will gradually increase from 1.5% in 2019 to 10% in 2026 (Box 1.4). The estimated annual cost of this reform is EUR 60 million (approximately 0.02% of GDP) (Danish Government, 2017[75]). Although this would roughly represent a doubling of the current support provided through R&D tax incentives, the tax allowance rate will remain relatively low by international standards (Figure 1.25). While an assessment of the reform is needed, the Government should potentially consider increasing further the support through R&D tax incentives. The schemes should be carefully designed to take into account heterogeneity among potential R&D performers (Appelt et al., 2016[78]). Incremental R&D tax credits based on the increase in R&D over time should be considered as volume-based credits, although they have the advantage of simplicity, tend to benefit mainly large firms. Raising the ceiling on the scheme for loss-making firms could also be considered in order to reach significant impact in terms of shifting public support to young innovative firms. This may also require an increase in direct public funding, as even if the R&D tax incentives contain refunds for loss-making companies, young firms may not fully benefit from the schemes if they lack the upfront funds to start an innovative project (Busom, Corchuelo and Martinez-Ros, 2014[79]).

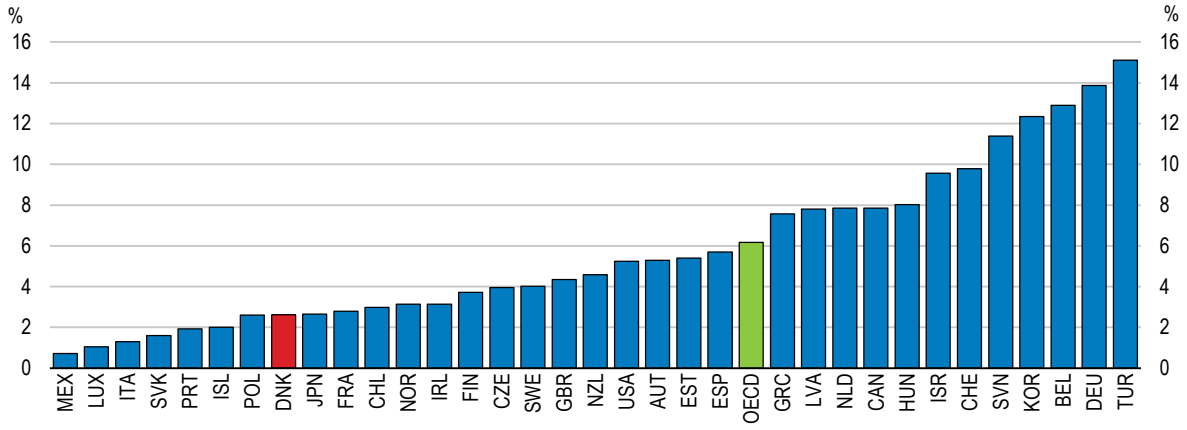
Improving cooperation between universities and the business sector

Given the high weight of public institutions in R&D expenditure, linkages between public and private innovation actors are a key factor to enhance the economic returns from research expenditure. Evidence shows that more intensive collaboration between firms and universities is associated with higher productivity outcomes at the firm level (Danish Productivity Commission, 2013[80]; Andrews, Criscuolo and Gal, 2015[81]). Weak collaboration and spillovers from public research to businesses constitute an important barrier for business investments in intangible assets (Thum-Thysen et al., 2017[41]).

Collaboration between universities and industry needs strengthening in Denmark. The share of higher education research financed by industry stood at 2.6% in 2015, well below the 5.6% OECD average (Figure 1.26). Commercialisation of the institutions' research results, which is a good indicator of knowledge transfers from public research institutions to the rest of the research community, is also limited. The share of patent applications from public research institutions has more than doubled between 2003 and 2013, but remains below the OECD average (OECD, 2016[69]).

Figure 1.26. Private funding of public R&D is very low

Share of higher education sector research financed by industry, 2015



Source: OECD Main Science and Technology indicators.

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In December 2017, a new research and innovation strategy was launched, including initiatives to strengthen research in technology and technology transfers from universities to business. This includes an inspection of technology transfers efforts from universities, as well as the legislation surrounding these transfers, with the aim to remove any possible barriers (Danish Ministry of Higher Education and Science, 2018[82]). This initiative is welcome as strengthening the intellectual property right policies of universities would help give researchers stronger incentives to commercialise their research (Grimpe and Mitchell, 2016[83]).

Enabling businesses to thrive in the digital age

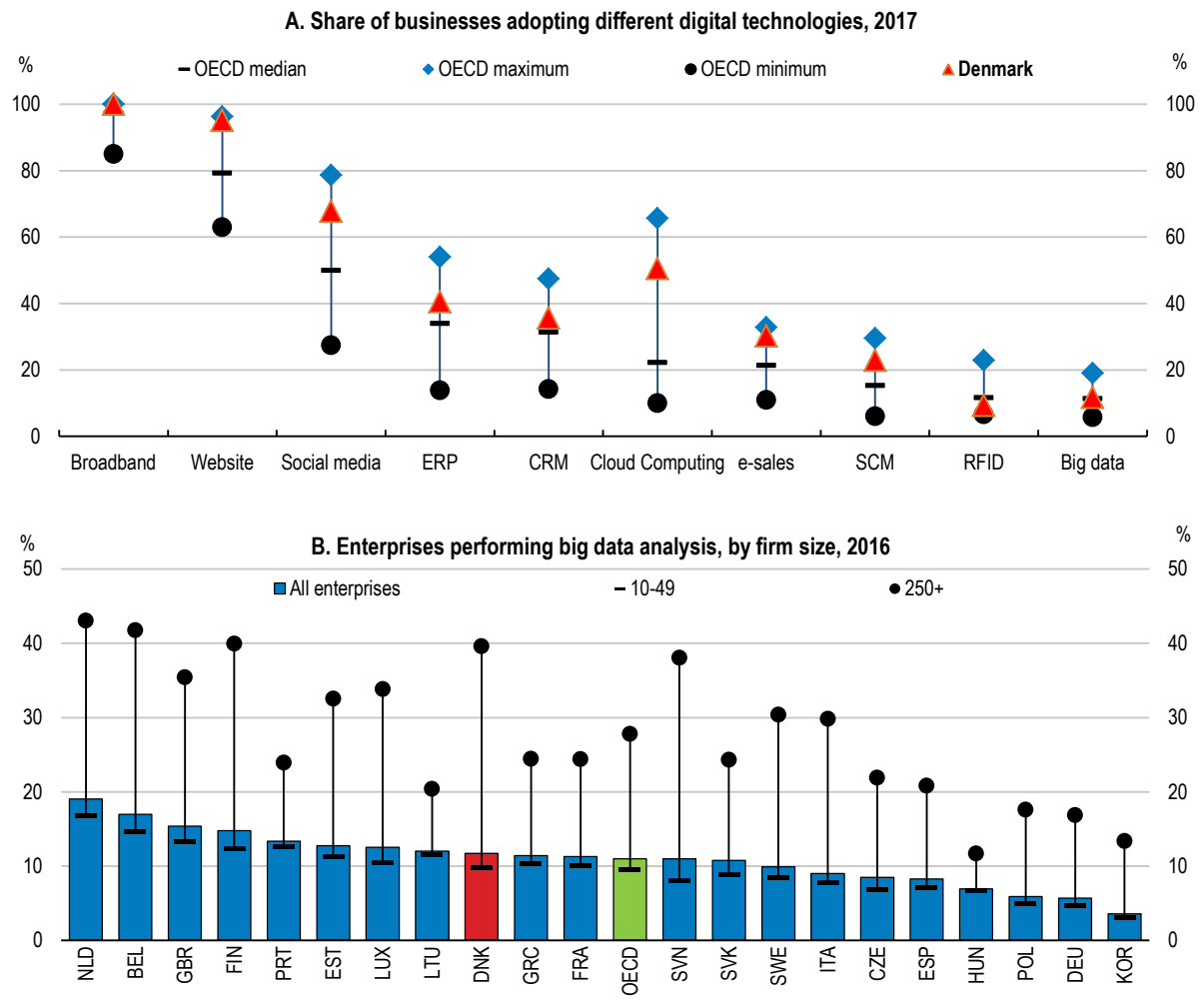
The digital transformation not only offers new technological and business opportunities, it also facilitates communication and knowledge sharing, which in turn leads to a higher pace of innovation and technological change. Digitalisation brings opportunities for the business sector and is likely to be a major driving force of future productivity growth. Digital technologies also pose new challenges for taxation, digital security and data privacy, which have to be addressed in order to favour trust in these technologies without which a large uptake cannot take place.

Boosting digital adoption in firms to spur productivity growth

Although Denmark is a highly digitalised country, the use and implementation of new digital technologies by businesses remains a challenge, especially for small firms. The diffusion of basic digital technologies such as broadband connection or having a website is almost complete. Firms are relatively less advanced in the adoption of more advanced technologies such as the use of enterprise resource planning or customer relationship management software, radio frequency identification technology or big data analysis (Figure 1.27, Panel A) (Statistics Denmark, 2018[84]; Højbjerre Brauer Schultz, 2017[85]). These technologies are likely to boost productivity, not only within the adopting firm but also in other firms thanks to spillover effects (Andrews, Nicoletti and Timiliotis, 2018[86]).

As in most OECD countries, SMEs are lagging behind in ICT usage (Figure 1.27, Panel B) (OECD, 2017[17]; Danish Ministry of Industry Business and Financial Affairs, 2017[87]), which might be due not only to lower investment capacity but also to lower ability to use and benefit from technologies.

Figure 1.27. Adoption of digital technologies is uneven across technologies and firm size



Note: In Panel A, data cover 26 OECD countries and correspond to the share of businesses with ten or more employees with broadband connection (fixed or mobile); with a website or home page; using social media; using Enterprise Resource Planning (ERP) software; using Customer Relationships Management (CRM) software; purchasing cloud computing services; receiving orders over computer networks; sharing electronically SCM information with suppliers and customers; using Radio Frequency Identification (RFID) technology; and having performed big data analysis (2016 data).
Source: OECD ICT Access and Usage by Businesses Database; OECD Digital Economy Outlook 2017.

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Indeed, a number of studies conducted on firm level data suggest sizeable potential productivity impacts from adopting new ICT and digital technologies (OECD, 2018[88]). In the case of Denmark, all three components of ICT spending (hardware, software and communication equipment) have generally increased productivity at the firm level

(Box 1.5). This is in line with previous results, showing that Danish ICT intensive firms are more likely to engage in innovation activities and have higher productivity for the period 2007-2010, with a significant part of this being explained by ICT-induced innovation (Fosse, Jacobsen and Sørensen, 2013[89]). Likewise, among Danish firms with at least 20 employees the more digitalised firms generate a larger share of value added from exports and have 6% higher productivity than less digitalised firms on average, controlling for differences in size, industry, and capital stock (Danish Ministry of Industry Business and Financial Affairs, 2017[87]).

Given that differences in technology adoption are likely to result in differences in productivity performance, policy makers should aim to reduce obstacles to technology investments and digital diffusion. Ensuring global connectivity for all is an important first step, but fostering complementary investments in knowledge-based capital such as R&D, digital and managerial skills, and organisational change, especially in SMEs are also necessary. Findings from recent analysis suggest that even if expected gains are lower than in other countries, there is scope for policy to raise firms' incentives to adopt digital technologies, in particular by further reducing employment protection legislation (Box 1.7).

Box 1.7. How much scope for structural reform to boost digital adoption in firms in Denmark?

Overview of the framework

Recent OECD research has identified structural and policy factors that may accelerate the adoption of digital technologies by firms (Andrews, Nicoletti and Timiliotis, 2018[86]). The study analyses three sets of digital technologies that are far from a complete diffusion rate and that are likely to be relevant for productivity growth within firms: Cloud Computing (distinguishing standard and advanced use), Enterprise Resource Planning (ERP) software and Customer Relationship Management (CRM) systems.

The policy factors considered include managerial practices, education and training, product market regulations (PMR), employment protection legislation for regular contract (EPL), insolvency regimes and risk capital markets. Economic effects of policy reforms are captured by comparing industries that are naturally more or less exposed to them (depending for example on the level of firm turnover rate or knowledge intensity), following Rajan and Zingales (1998[90]). The industry-level data applied covers 25 European countries.

Effect of reforms on digital adoption rates

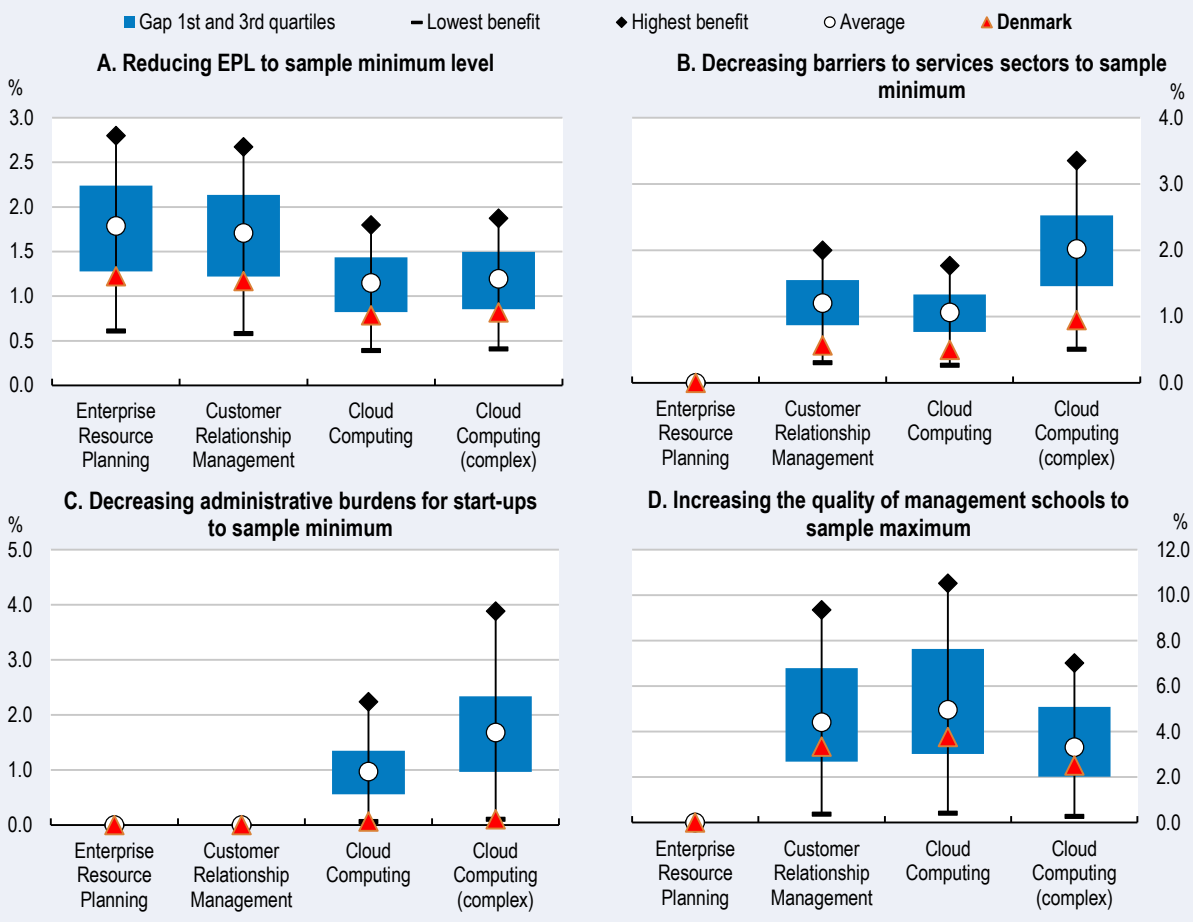
This framework can be used to tentatively simulate the potential benefits of changes in selected structural and policy factors on adoption rates of various digital technologies. Figure 1.28 presents the estimated gains in adoption of high versus low exposed industries of a move to the best practice observed in the sample for Denmark and other countries included.

Compared to other countries, Denmark has relatively low scope to boost digital adoption through reforms to reduce administrative burdens for startups. Some sizeable gains in terms of digital adoption may be achieved by reducing the strictness of employment protection on regular contracts, i.e. the regulation of individual and collective dismissals, or increasing the (perceived) quality of management schools, even if expected gains are lower than in

the other countries. Reducing EPL to the level of the United Kingdom would for example reduce the difference in adoption rate of ERP software between highly exposed industries and marginally exposed industries by around 1.2 percentage point.

Figure 1.28. Potential increase in digital adoption rate from structural policy reforms

Differential impact between industries with high and low exposure to the policy



Note: The graphs show the ceteris paribus differential increase in digital adoption rates from decreasing EPL (Panel A), barriers to services sectors (Panel B), and administrative burdens for startups (Panel C) to sample minimum; or increasing the quality of management school (Panel D) to sample maximum between industries with high (i.e. 75th percentile) and low (i.e. 25th percentile) turnover rates (Panel A, B, C) or knowledge intensity (Panel D). Effects that are not significant are reported as nil.
Source: Calculations based on Andrews, Nicoletti and Timiliotis (2018[86]).

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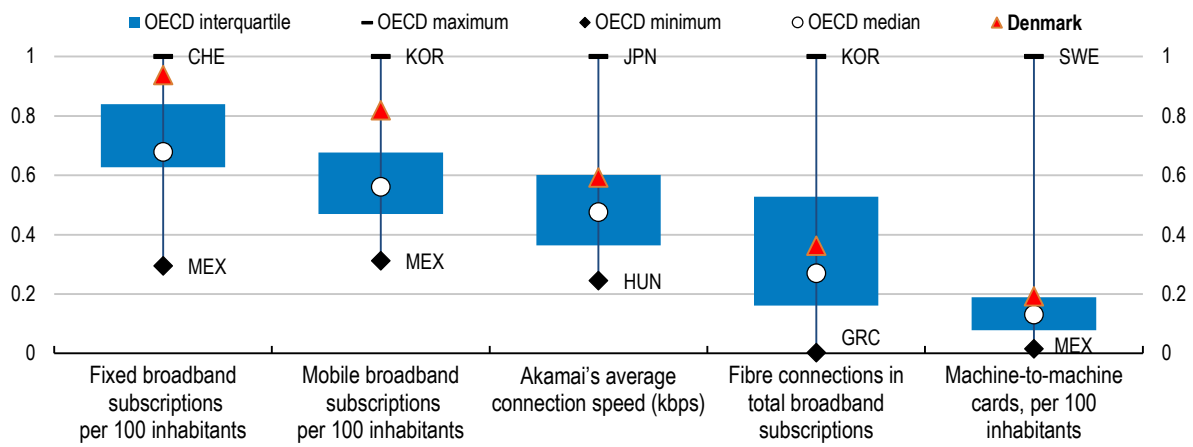
Fostering high-quality digital infrastructure

The broadband infrastructure is highly developed, ranging in the top quartile of OECD countries for fixed and mobile subscriptions per inhabitant (Figure 1.29). This enables a widespread use of digital technologies, with few differences across age groups, gender or geographical areas (OECD, 2017[17]). Yet, with respect to the deployment of high-speed

connection (such as fibre-subscriptions) or machine-to-machine subscriptions, Denmark ranks below neighbouring countries. The Government has taken a number of initiatives aiming at increasing the coverage and speed of broadband connection, which take as a point of departure that broadband development should be market-driven and regulation should be technology-neutral. These initiatives are welcome, although complementary initiatives may be necessary to allow the deployment of most advanced technologies, where Denmark is lagging. For instance, the deployment of Internet Protocol version 6 needs to be strengthened in the longer term to allow the uptake of the next wave of digital technologies (Box 1.8).

Figure 1.29. Digital access is high, but deployment of the latest technologies is low

Access to digital infrastructures, 2016-17



Source: OECD Broadband statistics.

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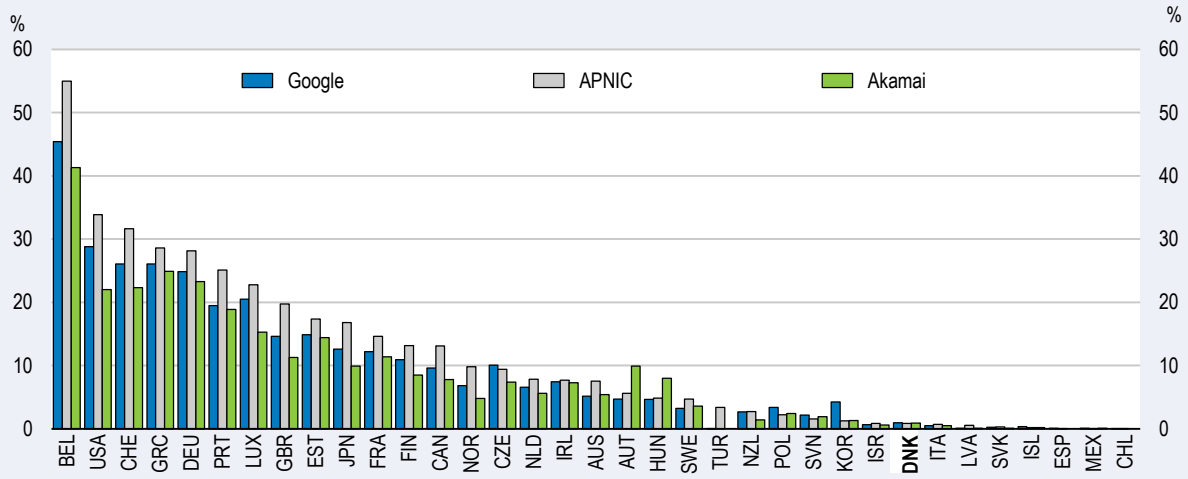
Box 1.8. Preparing for the next waves of digital innovation with the deployment of IPv6

Encouraging the deployment of Internet Protocol version 6 (IPv6) is crucial to prepare the country for future disruptions (Figure 1.30), as this technology will be key to support the proliferation of connected devices and sensor networks and the uptake of the Internet of Things (OECD, 2017[17]).

Figure 1.30. IPv6 adoption is very low in Denmark

Country adoption of Internet Protocol version 6 (IPv6), 2016



Note: Country adoption of IPv6 in 2016 according to three different methodologies.
Source: OECD Digital Economy Outlook 2017.

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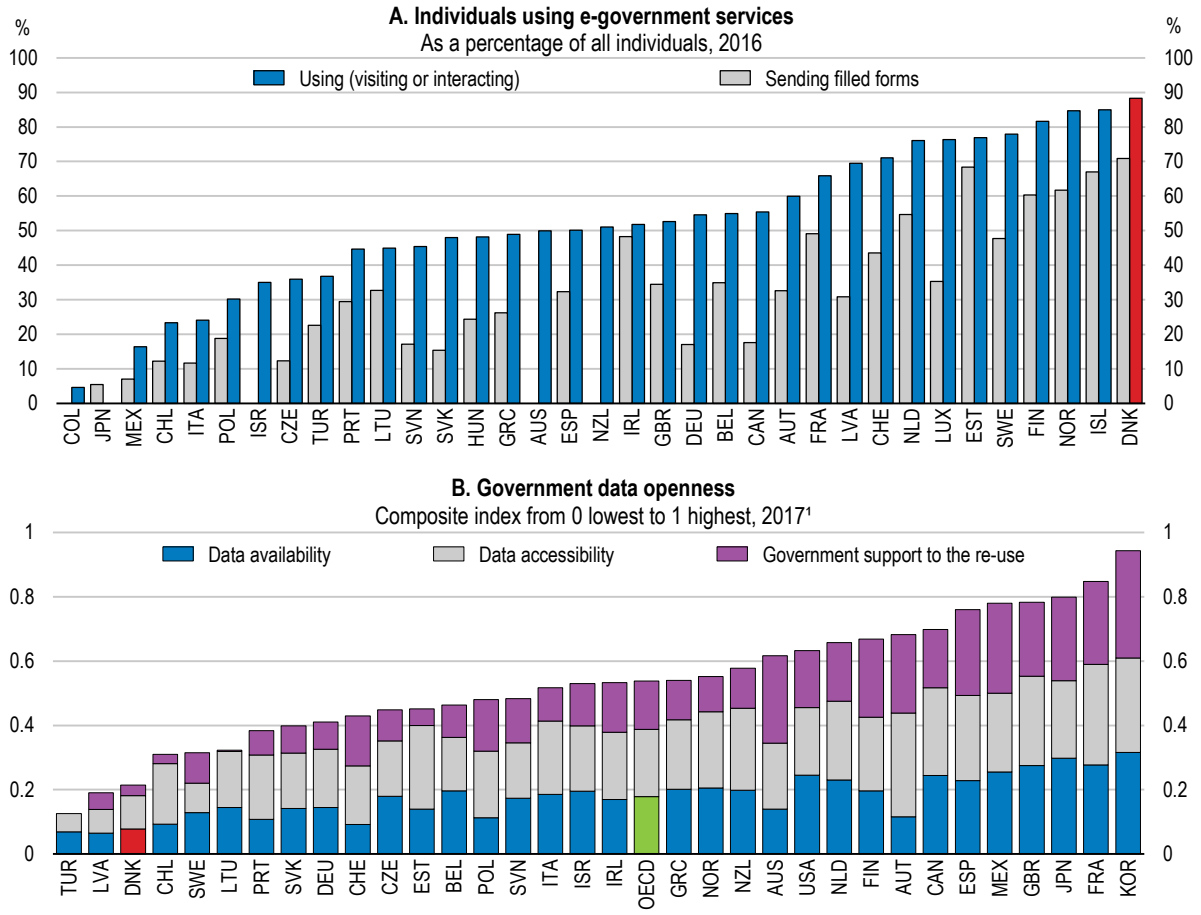
The Government can play a role as a large user by requiring equipment that is compatible with this new standard, which may in turn facilitate the development of human capital related to the deployment of this technology and indirectly stimulate private investment (OECD, 2014[91]). In the United States, for example, the Government has mandated adoption of IPv6 first within the Department of Defence and later in other federal agencies. In Sweden, the Government has established a goal that all Swedish authorities and municipalities should be reachable over IPv6 and launched a program of informational awareness in the public sector, providing practical information on how to deploy on IPv6 (OECD, 2014[91]; Hersaeus and Svahn, 2011[92]).

Favouring superior digitalisation of the public sector and open government data

Although the public sector is highly digitalised in terms of interactions of individuals with e-government services, further initiatives on digital government are needed to improve current practices and procedures regarding open government data (Figure 1.31). In 2012 Denmark launched a basic-data initiative, focusing on providing free and easy access to basic data registries such as geographic and real property data, both for public sector units and businesses. While more data is gradually being made available, other countries have managed to make a wider range of government data freely accessible in one platform. For

instance, Canada, France and the United Kingdom provide access to data on prices, quantities and outcomes in areas such as transport, law and justice and agriculture.

Figure 1.31. Denmark is a frontrunner in e-government use but lags in data openness



1. Responses represent countries' own assessments of current practices and procedures regarding open government data. Data refer only to central/federal governments and exclude open government data practices at the state/local levels.
Source: OECD Digital Economy Outlook 2017; OECD Survey on Open Government Data.

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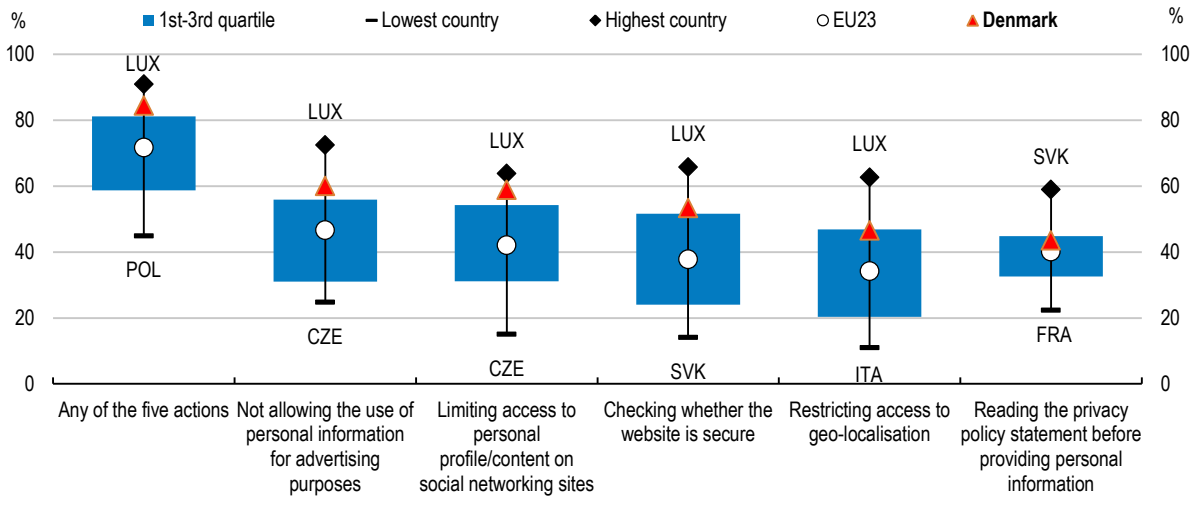
Recent digital initiatives by the Government (Box 1.4) aim at fostering further open access to public-sector basic data, in particular by making more public data available (e.g. weather data) and investing in technologies (e.g. cloud computing and artificial intelligence) to reuse these data. This should create new opportunities for research or innovation, including by businesses. Indeed, given the long history of building register-based data and the wealth of data collected, Denmark should do more in this area since it could foster innovative services to the benefit of households. Early adopters of open government data initiatives, such as Korea, France, the United Kingdom or the United States have been able to introduce and implement a large range of policies to promote data availability, accessibility and re-use. One concrete initiative is to organise, as is the case in France, working groups with private sector and civil society organisations to discuss platform design.

Favouring trust in the new digital economy

Public acceptance of innovation and new technologies is in general high. Denmark has the highest share of positive views of robots and Artificial Intelligence among EU countries (European Commission, 2017[93]). Nonetheless, fostering the diffusion of new technologies will require investments to address security and privacy issues associated with these technologies. While Danes generally have a positive attitude towards new technologies, they tend to be more concerned than the EU average by security issues and the treatment of their personal information on the Internet (Figure 1.32) (OECD, 2017[17]; European Commission, 2017[93]). This represents an obstacle to the uptake of new types of services enabled by the digital technologies, in particular e-commerce.

Figure 1.32. Use of personal information on the Internet is a concern in Denmark

As a percentage of internet users, 2016



Note: The sample contains 23 EU countries covered in the Eurostat, Digital Economy and Society Statistics, Comprehensive Database and represents individuals aged 16-74. For example, in Slovakia, 60% of internet users aged 16-74 are reading the privacy policy statement before providing personal information.
Source: OECD calculations based on OECD STI Scoreboard 2017.

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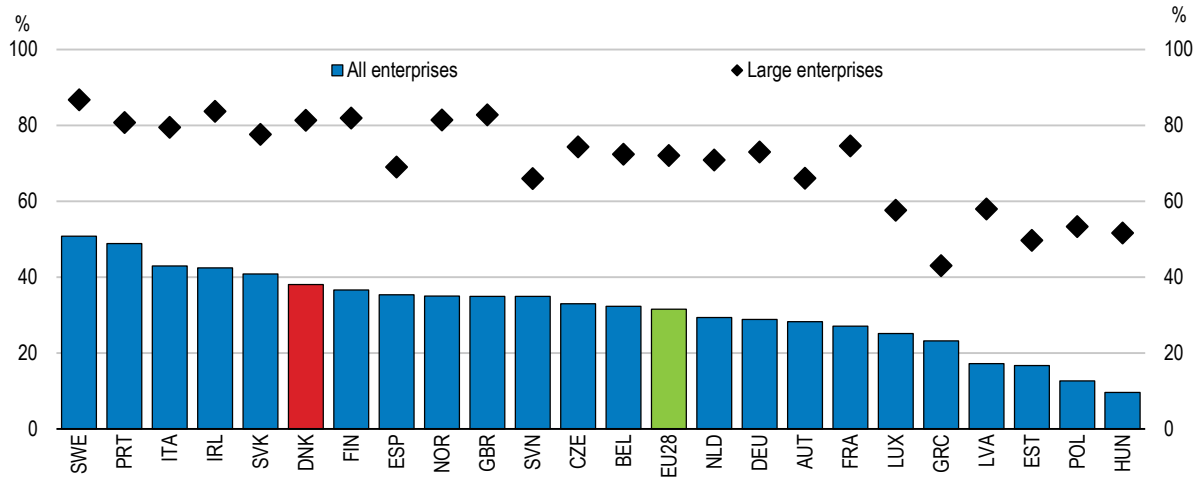
The 2018 Digital Growth reform package (Box 1.4) contains a number of initiatives to strengthen cyber security in companies, including the creation of a single digital point of entry for reporting of IT security incidents to public authorities. The Government also launched a national strategy for cyber and information security, focusing particularly on institutions that perform functions that are critical to society. The successful implementation of this new strategy will be crucial to increase trust in digital technologies and to pave the way for better awareness of cybersecurity issues in the business sector, which is missing especially in small firms (Figure 1.33). Furthermore, the Government has appointed an expert group to provide recommendations on ethical and responsible use of data by businesses and announced the intention to set up a permanent Data Ethical Council (Box 1.4).

Figure 1.33. Formally defined security policies are mostly present in large firms

As percentage of enterprises in each employment size class, 2015



Source: OECD STI Scoreboard 2017.

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Overlooking the social consequences of disruptive technologies is likely to bring resistance to innovation, with uncertain political and economic consequences (OECD, 2017[17]; Korinek and Stiglitz, 2017[94]). Trust in the new technologies can also be increased through social measures that accompany disruptions. Given its extensive welfare system, Denmark is in a good place to play a pioneering role in developing social safety nets for the new economy. Inclusion and cooperation with social partners have so far supported the digital transformation well, with for example the world's first collective agreement for the platform economy recently signed between a Danish platform for cleaning in private homes (Hilfr.dk) and the largest trade union (3F) (Fagbladet 3F, 2018[95]). The Government also has a role to play and should pursue efforts to integrate these new types of business models into its tax and labour laws, as already initiated with the strategy for the collaborative economy in 2017. This approach will help increase trust and in turn facilitate the uptake of new types of services provided by these new technologies.

Building skills to keep up with technological disruption

New technologies and globalisation are changing labour markets, creating new forms of work and new skill needs in a "technology-rich environment" (Andrews and Westmore, 2014[96]; Pellegrino and Zingales, 2017[97]; Bloom et al., 2012[98]), but also displacements and a need for adapting labour market policies (OECD, 2017[99]). Automation and disruptive technologies could fundamentally change many jobs in the future, albeit only a relatively low share of around 10% are estimated to face high risk of automation in Denmark (Nedelkoska and Quintini, 2018[100]), reflecting the already high level of digitalisation. Polarisation of the labour market has been observed in Denmark as in most OECD countries, with indications of skill mismatches as tertiary graduates have dominated the rise in low-skill jobs (see Key Policy Insights).

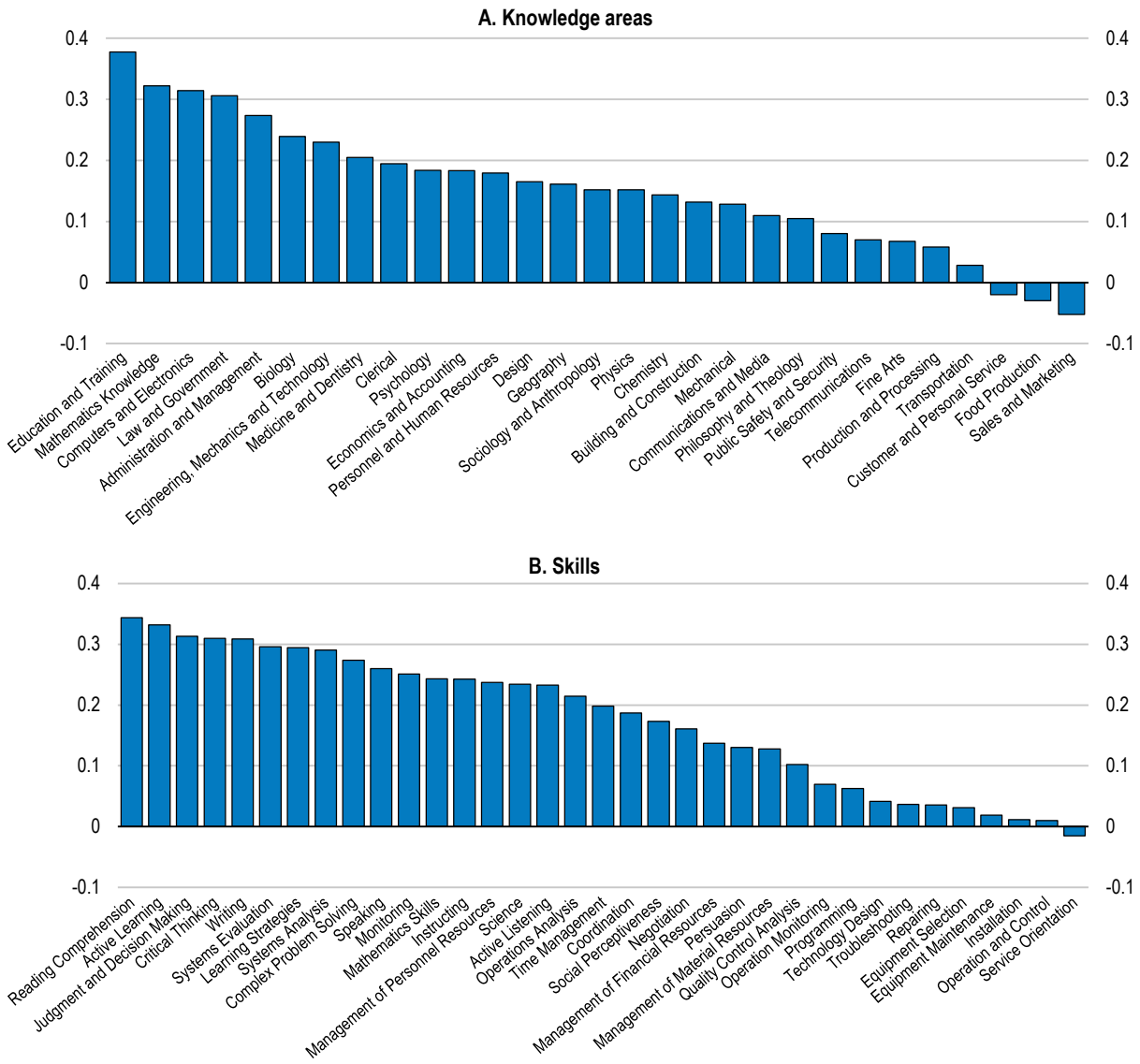
Skills for the future

New technologies and their increasing use in the business sector have in particular raised the demand for complementary skills, such as management and communication skills (OECD, 2016[101]; OECD, 2017[29]; OECD, 2016[102]). The rapid pace of innovation calls for moving towards a more flexible education system. Curricula need to target the future demands of the labour market and provide students with general skills, which will enable them to adapt to a changing work environment.

Denmark is currently facing difficulties to meet labour demand for certain skills, with a comparatively low share of high-skilled labour in the private sector. Skills shortages are observed in various knowledge areas such as education and training, mathematics and computer and electronics (Figure 1.34) (OECD, 2017[103]).

Figure 1.34. Knowledge areas and skills in shortage and surplus in Denmark

2015



Note: Positive values represent shortages (e.g. unsatisfied demand in the labour market for the analysed dimension). Negative values represent surpluses (supply exceeds demand in the labour market for the analysed dimension). Results are presented on a scale that ranges from -1 to +1. The maximum value represents the strongest shortage observed across OECD (31) countries and knowledge areas.
Source: OECD Skills for Jobs database (2018).

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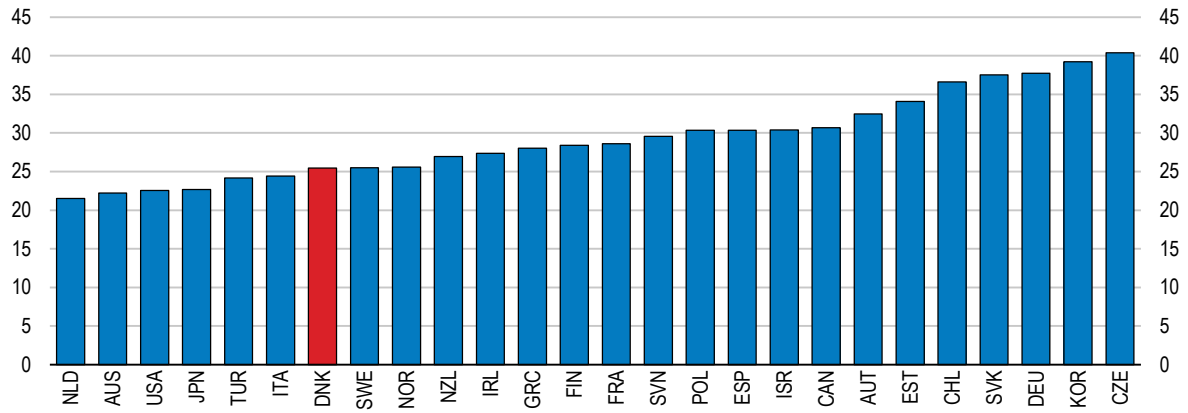
Around one fourth of all job openings in the private sector requires skills in IT and science, technology, engineering and mathematic (STEM) (Højbjerre Brauer Schultz, 2018[104]). While the share of the adult population with tertiary education is slightly above the OECD average (OECD, 2017[105]), fewer students are choosing STEM as their field of education than in other OECD countries (Figure 1.35). At the same time, a relatively high share of

youth enters the labour market with low qualification levels (Deloitte/Kraka, 2017[73]; Maibom, Rosholm and Svarer, 2014[106]; Andersen, 2017[107]).

Figure 1.35. The share of STEM graduates is low

Tertiary educated adults with STEM as a % of 25-64 year-old non-students, 2015 or latest available year



Note: STEM refers to science, technology, engineering and mathematics subjects.
Source: OECD Survey of Adult Skills (PIAAC) (2013; 2016).

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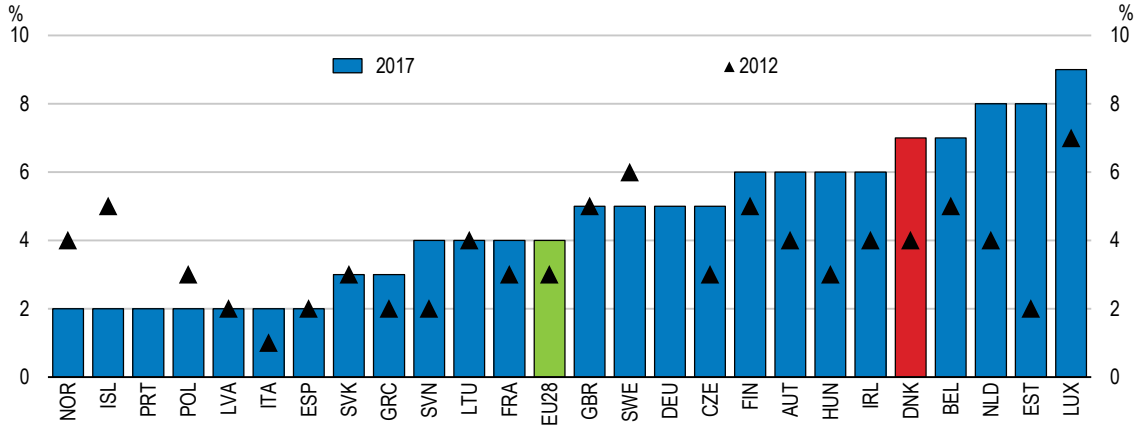
The share of firms facing difficulties in filling vacant positions of ICT specialists is among the highest in OECD countries (Figure 1.36). Businesses' difficulties to attract ICT specialists is likely related to the fact that the returns of ICT-task intensive jobs, and returns to skills in general, are low compared to other countries (Figure 1.37). This partly reflects the relatively low wage dispersion in Denmark and low income inequality in general. At the same time, labour market and productivity returns may also be higher in other sectors such as health and social sciences (Danish Ministry of Finance, 2014[108]).

Figure 1.36. ICT skills shortage is significant and increasing

Percentage of firms reporting they had hard-to-fill vacancies for jobs requiring ICT specialist skills



Note: All enterprises with 10 or more employees, excluding the financial sector.
Source: Eurostat, Information Society database, 2018.

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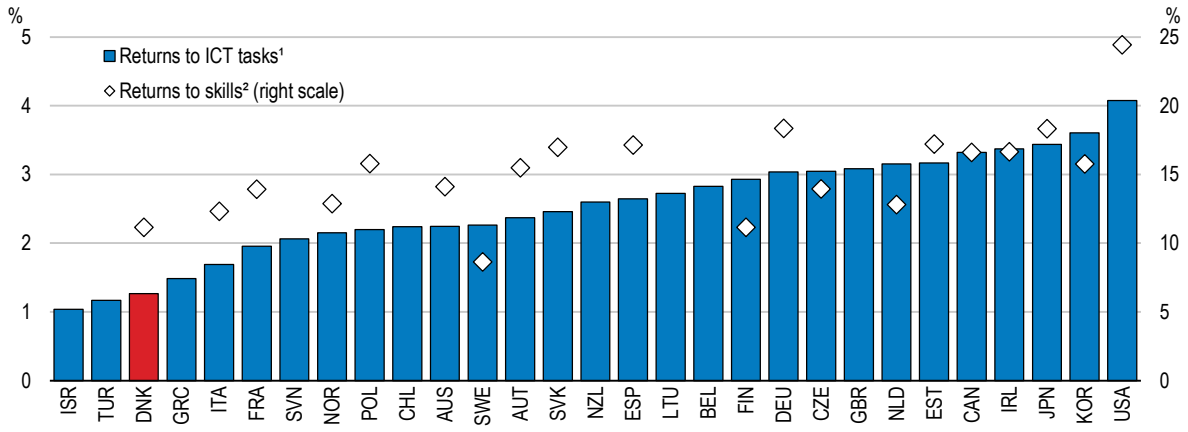
Figure 1.37. Labour market returns to ICT tasks are relatively low

Percentage change in hourly wages for a 10% increase in ICT task intensity, 2012



1. Percentage change in hourly wages for a 10% increase in ICT task intensity. The detailed methodology can be found in Grundke et al. (2018[109]). Labour market returns to task intensities are based on OLS wage regressions (Mincer equations) using data from the OECD Survey of Adult Skills (PIAAC).
2. Percent increase in hourly wages for a standard deviation increase in numeracy. Data show the coefficients on numeracy scores from country-specific regressions of log hourly wages (including bonuses) of wage and salary earners (in PPP corrected USD) on proficiency scores standardised at the country level.
Source: OECD STI Scoreboard 2017, based on the Survey of Adult Skills (PIAAC) database; OECD Employment Outlook 2015.

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Overall, a possible skill shortage of 110 000 persons (around 4% of total employment is projected by 2025 (Iversen, Stephensen and Hansen, 2016[110]), including a shortage of workers with a vocational education. In order to address this issue, the education and tax systems need to encourage students to choose fields of education that are in line with their abilities, to complete education in a reasonable time, but also to focus on occupations in high demand. The quality and relevance of the vocational education system needs strengthening. Graduates with vocational education are on average 28 year old, among the oldest across European countries (OECD, 2017[105]), and dropout rates are relatively high.

The Government has initiated a wide scale reflection on how to improve the education system and make it more relevant for the labour market by reforming the university funding system and better targeting labour market demand and future skill needs in education (Danish Ministry of Higher Education and Science, 2018[111]). An agreement was passed in December 2017 to reform university funding based on quality and outcomes of students (with a basic allocation of 25% fixed upon the present budget level, an activity allocation of 67.5% and an outcome-oriented allocation of 7.5%), which will be effective from January 2019. In April 2018, the Government also launched a Technology Pact (Box 1.4) aiming to raise the number of STEM graduates in collaboration with companies, educational and research institutions.

While these initiatives are welcome, they will take time to materialise into tangible outcomes. Further reforms could be considered, including raising the share of funding attributed to programmes reaching good labour market outcomes. Complementary measures on the education system would help supporting labour market demand, such as evaluating the supply of tertiary educations to simplify and reduce the large number of

specialised entrances (currently more than 1000 programmes are offered) and providing clear information on employment opportunities for prospective students as recommended by a recent review (Danish Ministry of Higher Education and Science, 2018[111]).

Sizeable public resources are allocated to education, elevated by the absence of tuition fees and provision of very generous student grants (830 EUR per month per student before taxes in 2019), exceeding levels in other Nordic countries. Such high levels of grants are likely to exceed the level justified by market failures and have distortive implications for society, as highlighted in recent analysis by the Danish Economic Councils (2018[112]). Reducing student grants and relying more on favourable student loans should be considered. Such reform could free resources for e.g. more investment in the quality of education, for instance increasing teaching hours or other measures to reduce dropout (Danish Ministry of Higher Education and Science, 2018[111]). It would also raise labour supply by motivating students to complete education in designated time and could enhance incentives to choose education fields in stronger demand and with higher wages.

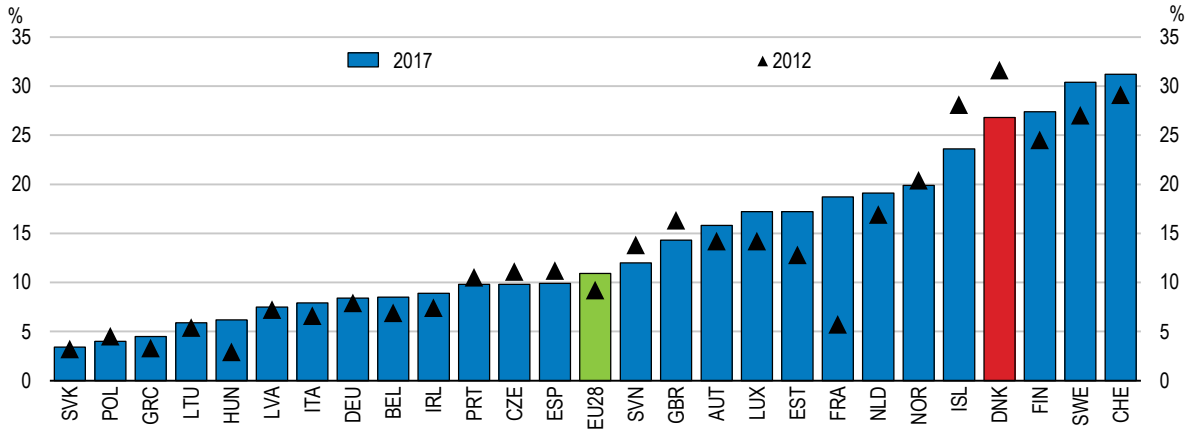
Concerns prevail that universal access to education and social mobility would suffer from reducing student grants to higher education. Yet, analyses by the Danish Economic Councils (2018[112]) suggest that the impact would be very limited in Denmark, as a 10% reduction in the grants level is estimated to only reduce the share completing tertiary-education from 75% to 74.7% of the group of youth having completed upper secondary school. To secure equal access to education for all and avoiding indebtedness, an extended repayment period linked to subsequent income and labour market status could be considered as in e.g. Australia and the New Zealand (OECD, 2017[105]). The Government has recently established an expert group, which will examine the grant system and its effect on educational attainment and social mobility, expected to finish its work during 2019.

Ensuring effective upskilling and lifelong learning

Fostering upskilling and lifelong learning is critical to help employees at risk of automation or disruptive change to acquire the new skills needed, which are likely to be different from the ones acquired in past training and accumulated firm-specific human capital (Nedelkoska and Quintini, 2018[100]). The participation rate of Denmark's adult population in lifelong learning (formal or non-formal education and training) remains among the highest in the OECD countries, but it has been decreasing over the past five years, falling behind other Nordic countries (Figure 1.38). While this might indicate low incentives for the unemployed to undertake training in a context where employment opportunities improve, it is crucial to continue efforts and to cooperate with employers to maintain high participation in lifelong learning in a cost-efficient way. In this view, the tripartite agreement reached between the Government and social partners in October 2017 to build a strengthened and more flexible adult education and training system is welcome (see Key Policy Insights).

Figure 1.38. Participation in life-long learning is high but decreasing

Percentage of adult population (age 25 to 64) participating in learning



Note: The indicator measures the share of the population aged 25 to 64 who stated that they received formal or non-formal education and training in the four weeks preceding the survey (numerator). The denominator consists of the total population of the same age group, excluding those who did not answer to the question 'participation in education and training'. Adult learning covers formal and non-formal learning activities, both general and vocational, undertaken by adults after leaving initial education and training.
Source: Eurostat, based on the EU Labour Force Survey.

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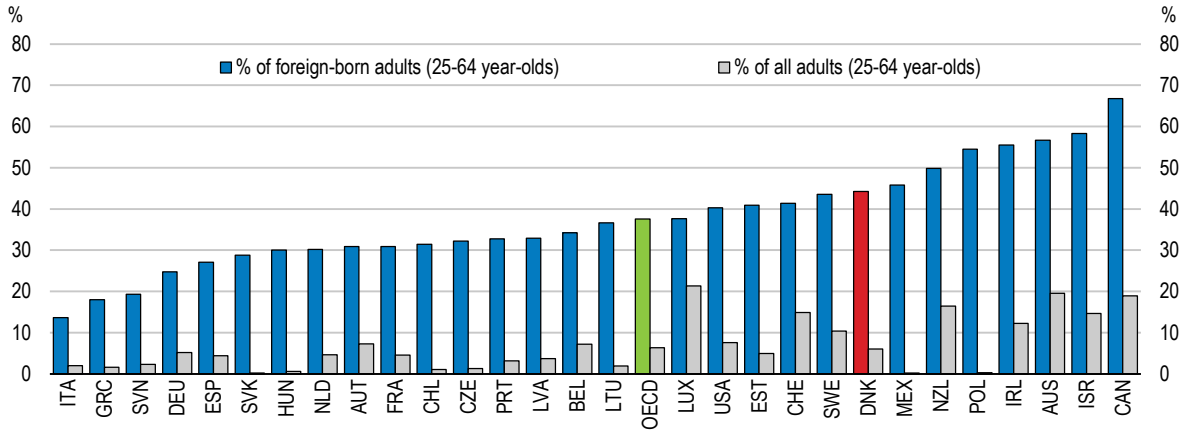
Easing access to skilled foreign workers

Danish firms are increasingly relying on foreign workers to satisfy labour demand. The number of immigrants who have come to Denmark for work reasons has increased significantly since the 2000s, which has played an important role in avoiding the capacity constraints experienced in previous upturns (see Key Policy Insights). These foreign workers are mainly EU citizens who can reside and work in Denmark under EU regulations and are mostly low-income workers (Danish Economic Councils, 2017[113]; Danish Ministry for Economic Affairs and the Interior, 2017[114]). However, as economic conditions have improved, especially in Eastern European countries, recruitment is becoming more difficult. Attracting high-skilled foreign workers, from EU and non-EU countries, is essential as it not only can help to address the skills shortage, but may also boost productivity within firms (Malchow-Møller, Munch and Skaksen, 2017[115]).

Restrictions on access for non-EU workers have contributed to raise the average qualification profile of immigrants. For example, 44% of foreign-born adults were tertiary educated in 2017 (Figure 1.39). Nonetheless, the proportion of high-skilled immigrants in the working-age population remains relatively low compared to other countries. The proportion of foreign-born workers with a tertiary education is similar to Sweden, but in total they represent a much higher share of the working-age population in Sweden (12% versus 6%) (Figure 1.39).

Figure 1.39. A large proportion of foreign-born adults are highly educated, but they represent a small proportion of the total population

Tertiary-educated foreign-born adults, 2017



Source: Calculations based on OECD Education at a Glance 2018.

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Recent policy changes have tightened the entry conditions for non-EU workers. In 2016, the Green Card scheme was abolished and the wage floor for entering through the "Pay Limit Scheme" was raised (*beløbsordningen*, allowing access to the Danish labour market to foreigners who have been offered a job with a yearly salary of minimum EUR 57 000 without any requirement on educational background or professional field). Stricter rules for salary calculation (exclusion of fringe benefits) and additional requirements to use a Danish bank account were introduced in 2017, which tend to significantly raise the administrative burden on firms and workers. Preliminary evaluations show that the two tightenings have resulted in a decline in entry and procedures have become more lengthy and complicated (Danish Ministry of Finance, 2018[116]; Danish Ministry of Immigration and Integration, 2018[117]). In addition, instability in the legislation creates uncertainty for foreigners who envisage working in Denmark as well as for the firms who envisage recruiting them.

The Government is currently exploring options for revising the visa schemes to ease access for high-skilled non-EU workers. Other countries have moved in the same direction by loosening entry conditions on existing schemes or creating new ones (OECD, 2017[118]). For example, in Japan the waiting period for permanent residence has been reduced for top-scoring foreigners in its points-based system. Recent changes have also been introduced to attract investors and entrepreneurs in Australia, Canada, Chile, France, Korea, Spain and New Zealand.

In a context of tightening capacity constraints and ageing, incentives to attract foreign workers should be strengthened. Denmark should assess whether the current visa schemes for non-EU workers sufficiently address skill needs and take necessary steps. The Pay Limit Scheme is the most used, reaching 6 000 permits in 2017, yet the visa permit system offers a number of options, which may be simplified and made more efficient. In this context, lowering the top marginal income tax rate, as discussed above, would also raise the incentives for high-skilled foreign workers to come and work in Denmark.

Box 1.9. Recommendations

(Key recommendations are in bolded text)

Competition and regulation

- **Provide greater power to competition authorities to impose administrative fines and structural remedies within constitutional constraints**.
- **Develop clearer standards for exemptions from the Competition Act and involve competition authorities in their determination**.
- Proceed with revisions of regulatory frameworks to make them technology-neutral and monitor fast evolving sectors to swiftly respond to emerging market failures.

Taxation and access to finance

- **Reduce top marginal tax rates on labour and capital incomes. Withdraw reduced inheritance taxation for family-owned businesses.**
- **Implement an allowance for corporate equity (ACE) in the corporate income tax, accompanied by a sufficient anti-avoidance framework**.
- Review financial regulation for pension funds to remove barriers for investments in the domestic equity market, including innovative startups and SMEs through investment funds.

Innovation

- **Broaden public support to business R&D through well-designed R&D grants and tax credits for incremental R&D expenses**.
- Improve collaboration between universities and businesses by reducing the complexity of the system regulating cooperation, and improving intellectual property right policies of universities.

Technology adoption

- Deploy key enabling technology standards in the public sector and make government data more available and usable.
- Raise awareness and education for digital risk management in businesses.

Skills

- **Reduce student grants for tertiary education and rely more on student loans. Link repayment conditions to subsequent income and labour market status**.
- **Assess whether the current visa schemes for non-EU workers sufficiently address skill needs and consider simplifying entry procedures**.

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(10 2019 10 1 P) ISBN 978-92-64-31035-3 – 2019

OECD Economic Surveys

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Living standards and wellbeing are high in Denmark. Economic conditions have improved in recent years and the steady expansion is projected to continue. A prolonged series of pension and benefit reforms has delivered sound public finances and strengthened potential growth, among others by indexation of statutory retirement ages to life expectancy. Improving public sector efficiency remains a challenge and would benefit from further digitalisation and reform of collective bargaining. Danish firms are close to the technological frontier thanks to digitalisation and favourable business framework conditions. Nonetheless, productivity growth has been disappointing in the recent past with a particular weakness in less knowledge-intensive service industries. Boosting productivity growth is essential to ensure that living standards and wellbeing remain high. This requires further improving business framework conditions, notably competition pressures. Policy needs to embrace innovative technologies by leaning against attempts to discourage or exclude them and by tackling unintended or outmoded obstacles in legislation and regulation. Reducing high marginal taxes, broadening innovation activity and attracting more high-skilled foreign workers are also priorities.

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Volume 2019/1
January 2019

OECD*publishing*
www.oecd.org/publishing

ISSN 0376-6438
2019 SUBSCRIPTION
(18 ISSUES)

ISBN 978-92-64-31035-3
10 2019 10 1 P

9 789264 310353