OECD Economic Surveys
DENMARK

JANUARY 2012

OECD

OECD Economic Surveys: Denmark 2012

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

Please cite this publication as:
OECD (2012), *OECD Economic Surveys: Denmark 2012*, OECD Publishing.
http://dx.doi.org/10.1787/eco_surveys-dnk-2012-en

ISBN 978-92-64-12678-7 (print)
ISBN 978-92-64-12679-4 (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)

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

Photo credits: Cover © iStockphoto.com/Arpad Benedek.

Table of contents

Tables

Figures

This Survey *is published on the responsibility of the Economic and Development Review Committee (EDRC) of the OECD, 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 30 November 2011. The draft report was then revised in the light of the discussions and given final approval as the agreed report of the whole Committee on 16 December 2011.

The Secretariat's draft report was prepared for the Committee by Stéphanie Jamet and Muge Adalet-McGowan under the supervision of Vincent Koen. The draft has benefited from background research by Jean-Marc Burniaux, consultant. Research assistance was provided by Lutécia Daniel.

The previous Survey *of Denmark was issued in November 2009.*

Information about the latest as well as previous Surveys and more information about how Surveys are prepared is available at www.oecd.org/eco/surveys.

BASIC STATISTICS OF DENMARK

THE LAND

Area (km^2)	
Total	43 098
Agricultural	26 630

Population of major urban areas (thousands, 2011)	
Copenhagen	1 199
Århus	250
Odense	168
Ålborg	104

THE PEOPLE

Population (thousands, 2011)	5 561
Inhabitants per km^2	129
Average annual net population growth (2000-10)	8.4

Total employment (thousands, 2010)	2 793
Percentage of employment in:	
Agriculture	2.7
Manufacturing	11.3
Construction	5.8
Market services	42.9
Community, social and personal services	37.2

THE PRODUCTION (2010)

Gross domestic product	
DKK billion	1 755
Per capita (USD)	56 300

Gross fixed capital formation	
DKK billion	302
Per cent of GDP	17

THE GOVERNMENT

General government, % of GDP (2010)	
Total revenue	55.1
Total expenditure	57.8
Public consumption	29.1
Gross fixed capital investment	2.1
Public debt (Maastricht definition)	43.4

Composition of Parliament (December 2011)	Number of seats
Liberals	47
Social Democrats	44
Danish People's Party	22
Social Liberal Party	17
Socialist People's Party	16
Red-Green Alliance	12
Liberal Alliance	9
Conservative People's Party	8
North Atlantic	4
Total	179

Last general elections: 15 September 2011

THE FOREIGN TRADE (2010)

Exports of goods and services, % of GDP	50.3
Main merchandise exports (% of total)	
Agricultural products	16.6
Machinery and instruments	24.9
Manufactured articles and goods	24.0
Chemicals and related products	11.3
Petroleum and petroleum products	12.3
Merchandise exported by destination (% of total)	
Germany	28.4
Sweden	17.9
United Kingdom	9.0
United States	8.9

Imports of goods and services, % of GDP	45.1
Main merchandise imports (% of total)	
Agricultural products	11.2
Machinery and instruments	31.4
Manufactured articles and goods	31.1
Chemicals and related products	11.6
Petroleum and petroleum products	10.6
Merchandise imported by destination (% of total)	
Germany	29.9
Sweden	16.5
Netherlands	8.8
United Kingdom	6.9

THE CURRENCY

Monetary unit: Krone

November 2011, monthly average of daily figures	
DKK per USD	5.49
DKK per EUR	7.44

Executive summary

The current international slowdown entails new risks for the Danish economy, which so far had been recovering only slowly and unevenly from the unwinding of a massive domestic property boom and the global crisis that erupted in 2007-08. The main challenge is to secure the necessary space for policies to cope with potential further adverse shocks by sticking to the current plans and to bring about strong, sustainable and greener growth. The economy displays a number of strengths. The fiscal position is relatively sound. The flexicurity system helps adjust to shocks while limiting the social cost of unemployment and the risk that it becomes entrenched. The welfare system ensures low poverty and inequality. However, competitiveness has deteriorated in the past decade and productivity growth has been weak, eroding potential growth. Moreover, vulnerabilities remain in the financial sector. Denmark's green growth ambitions might translate into new sources of growth, but energy and climate change policies need to be reviewed to achieve better results at low cost.

- ***Improving financial stability.*** *Further strengthening co-operation between the financial supervisory authorities and enhanced prudential tools, in line with developments at EU level, would improve financial stability. Systemically important financial institutions may need to be subjected to higher capital requirements. Issuance of new deferred-amortisation mortgage loans should be closely supervised to preserve the quality of the assets of mortgage issuers.*
- ***Further encouraging competition.*** *Despite some recent progress, there is ample scope for greater competition in a number of sectors, which would boost productivity growth. Decreasing the number of institutions involved in competition policy and granting them more power would improve their effectiveness.*
- ***Strengthening the fiscal framework.*** *Better control of public expenditure would help to ensure long-term fiscal sustainability without raising the already high tax burden, which acts as a drag on economic growth. This could be achieved by introducing multi-annual spending ceilings at the general government level, covering most spending, and broadening the Danish Economic Council's fiscal monitoring mandate. To ensure that individual municipalities are constrained by expenditure ceilings covering all municipalities, the use of individual and credible sanctions should continue.*
- ***Raising the efficiency of social expenditures.*** *The reform of the early retirement scheme will increase labour supply and strengthen the sustainability of the welfare system. Reducing the share of the working-age population receiving sickness and disability benefits is also crucial to achieve these goals. The authorities will have to ensure that the new senior disability scheme does not lead to a greater uptake of these benefits. The special disabled employment programme (Fleksjob) should also be reconsidered, in particular by making it more targeted and less generous. The efficiency of public spending on education and health care can be improved.*
- ***Towards green growth: improving energy and climate change policies.*** *Regular reassessment of national climate and energy targets in light of international and technology developments would reduce their costs. Supporting technologies in a more neutral way would increase the chances of adopting the best technologies and reduce the risks of costly mistakes. It would be consistent with Denmark's ambitious targets to push for lower emissions caps in future EU negotiations. Hiking some taxes on fossil fuels would help harmonise the implicit price of carbon and encourage GHG emission cuts in the transport and residential sector. Efforts to cut GHG emissions from agriculture should continue.*

Assessment and recommendations

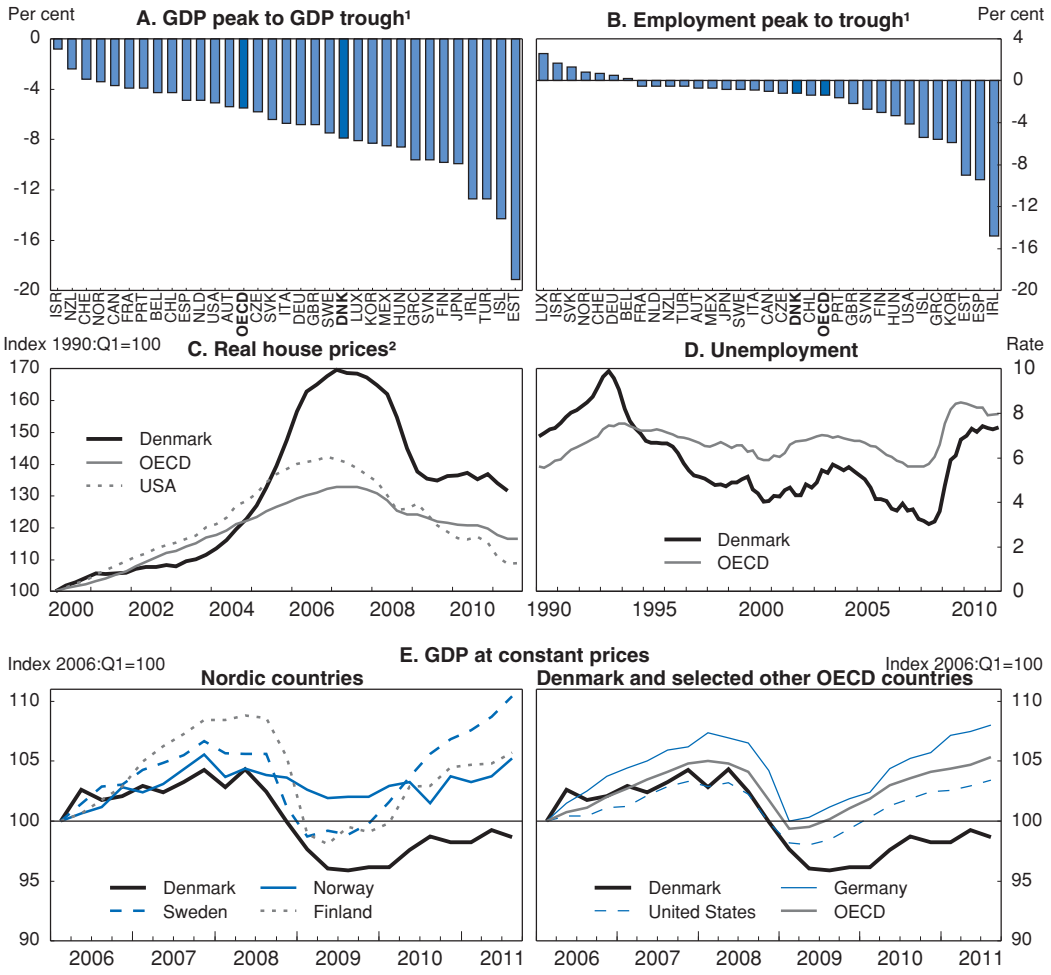
The Danish economy has only partly recovered from the global crisis that erupted in 2007-08 and from the unwinding of a massive domestic property boom, and now faces weakening global activity and confidence amidst acute uncertainty surrounding the euro area crisis. The new government has to make sure it has sufficient leeway to cope with a potential further deterioration in global economic conditions while in a longer-run perspective promoting strong, sustainable and green growth. Denmark's fiscal, labour market and well-being indicators compare favourably with those in many other OECD countries, but productivity growth has long been anaemic and weaknesses remain in the financial sector. Implementing policies to achieve the new government's ambitious goal to raise labour supply is also a key part of the solution.

Reforming the welfare system and strengthening the fiscal framework would help contain public expenditure, thereby making room to deal with future shocks and to avoid increases in the tax pressure, which acts as a drag on productivity growth (Chapter 1). Greater competition in a number of sectors would boost productivity gains. Addressing financial sector vulnerabilities would limit short-term risks and policies should be in place to prevent any future resurgence of the housing market imbalances that contributed to weakening productivity growth in the 2000s. Denmark is focused resolutely on green growth and plans to become independent from fossil fuels by 2050 (Chapter 2). In many respects, this strategy is visionary and it may allow Denmark to benefit from potential new sources of growth. However, as it is also likely to entail substantial economic costs, energy and climate change policies need to be designed efficiently.

The ongoing global economic slowdown clouds Denmark's economic prospects

Following several years of strong but overleveraged growth, the Danish economy started to slow down in 2007 due to binding capacity constraints, eroding competitiveness and the unwinding of a major property boom. This slowdown was amplified in 2008 by the global crisis as exports collapsed in the face of shrinking foreign demand and the financial sector experienced problems. Taking advantage of the country's fiscal wherewithal, the authorities took swift action, easing the macroeconomic policy stance and offering support to the banking system. Even so, Denmark endured an unprecedented economic contraction, with output down by 7.9% from the unsustainably high peak to the trough (Figure 1). Unemployment rose strongly and employment fell abruptly, especially in construction. The increase in unemployment has not been reversed and it remained at 7.4% of the labour force in the third quarter of 2011 (on the harmonised measure). Long-term unemployment has also risen, and accounted for 23% of unemployment in the third quarter of 2011, which, however, remains low in historical and international perspective.

Figure 1. **The Danish economy is still struggling to overcome the crisis**



1. Australia and Poland are excluded as they did not have recessions. The recession shown for Norway is the one that started in 2008.
2. House prices are deflated by the private consumption deflator.

Source: OECD, *Analytical Database*. StatLink http://dx.doi.org/10.1787/888932563419

The Danish economy had not fully recovered from the property collapse and the global economic crisis when renewed economic weakness became apparent in 2011. Following the May 2010 Fiscal Consolidation Agreement, it had been hoped that growth would gradually rely more on private domestic demand and exports. However, stagnant private consumption and lower-than-expected export growth made for a muted recovery through mid-2011 (Table 1). The renewed global slowdown will depress exports and delay the hoped-for pick-up in investment and private consumption. Competitiveness has deteriorated markedly since 2000 and the recent improvements were not sufficient to fully reverse previous losses (Figure 2). However, terms-of-trade gains and a large surplus in the current account over the past 20 years may reflect better performance in terms of non-price competitiveness. Nevertheless, wage moderation will have to continue. The new stimulus package, mainly in the form of public investment, and the pay-out of contributions from the early retirement scheme as part of its reform (see below), will boost economic activity in 2012. Exports are expected to benefit from a pick-up in world trade in 2013 and the labour market should improve slightly. However, fiscal consolidation is projected to damp private demand and the recovery is likely to remain subdued in 2013.

Table 1. **Macroeconomic developments and projections**

	2008	2009	2010	2011	2012	2013
	Percentage changes, volume (2005 prices)					
Real GDP	–0.8	–5.8	1.3	1.0	0.6	1.2
Private consumption	–0.3	–4.2	1.9	–0.6	0.4	1.8
Government consumption	1.9	2.5	0.3	–0.4	0.6	0.1
Gross fixed capital formation	–4.2	–13.4	–3.8	0.0	3.4	2.0
Final domestic demand	–0.6	–4.4	0.3	–0.5	1.0	1.3
Stockbuilding[1]	–0.3	–2.3	1.0	0.3	–0.1	0.0
Total domestic demand	–0.9	–6.7	1.3	–0.1	1.2	1.3
Exports of goods and services	3.3	–9.8	3.2	7.5	2.2	4.6
Imports of goods and services	3.3	–11.6	3.5	5.7	3.1	5.3
Net exports[1]	0.1	0.7	0.0	1.2	–0.3	–0.1
Memorandum items						
Potential output growth	1.1	0.8	0.6	0.7	0.8	0.7
Consumer price index	3.4	1.3	2.3	2.7	1.6	1.8
Unemployment rate[2]	3.2	5.9	7.2	7.3	7.4	7.3
General government financial balance[3]	3.3	–2.7	–2.7	–4.0	–5.6	–2.9
General government gross debt[3, 4]	34.2	41.5	43.4	44.2	46.7	46.8
Current account balance[3]	2.6	3.5	5.2	5.4	4.7	4.6

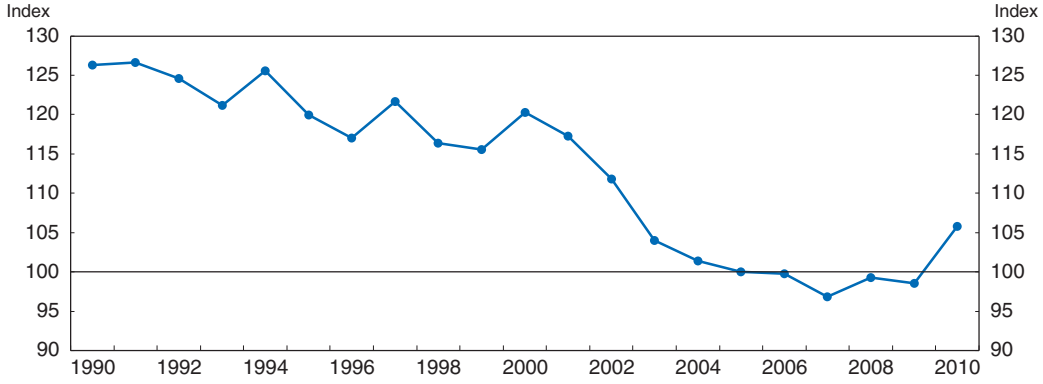
Note: National accounts are based on official chain-linked data. This introduces a discrepancy in the identity between real demand components and GDP. For further details see *OECD Economic Outlook* Sources and Methods (*www.oecd.org/eco/sources-and-methods*).

1. Contributions to changes in real GDP (percentage of real GDP in previous year).
2. The unemployment rate is based on the Labour Force Survey and differs from the registered unemployment rate.
3. As a percentage of GDP.
4. Maastricht definition.

Source: Update, based on national accounts data released on 22 December 2011 and other data releases, of the projections presented in *OECD Economic Outlook* No. 90, which are based on a "muddling-through" scenario.

Figure 2. **Competitiveness has deteriorated**

Based on relative unit labour costs,[1] index 2005 = 100



1. Competitiveness-weighted unit labour costs in dollar terms in manufacturing. Competitiveness weights take into account the structure of competition in both export and import markets of the manufacturing sector of 49 countries. A decrease in the index indicates a real effective appreciation and a deterioration of the competitive position.

Source: OECD, *Economic Outlook Database*.

StatLink http://dx.doi.org/10.1787/888932563628

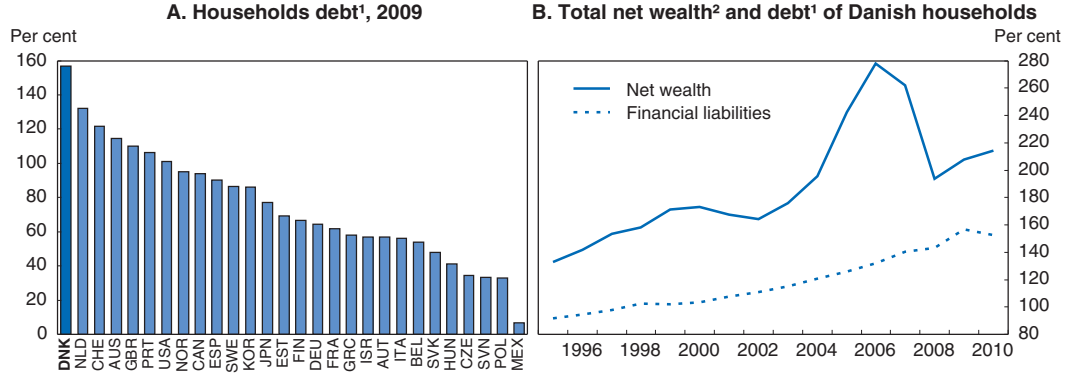
The Danish krone has been subject to appreciation pressures in recent months as a consequence of flight to quality, pushing ten-year government bond yields below Germany's. This has led the Danish National Bank (DNB), whose objective is to maintain a peg to the euro, to intervene in foreign exchange markets on various occasions. Accordingly, foreign-exchange reserves rose by 12% between January and December 2011, to 31% of annual GDP. The DNB cut its key lending rate by 35 basis points in early November 2011, to 1.2%, bringing it 5 basis points below the ECB's, and then twice in December 2011, to 0.7%, bringing it 30 basis points below the ECB's. Going forward, the economy will continue to be supported by low interest rates, which are expected to decrease even further, in line with developments in the euro area.

Despite accommodative fiscal and monetary policies, there are many downside risks to economic growth. A sharper-than-expected slowdown in Denmark's partner economies, would further depress exports. This in turn could worsen loan impairments in the corporate sector, putting pressure on the financial sector. Some small banks are especially exposed to agriculture, which faces high debt, falling land prices and funding problems. Moreover, if global financial conditions were to deteriorate further, leading to liquidity shortages, banks might restrict lending to the corporate sector. This would make it especially difficult for small and medium-sized enterprises, which already face stricter lending conditions, to access funding and would depress growth even further.

Household leverage reached disquieting heights during the pre-crisis boom (Figure 3). Since then, households have been taking advantage of the 2009 tax cuts and low interest rates to rebuild their savings, but this nevertheless led to subdued private consumption. The pay-out of contributions to the early retirement scheme due to its reform will give a one-off boost to household disposable income and thus should sustain private consumption in 2012, although households are expected to continue to deleverage. Household assets are also high. A major portion of these, notably pension rights, is illiquid, while household debt largely consists of mortgage loans. Households thus remain exposed to labour market, housing market or other shocks. Non-performing loans have not been a major problem for mortgage issuers' balance sheets during the crisis as legal arrangements in Denmark strongly encourage loan repayment. However, further increases in unemployment

Figure 3. **Household debt is high and net wealth has taken a hit**

In per cent of GDP



1. Gross household debt.
2. Aggregate household housing and net financial assets after tax.

Source: OECD, Households' assets and Danish National Bank.

StatLink http://dx.doi.org/10.1787/888932563647

and a fall in house prices would raise risks of losses for the financial system, which may in turn lead to a reduction of lending to households. While the house price slide essentially stopped in 2010, the real estate market has shown signs of further deterioration in 2011, with transactions falling anew.

The downside risks make it even more important to lift potential growth

Against this backdrop, the easing of the fiscal stance in 2012 is appropriate but it needs to be accompanied by measures to consolidate public finances in the longer term in line with the EU Stability and Growth Pact requirements and the 2020 budget balance target. In the event of a dramatic further deterioration in global conditions, however, Danish policy options would be influenced by the reaction of other economies and the state of international financial markets, and the potential benefits of fiscal expansion to support activity will have to be balanced against the need to safeguard the credibility of fiscal policy.

In any case, pushing ahead with structural reform is necessary to secure the leeway to cope with the ongoing slowdown and with further potential adverse shocks. In December 2011, the Parliament adopted the agreement signed between the previous government and other parties to reform the early retirement scheme, which allowed workers to leave the labour market at age 60, explaining why employment rates are relatively low for workers above that age, even though they are much above the OECD average for other age groups. The reform shortens the scheme's duration and brings forward the decision adopted in the 2006 Welfare Agreement to raise the retirement age. The implementation of this reform will significantly improve long-term public finances and hence provide room for short-term policy action. It will also help limit the effect of population ageing on employment and lead to a more equal treatment between current and future generations since the current generation already enjoys longer life expectancy.

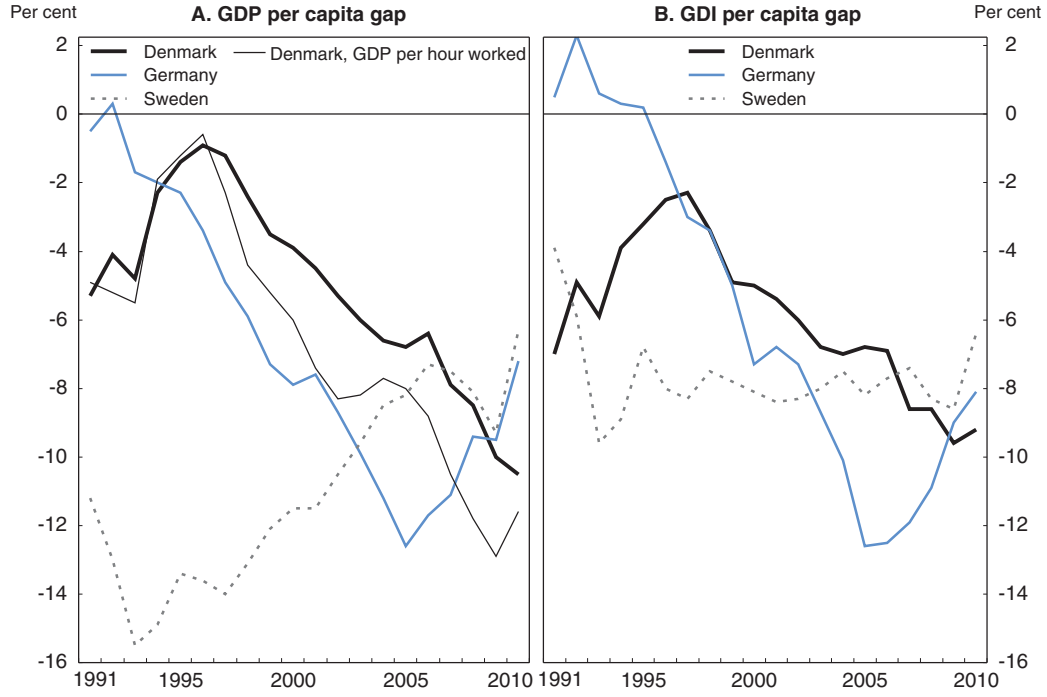
The shortening of the duration of unemployment benefits from four to two years as part of the May 2010 Fiscal Consolidation Agreement is also expected to raise labour supply although the new government has decided to postpone the implementation of this reform by six months. The reform will help to minimise the risks of long-term unemployment. It will also be important to ensure that the impact of measures proposed in the Budget Bill for 2012 that ease the requirements to receive certain social benefits and increase their generosity are offset by other measures to increase the labour supply.

Equally important for future living standards is the need to boost productivity growth so as to help restore competitiveness and increase potential growth, which is expected to be relatively weak in the absence of reform. Labour productivity growth declined from an average of 2.2% in 1981-93 to 1.4% in 1994-2007, reflecting slower capital deepening and smaller total factor productivity gains. This widened the GDP gap *vis-à-vis* the upper half of OECD countries (Figure 4). The scars of the global crisis may further weaken potential output insofar as heightened risk aversion inhibits investment (OECD, 2009). However, contrary to Sweden and to a lesser extent Germany, terms of trade have improved in Denmark and therefore, the country compares somewhat more favourably to those neighbours in terms of gross domestic income (GDI).

Flexicurity should help Denmark both during hard times and to achieve strong economic growth over the longer term. The Danish flexicurity model rests on three pillars: *i)* flexible hiring and firing regulations (Figure 5); *ii)* a generous social safety net; and *iii)* strong active labour market policies. This model fosters low unemployment and high

Figure 4. **GDP per capita and productivity have lost ground in relative terms**

Gap to the upper half of OECD countries[1]



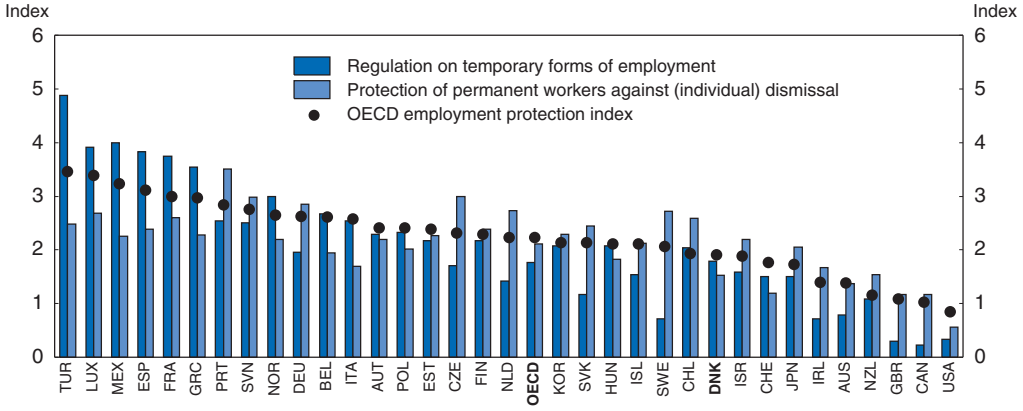
1. Percentage gap with respect to the simple average of the highest 17 OECD countries in terms of GDP (GDI) per capita and GDP per hour worked (in constant 2005 PPPs). For more details on the incorporation of terms-of-trade gains and losses into international comparisons, see OECD (2010), *Economic Policy Reforms 2010: Going for Growth*, OECD, Paris.

Source: OECD (2012), *Economic Policy Reforms 2012: Going for Growth*, OECD, Paris, forthcoming.

StatLink http://dx.doi.org/10.1787/888932563666

Figure 5. **Job protection is relatively unrestrictive**[1]

2008



1. OECD indicator for strictness of employment protection legislation. Index scale is 0 to 6, from least to most restrictive.

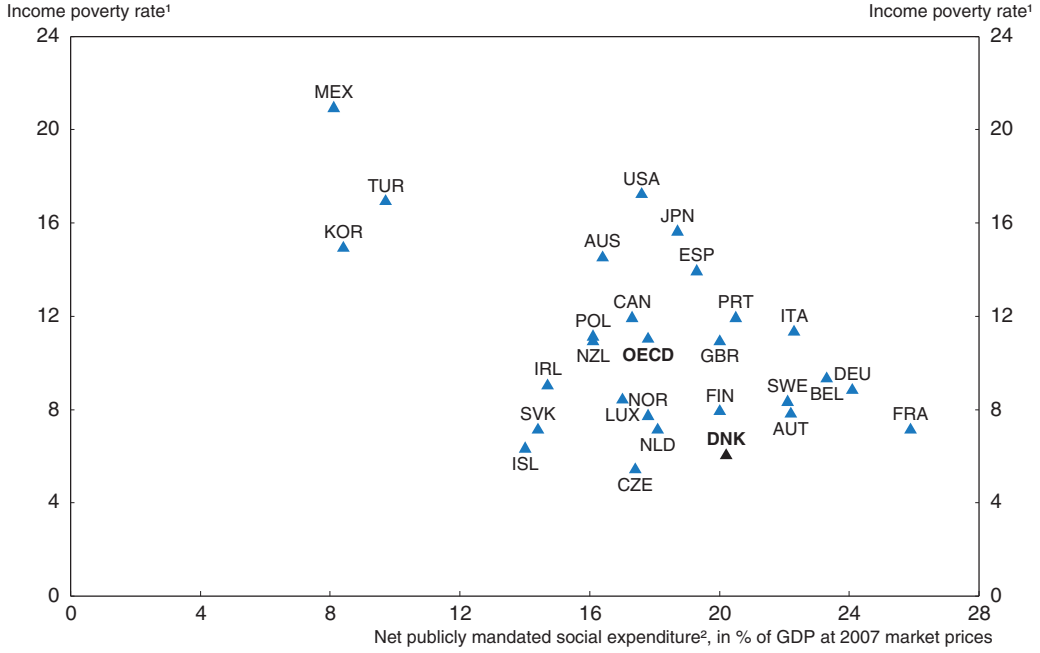
Source: OECD, *Employment Protection Database*.

StatLink http://dx.doi.org/10.1787/888932563685

employment but it may be tested by prolonged periods of low labour demand. It has been argued that low job protection has contributed to weak productivity growth by discouraging investment in firm-specific human capital (IMF, 2010). However, the equal treatment of workers on temporary and permanent contracts, which leads to low duality, minimises the risk that workers most in need of training do not receive it. Furthermore, job protection affects productivity growth through various channels (Bassanini *et al.*, 2009). In particular, low job protection helps firms adapt to the cycle and to technological progress, and encourages them to use labour and capital efficiently (Hopenhayn and Rogerson, 1993). In any case, Danish hiring and firing regulations were already in place in the 1990s when the productivity gap relative to leading OECD countries was narrowing.

The Danish welfare system acts as a buffer in periods of crisis. While GDP per capita has lost some ground relative to the upper half of OECD countries, well-being in terms of both material conditions and quality of life is very high (OECD, 2011a). In particular, relative income poverty rates and inequality are comparatively low and intergenerational mobility is high (Causa and Johansson, 2009; d'Addio, 2011). This is the result of a well-functioning labour market and a well-developed and generous welfare system that includes social policies directed at helping those with the lowest incomes, broad access to education and free access to most health services (Figure 6). This system is costly, however, with Denmark spending more than 20% of GDP on social policies. Even so, net public social spending is higher in a number of OECD countries where poverty is more prevalent.

Figure 6. **The welfare system has led to low relative poverty rates**



1. Defined as the share of persons whose after-tax income is below 50% of the median, in 2007 or more recently, depending on date availability.
2. Net publicly mandated social expenditure accounts for the effect of government intervention through the tax system on social spending. It includes: *i)* direct taxes and social security contributions on cash transfers, *ii)* indirect taxes on goods and services bought by benefit recipients and *iii)* tax breaks with a social purpose.

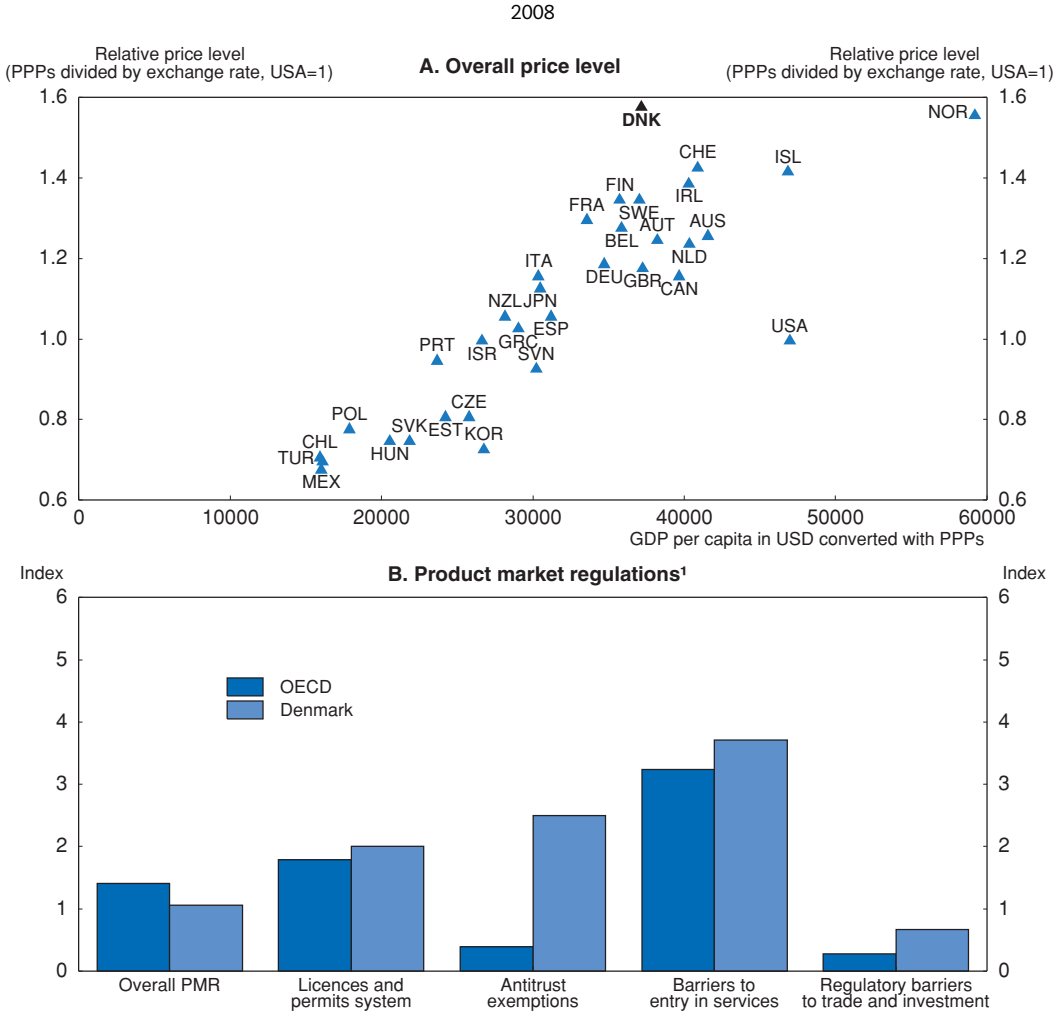
Source: OECD Income distribution – *Poverty Database* and *OECD Social Expenditure Database*.

StatLink http://dx.doi.org/10.1787/888932563704

More could be done to foster competition in some sectors

Intensifying competition would help raise total factor productivity growth. Indeed, despite high rankings on overall competition indicators, including those featuring in the OECD product market regulation database, weak competition and barriers to market entry depress productivity in Denmark (Danish Economic Council, 2010). Net prices, adjusted for VAT, taxes and income, are higher on average in Denmark than in comparable countries, especially in services, signalling insufficient competition (Figure 7; Danish Competition Authority, 2010).

Figure 7. **High prices indicate a lack of competition**



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

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

StatLink http://dx.doi.org/10.1787/888932563723

The April 2011 Competition Package introduced measures to boost competition, primarily in construction and services, which are broadly in line with the recommendations made in the OECD 2005 *Economic Survey* special chapter on competition. The relaxation of ownership rules of clinics by dentists and general practitioners is welcome. Despite some reforms, more progress for pharmacies, taxis, public transportation and healthcare remains

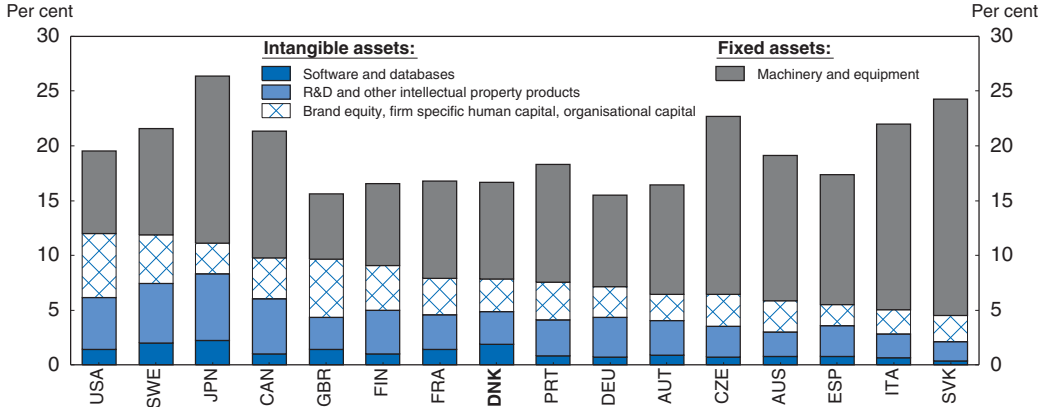
warranted (OECD, 2009). Some restrictive regulations in retail, such as zoning laws, prevent the exploitation of economies of scale through hypermarkets. The Package also aims to increase competition for public contracts. There has been an improvement in the tendering process in recent years and private provision of local public services has increased, but it can expand further. There is some choice of public and private providers of welfare services. For example, in 2009, one third of the assistance to elderly and disabled persons was provided by the private sector (Danish Competition Authority, 2010). Even so, regulations are quite restrictive in this area and private involvement would improve incentives to innovate and raise productivity.

Several agencies are involved in competition issues, which weakens the effectiveness and enforcement powers of the overall competition framework. The Danish Competition and Consumer Authority (DCCA), which is the main regulator, was made more effective in April 2010 as merger control was strengthened by lowering the thresholds of merger notifications, simplifying the procedures for handling unproblematic mergers and extending the time limits for the handling of problematic ones (OECD, 2010c). However, the two-tier system of the Competition Council (which also has a number of powers including to grant and revoke individual exemptions, review mergers and certify that conduct is not anti-competitive) and the Appeals Tribunal (which acts as a check on Council and Authority decisions before they get appealed to the regular court) may undermine decisions made by the Competition Authority (OECD, 2005). The inclusion of representatives from industry and consumers in the Competition Council, its lack of power to directly prosecute and impose fines and weak sanctions (low fines and no possibility of imprisonment) may undermine its effectiveness.

Greater competition would entice firms to innovate in order to survive and speed up the adoption of new technologies. In Denmark, innovation is high as measured by the number of patents, R&D spending as a percentage of GDP and R&D personnel, but there is room for improvement. Innovation results from a range of complementary assets that go beyond R&D, such as software, human capital and new organisational structures. Investment in these intangible assets is rising and high in Finland, Sweden, the United Kingdom and the United States but less so in Denmark (Figure 8).

Figure 8. **Investment in fixed and intangible assets lags many other OECD countries**

As a share of GDP in 2006[1]



1. For Canada, Japan and Portugal, data are available in 2005.

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

StatLink http://dx.doi.org/10.1787/888932563742

Box 1. **Competition policy recommendations from previous *OECD Economic Surveys* that remain relevant**

- Increase competition for pharmacies, taxis, and public transportation (OECD, 2005, 2009).
- Improve competition in the public sector via greater tendering (OECD, 2005).
- Ease regulations under the Planning Act surrounding the size and placement of new shops (OECD, 2005, 2009).
- Streamline the institutional set-up of the authorities in charge of competition and increase the fines for violations of competition policy (OECD, 2005, 2009).

Financial system vulnerabilities need to be addressed

The Danish banking system features a large number of small banks and a couple of banks that are "too big to fail" with one of them being classified as a global systemically-important financial institution by the Financial Stability Board. The two types of banks create different vulnerabilities, which need to be addressed in line with supervisory developments at the European Union level. In response to the global financial crisis, Denmark took numerous measures to support its banking system, including the provision of capital injections, guarantees and extra liquidity (OECD, 2009). Denmark has since replaced its blanket debt guarantee, and introduced a special resolution regime (which was used for Amagerbanken in February 2011 and Fjordbank Mors in June 2011). These measures, which prevent moral hazard, put Denmark ahead of other countries that were still working to replace extraordinary public support provided to the financial system during the crisis. In response to renewed pressures in global financial markets, some new support mechanisms were introduced in August 2011, including the expansion of collateral accepted by the Danish National Bank (DNB).

Funding problems faced by smaller banks will lead to banking sector consolidation

The number of commercial and savings banks had already decreased from 147 in early 2008 to 121 by mid-2011 as some of these small banks were merged or closed without endangering the financial system, given their size. After the expiry of the state guarantee, faced with the challenge of refinancing debt in 2012-13, smaller banks might have trouble accessing credit markets. Closure of small banks that cannot operate effectively without unconditional public support will lead to a more efficient banking structure. The set of new measures introduced – under the name of Bank Package IV – to more strongly encourage healthy banks to take over distressed ones (which was used for the resolution of Max Bank in October 2011), notably by extending existing government-guaranteed funding (for a fee), will speed up the consolidation process. However, care must be taken that such consolidation does not increase the number of banks that are too big to fail.

Until recently, the larger banks shared in the cost of compensating depositors of failed banks since the Danish guarantee scheme has an *ex post* financing mechanism with contributions being a function of banks' share in the covered net deposits of all the institutions in the scheme. Bank Package IV set out to change this arrangement into an insurance-like one with annual premia and thus a greater *ex ante* element. Making contributions to the scheme contingent upon the riskiness of banks, in line with forthcoming European Commission recommendations, would help prevent imprudent behaviour of the kind exhibited by some smaller banks exposed to construction and agriculture.

Large banks need to be supervised more closely

Whether the current winding-up arrangements would prove adequate to deal with the failure of a systemically-important financial institution (SIFI) is not clear, but Bank Package IV has rightly put SIFI supervision on the agenda. Developments in the supervision of global SIFIs can provide guidelines in this process (Financial Stability Board, 2011). The recent global crisis has shown that an overly large banking sector (as measured by assets to GDP) in general and SIFIs in particular can be dangerous for small countries. Many of them are addressing these issues, for example through higher contingent capital requirements on SIFIs in Switzerland. Denmark's experience in the early 1990s, when the banking crisis did not become systemic thanks to Danish banks' large capital and reserves, unlike in the other Nordic economies, illustrates the merits of adequate buffers (Vastrup, 2002). It is important to balance the need for banks to bolster their capital in the new supervisory environment, and the role they should play in shouldering the liabilities that a financial crisis can impose on public finances. This could be achieved by setting up a reserve which would be available in the event of future crises to assist financial institutions, especially SIFIs, along the lines of Sweden's Stabilisation Fund (Schich and Kim, 2010). The Danish government currently maintains an on-demand deposit with the central bank of 14% of GDP, which could be drawn upon in such circumstances.

Financial supervision has been strengthened but challenges remain

To address these vulnerabilities, the collaboration between the Financial Supervisory Authority (FSA) and the Danish National Bank (DNB) has been strengthened by joint liquidity stress tests and the introduction of a common bank reporting platform. A committee is investigating whether the structure of financial supervision needs to be altered. It is important to further step up collaboration efforts with a view to ensure consistency between the FSA microprudential mandate focusing on individual banks and the DNB macroprudential supervision mandate.

In 2010, the FSA introduced a new tool to monitor the riskiness of individual banks, dubbed the "supervisory diamond" (whose facets include large exposures, lending growth, a funding ratio, concentration on commercial property and liquidity ratios). The Danish supervisory diamond could be adjusted to take into account more of the risks to the financial system from external sources, as done in Norway, where a similar tool has been introduced. Further enhancement of cross-border financial supervision co-ordination and co-operation through the Nordic-Baltic Memorandum of Understanding, especially on the resolution of cross-border institutions, would also contribute to financial stability.

The supervisory authorities are also working to address the challenges Danish banks will face in the implementation of the Basel III rules, which needs to be carried out as soon as feasible. The two proposed liquidity measures, the net stable funding ratio (NSFR) and the liquidity coverage ratio (LCR), will help make mortgage markets more stable. Depending on how the NSFR is implemented in the European capital requirement directive, it may limit the use of shorter-term bonds to finance variable-rate mortgages.

Given that Danish covered bonds have proved to be as liquid as government bonds in the recent crisis (Boucholst, 2010), the authorities argue for treating the two on an equal footing for the purposes of the LCR (DNB, 2011). If that is done, it becomes even more important that the mortgage market is monitored closely. Adjustable-rate and deferred-amortisation mortgage loans have fuelled house price exuberance prior to the crisis (Danish Economic Council, 2008; DNB, 2010). These loans, especially when

accompanied by excessive loan-to-value ratios, could be a source of weakness if they are given to households who could not easily service their debt if interest rates increased sharply or house prices fell. Therefore, they should be closely supervised, including by monitoring the implementation of the requirement that the borrower can show they can afford the corresponding fixed-rate loan instalments. The ongoing efforts to improve data collection on the characteristics of the users of different types of loans will provide more information to the supervisory authorities. Once the housing market recovers, more stringent caps on loan-to-value or loan-to-income ratios for such loans could be introduced.

Box 2. **Recommendations on enhancing financial stability**

- Deposit insurance premia should be contingent on an institution's riskiness. Consider imposing capital requirements dependent on size for systemically-important financial institutions.
- Continue to improve collaboration between the Danish National Bank and the Financial Supervisory Authority with a view to ensure consistency between the DNB macroprudential supervision mandate and the FSA microprudential mandate focusing on individual banks.
- Closely supervise new deferred-amortisation mortgage loans, possibly by introducing more stringent caps on loan-to-value or loan-to-income ratios for such loans, once the housing market recovers. Continue the ongoing efforts to improve data collection to get a better understanding of the characteristics of the users of these types of loans.

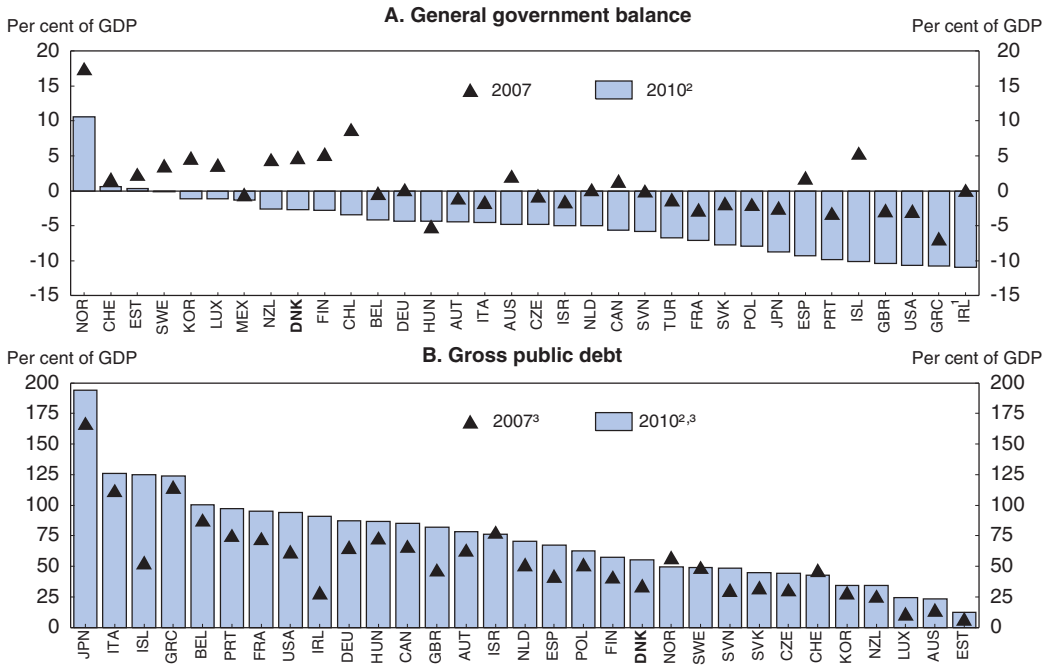
Better controlling public expenditure would help ease the tax pressure

Denmark entered the crisis with a large fiscal surplus and a moderate debt ratio, hence the country's public finances remain in much better shape than in many other OECD countries despite a marked deterioration during the crisis (Figure 9).

However, the tax pressure is high, reaching 50% of GDP (Figure 10). Despite some easing of the tax and social security burden on labour, taxes on labour remain high compared with other OECD countries (OECD, 2009, 2011b). In particular, the highest marginal tax rate enters into force at relatively low levels of income, leading to high marginal tax wedges for incomes just above the average. This is not conducive to entrepreneurship and reduces Denmark's attractiveness to foreign skilled workers, thereby exerting a drag on productivity growth. It also diminishes the attractiveness of higher education. High marginal tax rates, better work conditions in the public sector and relatively moderate wage dispersion may have discouraged skilled workers from taking jobs with high productivity growth potential in the private sector. Furthermore, high marginal tax rates on incomes just above the average reduce hours worked. Against this backdrop, the new government has announced a fully-financed tax reform, including a reduction in labour income taxation.

Apart from high marginal tax rates on income, the tax structure is generally sound, with relatively high indirect taxes and low corporate taxes, room to adjust the tax structure is limited (Arnold *et al.*, 2011). Nevertheless, part of the tax burden could be switched from labour to property and environmental externalities (see below). Property value taxes have been frozen in nominal terms since 2002. Raising taxation on property, by restoring the tax base once the housing market has stabilised, could limit the risk of future housing booms and would partly offset the distributional effects of reducing taxes on higher incomes, either through an increase in the tax threshold for the top personal income tax rate or a decrease in the marginal tax rate. Indirect taxes on unhealthy products have been raised

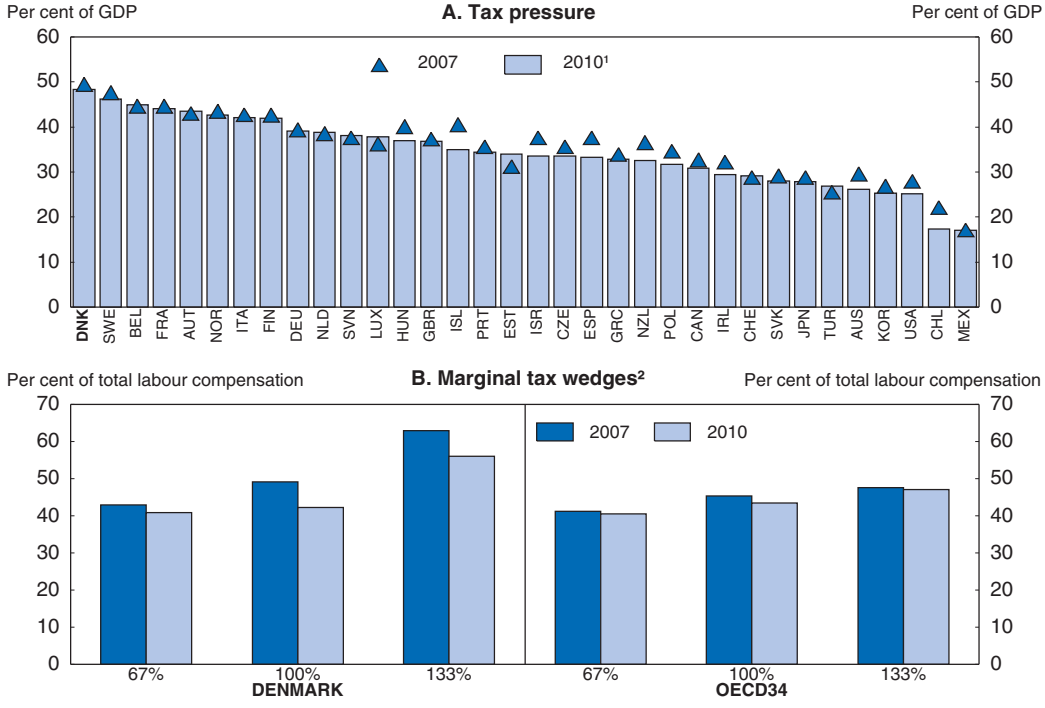
Figure 9. **Denmark's fiscal position is relatively good**



1. For Ireland, the support to the banking sector is excluded from the general government balance, given its exceptionally large size (20.4% of GDP).
2. Or latest year available.
3. Chile, Mexico and Turkey are excluded for lack of comparable data.

Source: OECD Analytical Database. StatLink http://dx.doi.org/10.1787/888932563761

Figure 10. **The tax pressure is strong and marginal tax wedges are high for high incomes**



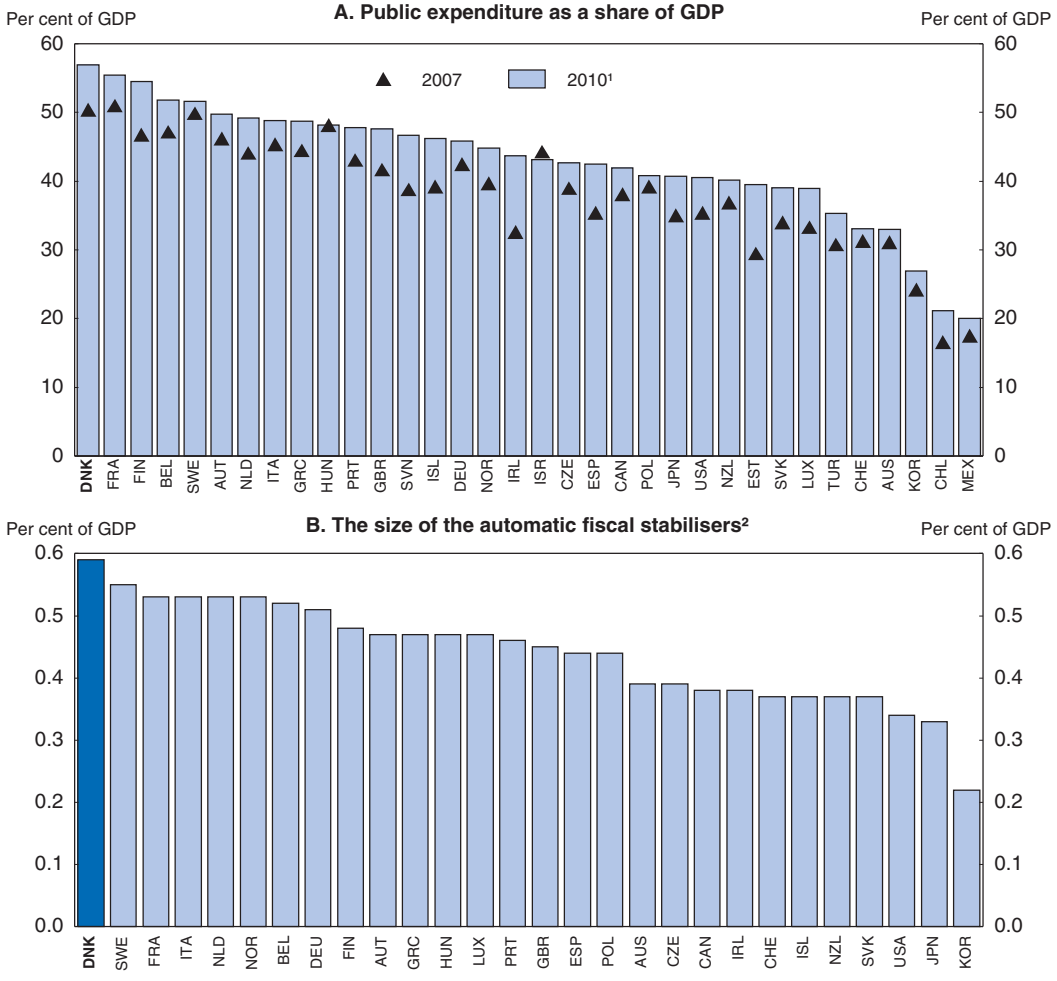
1. Or latest year available.
2. Evaluated at 67%, 100%, and 133% of average earnings for a single person with no child.

Source: OECD Analytical Database and *OECD Tax Database.* StatLink http://dx.doi.org/10.1787/888932563780

recently and will be increased further in 2012-13. Denmark is the first country to have introduced a "fat tax". Such increases contribute to making room over the longer term for enhancing the efficiency of the tax structure by reducing taxes on income. Their effect on health and their distributional impact should be monitored in the near future.

Denmark has long tried to contain public expenditure growth and to reduce the overall tax burden and its negative effects on the economy. The "tax freeze" introduced in 2001 to limit both direct and indirect tax hikes has to a certain extent acted as a disciplining device but has failed to restrain public expenditure. In order to alleviate the tax pressure while ensuring long-term fiscal sustainability, the public expenditure-to-GDP ratio will need to be brought back down over time. Public expenditure rose markedly during the crisis, from 51% of GDP in 2007 to 58% in 2010. The increase came from discretionary measures to support the economy (around 2 percentage points), increases in spending on active labour market policies and social benefits in the face of rising unemployment as Denmark has large automatic stabilisers, and the impact of the decline in nominal GDP (Figure 11). Just returning to the pre-crisis public expenditure-to-GDP ratio would necessitate a major adjustment in spending growth.

Figure 11. **Public expenditure has increased substantially from already high levels**



1. Or latest year available.
2. Change of the budget balance in per cent of GDP in response to a one percentage point change in the output gap.

Source: *OECD Analytical Database* and OECD (2011), *OECD Economic Outlook* No. 90.

StatLink http://dx.doi.org/10.1787/888932563799

The fiscal framework needs to be reinforced, both at the central and sub-central levels

In many respects, the Danish fiscal framework looks sound, with governments setting various targets and regularly preparing medium-term plans. Overall, there is a worthy tradition of focusing on long-term issues, *e.g.* under the aegis of the Danish Economic Council and various commissions. The main targets covering the structural balance and long-term fiscal sustainability have generally been met. However, in the past, governments have often missed targets for public expenditure. These failures point to the need to address the core of the problem, *i.e.* to have spending targets that are enforced and the associated requirement to improve fiscal relations between levels of government.

The medium-term targets lack strong legal backing and, as slippage triggers no corrective mechanisms, they are weakly enforced. The new government has recently proposed to introduce expenditure ceilings anchored in a law, one for each level of government (state, regions and municipalities), which is an important step in the right direction. It is advisable that expenditure ceilings cover most public spending, not only public consumption as is currently the case, though perhaps excluding investment and cyclically-sensitive spending such as unemployment benefits, and all levels of government.

International experience suggests that fiscal councils can help prevent slippage and more generally improve fiscal performance (Hagemann, 2010). Denmark has a long experience in this area with the Danish Economic Council since 1962 and the Environmental Economic Council since 2007 – which are both headed by independent chairpersons. The Economic Council provides analysis and recommendations twice a year on a broad range of issues including fiscal and labour market ones. It could play an even stronger role as a fiscal council if its mandate in this area were broadened, and if it were granted access to the data needed to thoroughly assess budgetary targets and outcomes.

Expenditure slippage has mostly stemmed from difficulties in controlling public expenditure at the sub-central level, especially in the case of municipalities. More than 60% of public expenditure is decentralised, meaning that sub-central public expenditure as a share of GDP is greater than total public expenditure in Australia or Switzerland. It is therefore crucial to have a framework to control it while ensuring sufficient sub-central government independence. The Danish framework rests on negotiations between the central level and an association representing municipalities on a broad range of issues, including expenditure targets and the level of grants they receive from the central level. This framework suffers from two major weaknesses:

- It has led to a relatively soft budget constraint for municipalities, which do not feel individually bound by agreements as they have no legal status and as, until recently, there were no sanctions. The “tax freeze” imposed some limits on tax increases, but failed to contain public expenditures as municipalities have found other sources of revenues, including by drawing down their savings, and state grants were raised to finance overruns of spending.
- Grants account for a significant share of municipalities’ revenues (around 40%). Hence, although at the margin each municipality has to finance higher service spending fully out of its own revenues, the link between the cost borne by taxpayers and the benefits of public services may be less visible, creating pressure for more spending (Joumard and Kongsrud, 2003). The power of municipalities over some transfer spending is also relatively weak, as the central government sets many regulations. The central government

becomes partly responsible, at least implicitly, for the quality of services provided at the local level and may be asked to intervene when service provision is under pressure, which in turn generates expectations at the local level that their fiscal problems will be solved.

The 2010 Fiscal Consolidation Plan contained measures to better control municipalities' expenditures, including the possibility to cut the grants if expenditures were to increase more than agreed upon, sanctions for municipalities that raised their tax rates beyond the agreed limits and some rules for adjustment in case of slippage. These measures go in the right direction and seem to have contributed to containing public consumption growth in the very recent past. However, it is too early to assess their full effectiveness and therefore, the authorities will have to remain vigilant and be ready to tighten sanctions if slippages are observed. An overall ceiling on local public expenditure with a legal status, as announced by the previous and again the new government, would give more credibility to these sanctions. To ensure that individual municipalities feel constrained by rules covering all of them, negotiations on the distribution of individual expenditure ceilings and grants should ensure compliance with the overall ceiling. Municipalities that overrun the ceiling should continue to be penalised and to have to present a plan to offset the slippage in the following years. A system of tradable municipal rights, limiting overall municipalities' expenditures to the amount of "rights" and allowing municipalities to buy or sell these rights depending on their expenditure needs, could also conceivably be introduced.

The envisaged spending ceilings should help prevent slippages. If they were to fail to contain local public expenditures, consideration should be given to raising the share of taxes in municipal revenues and to limiting the sharing of responsibilities so as to help prevent spending and taxes from rising beyond voters' choices. Grants could be reduced to encourage municipalities to realise the economies of scale that the merging of municipalities in 2007 was supposed to generate and to raise the efficiency of their expenditures.

Box 3. **Recommendations on strengthening the fiscal framework at the central and sub-central levels**

- Introduce expenditure ceilings at general government level covering most public spending (not only public consumption, though perhaps excluding investment and cyclically-sensitive spending such as unemployment benefits) at a medium-term horizon.
- Give the Economic Council more of a fiscal council role and to this end grant it access to the necessary information, including the detailed government accounts.
- Continue with the use of sanctions to contain local public expenditures and consider raising them further if slippages reappear.
- If the new sanctions and envisaged spending ceilings fail to contain local public spending, consider limiting the use of grants to sub-national governments to specific purposes and reducing the sharing of responsibilities between levels of government.

Raising the efficiency of social expenditures

There is scope to reduce the cost of social policies while maintaining their high standards. The adoption of the reform of the early retirement scheme in December 2011 is a case in point but the cost of social policies can be lowered further by reducing expenditures in areas where they bring limited social and economic benefits and by raising the efficiency of social spending in other areas. Major categories of spending which require attention are expenditure on education and health care as well as spending on certain welfare and social services.

Sickness and disability benefits

Expenditures on sickness and disability benefits are high in Denmark and the share of the working-age population receiving these benefits is well above the OECD average. Furthermore, the agreement on early retirement introduces a new "senior" disability scheme, which entails a risk of larger-than-expected inflows into this scheme, all the more so as disability benefit schemes tend to expand in the wake of unemployment peaks (OECD, 2010a). To prevent this, older workers who are able to work should not be given easy access to the new "senior" disability scheme. There is also a case for better integrating disability benefits with other policies to make work pay. Local job centres, which pay out these benefits, could be given more responsibility with regard to medical decisions, including early involvement of municipal doctors and regular control of general practitioners' decisions (OECD, 2010b). Efforts should aim at helping the sick and disabled with sufficient ability to work to find ordinary employment. In particular, the special disabled employment programme (*Fleksjob*) should be reconsidered as it has led to an increase in the overall number of recipients of these programmes. It should be made less generous as the income can be higher than the previous wage, and more targeted to individuals in need. A plan to reform the special disabled employment programme following these lines was proposed in April 2011 but reforms have been postponed since then (Danish Government, 2011a).

Compulsory education

Free and broad access to education is one of the main pillars of the Danish education system. Expenditure per student is among the highest OECD-wide but education system performance is mixed, as documented in a special chapter of the 2009 *Economic Survey* (OECD, 2009). In particular, a number of students, especially children of immigrants, are left behind. This suggests that efficiency gains can be reaped by continuing to improve and develop the evaluation and assessment framework, in particular for school staff, and to increase its implementation (Shewbridge *et al.*, 2011). For schools to better serve all students including the children of immigrants, many of whom were born in Denmark, there is a need to professionalise school leadership and to improve the targeted initiatives for students most in need (Nusche *et al.*, 2010; Sabel et *al.*, 2010). Reducing the size of classes in high schools, which is already relatively low compared to other OECD countries, as proposed by the Budget Bill for 2012, tends to have only a limited impact on overall performance and to be costly (Nusche, 2009).

Tertiary education

In tertiary education, the main problems are late completion, which reduces the supply of high-skilled labour, and students' inclination to choose fields where business demand is relatively low (OECD, 2009; Growth Forum, 2011). Confining the duration of grants to the normal length of study would push students to complete their curriculum faster. Gradually moving to a system that combines grants and loans in a way that encourages completion on time could also help. Going even further, a system of tuition fees with income-contingent loans could be considered that encourages students to take earning prospects after graduation more into account when making study choices, and to choose fields with higher potential productivity gains. However, care should be taken not to reduce overall incentives to take up education.

Health care

Another pillar of the Danish welfare system is broad and mostly free access to health care. Expenditure on health has risen markedly in recent years and Denmark is now one of the OECD countries with the highest public spending on health. However, Denmark's performance in terms of health status is generally sub-par. OECD analysis shows that health outcomes could be better with the same level of spending on health or that these outcomes could be achieved at a lower cost (Joumard *et al.*, 2010). The analysis reveals a lack of consistency in assignment of responsibilities across levels of governments, which generates waste through duplication, weak control over spending and lack of incentives to provide cost-effective services. If the current allocation of resources is generally kept, mechanisms that make municipalities contribute to the funding of hospitals should be improved, and regions should be given more options to reduce costs, for instance by further developing tendering and adjusting the number of hospitals.

Box 4. **Social policy and tax recommendations**

- In the implementation of the reform of the early retirement scheme, make sure that the provision concerning the "new" senior disability scheme does not lead to an unwarranted increase in the number of recipients of these benefits.
- Improve work incentives and targeting of support for the sick and disabled with ability to work, while tightening eligibility conditions, and reassess entitlements regularly. In particular, the special disabled employment programme (*Fleksjob*) should be reconsidered. It should be better targeted, work ability should be regularly reassessed, and the wage subsidy should be lowered.
- Continue to improve and develop the evaluation and assessment framework for both students and school staff. Improve targeted initiatives for pupils most in need.
- Gradually move to a system that combines educational grants and loans in a way that encourages on-time completion.
- Reduce marginal taxes on higher incomes, by raising the tax threshold or cutting the marginal tax rate, once fiscal consolidation has been achieved and public spending is better controlled. Increase property taxes by restoring the tax base once the housing market has recovered.

Towards green growth: improving energy and climate change policies

Denmark attaches a high value to preserving natural and environmental assets, which is seen as an opportunity to develop new sources of growth rather than as a constraint. The country has adopted ambitious energy and climate targets. In parallel, it has invested heavily in green technologies, in particular wind, to become a leader in this area. These targets include:

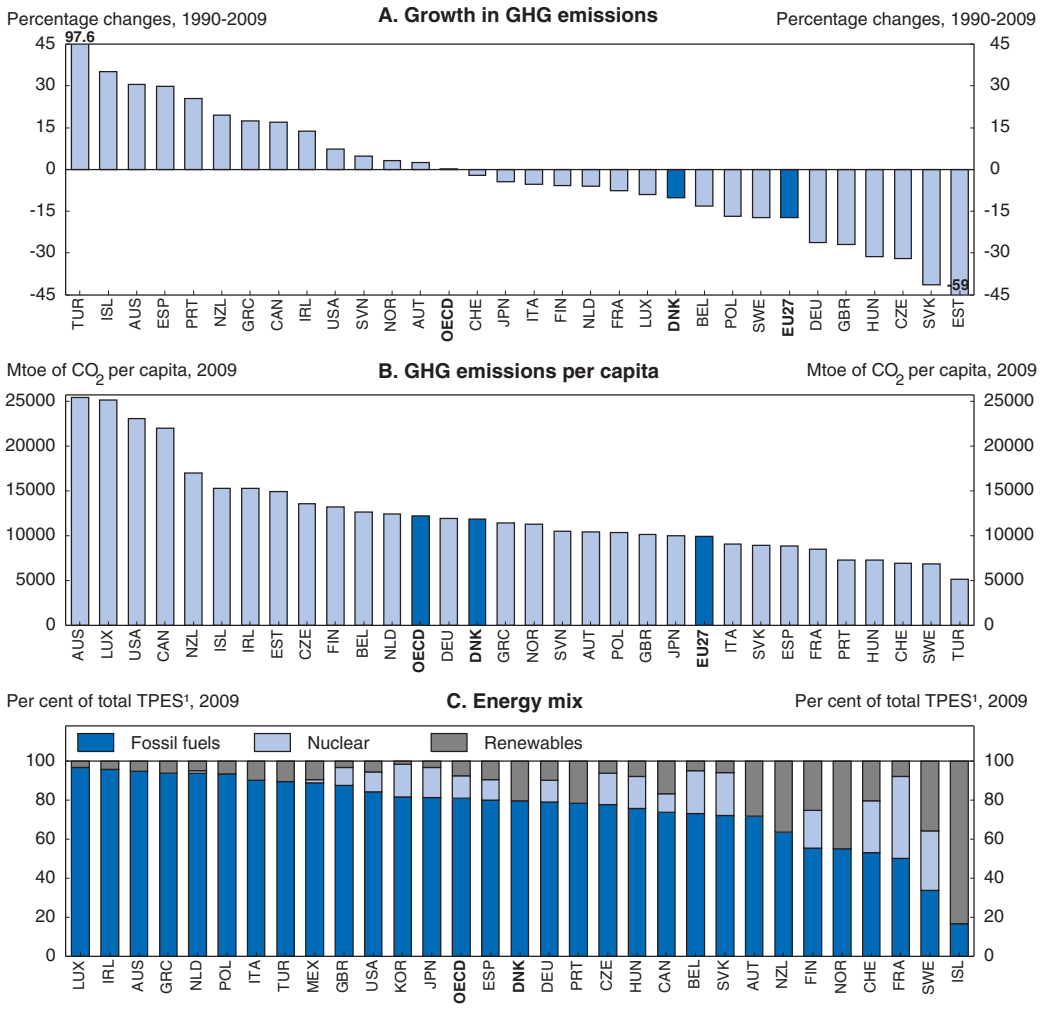
- Within the EU climate change policy framework, a 20% cut in GHG emissions in sectors not covered by the EU emission trading scheme (ETS) by 2020 relative to 2005, as well as an increase in the share of energy from renewables from 17% in 2005 to 30% in 2020.
- Becoming independent from fossil fuels by 2050, a choice made in 2007 and subsequently reiterated in *Energy Strategy 2050* and more recently in *Our Future Energy*, which spell out a broad range of measures to achieve this goal (Danish Government, 2011b; 2011c). To make progress towards fossil fuel independence, the new government aims to have 50% of electricity consumption coming from wind by 2020, to phase out the use of coal by power plants by 2030 and to have electricity and heating coming exclusively from renewable sources by 2035.
- A 40% cut in GHG emissions by 2020 from 1990 levels.

Having more ambitious and long-term domestic targets on top of EU ones sends signals that fossil fuel and GHG emissions will be taxed in the future and therefore helps anchor private agent expectations. The credibility and stability of the financing framework are key to fostering investment in new technologies. Greening growth will require expanding existing technologies and finding new ones, thereby creating new growth opportunities. However, identifying the latter *ex ante* is difficult and depends *inter alia* on the choices other countries will make. For instance, limiting the use of fossil fuels would be less necessary if carbon capture and storage technology were to become readily available and competitive. It will also be costly for a small country to achieve ambitious targets when it has already cut its GHG emissions significantly. Such considerations point to the advantages of maintaining some flexibility by reassessing these targets regularly in light of new developments and adjusting accordingly the share of GHG emissions cuts to be achieved domestically by financing GHG emission cuts outside Denmark.

Denmark has cut emissions by 10% over 1990-2009 and by 4% over 2005-09 when emissions from land use, land-use change and forestry are excluded (and by 16% and 11% respectively when they are included). It is one of the most energy-efficient OECD countries, although emissions per capita are close to the OECD average (Figure 12). This paradox reflects a number of factors. The energy mix leads to higher emissions per unit of energy partly because Denmark has decided that nuclear energy is not an option and hydropower cannot be developed because of the country's geography. A relatively large agricultural sector with a lot of livestock generates sizeable GHG emissions.

The Danish policy framework combines market-based instruments, regulations and subsidies and is generally sound. Denmark taxes fossil fuels at a very high rate and was one of the first OECD countries to introduce a tax on CO_2 emissions that now applies to emissions from households and industry, which are not covered by the EU ETS, at a uniform rate of EUR 20 per tonne. Subsidies to specific technologies, notably wind, are large and Denmark has launched an ambitious plan to reduce emissions in the housing sector through strict performance standards on energy efficiency and the use of labelling.

Figure 12. **Denmark's performance in terms of greenhouse gas emissions has been mixed**



1. Total primary energy supply (TPES).

Source: UNFCCC, *IEA World Energy Balances Database*, OECD calculations and OECD (2011), *Towards Green Growth – Monitoring Progress*.

StatLink http://dx.doi.org/10.1787/888932563818

Denmark thus pursues a mix of energy and climate change policies and stands out by the ambition of its objectives. The challenge is to achieve these targets in a cost-effective manner and to ensure that these ambitions contribute as much as possible to global GHG emissions mitigation and to stronger and greener growth in Denmark.

Interactions with EU and international policies could be better exploited

GHG emission cuts in sectors covered by the EU ETS do not automatically lead to cuts at the EU or global levels. As long as the cap on emissions remains unchanged at the EU level, abatement from additional overlapping instruments in Denmark frees permits for higher emissions in other EU countries. In particular, this holds for policies to increase renewable energy in the electricity sector, which is covered by the EU ETS. Over the longer term, however, the EU-wide cap on CO_2 emissions will be renegotiated and Denmark will be

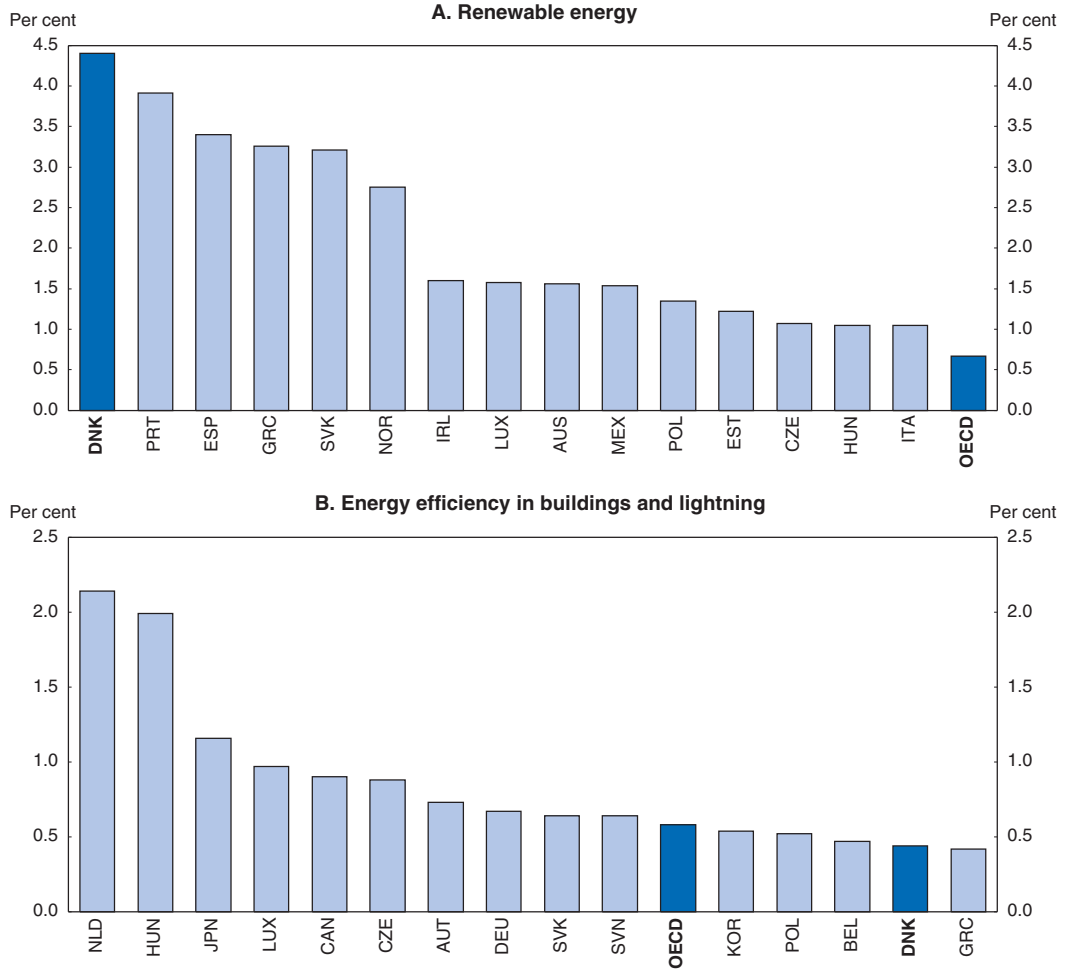
in a position to push for a more stringent one on the grounds of its domestic efforts to reduce CO_2 emissions and of the technological spillovers. Currently, the ambition of the new government is to push for a binding EU-wide reduction target of 30% in 2020 relative to 1990.

Supporting a small range of technologies entails risks

Denmark is at the frontier in the area of renewable energy technologies in the electricity sector, notably with respect to wind (Figure 13, Panel A). Two main types of policies have been used to that end: public R&D and feed-in tariffs. R&D spending on energy research has increased in recent years, in contrast to support to more basic research (Danish Economic Council, 2011). These policies may be justified by the fossil fuel independence goal, since current and future EU carbon prices are too low to encourage sufficient investment in these technologies to meet such a goal and there are market failures specific to the market for green innovations (OECD, 2011c). Furthermore, Denmark wants to be a leader in this area.

Figure 13. **Denmark has largely contributed to the development of renewable energy technologies**[1]

As a per cent of total Patent Co-operation Treaty patent applications, 2003-08



1. The figure shows the first 15 best-performing OECD countries.

Source: OECD (2011), *Towards Green Growth – Monitoring Progress*.

StatLink http://dx.doi.org/10.1787/888932563837

However, this strategy involves risks, notably that a new, more cost-effective technology emerges. Furthermore, recent OECD analysis shows that only a small share of the key inventions that are aimed at addressing climate change result from energy or environmental R&D (OECD, 2011c). Hence, in general public research needs to cover many areas, and should rest on multi/inter-disciplinary approaches. It should also be neutral with respect to specific technologies, as innovations may emerge from a wide range of fields. Therefore, R&D policies should leave more flexibility as regards technological choices and be assessed in the light of the precise market failure they try to address.

The feed-in tariff system in place is the main policy to support electricity from renewables and provides large subsidies to wind technology. Experience has shown that once granted, subsidies can be very difficult to withdraw, even when the initial justification no longer applies, and rents tend to be captured by specific industries (de Serres *et al.*, 2011). To limit these risks and ensure that least-cost options are developed, differences in subsidy between technologies should be justified by differences in cost structures and maturity of technologies. In the absence of such justification, subsidies should be made more uniform across technologies. The new government has announced a reduction in the subsidies to future land based windmills as their cost is expected to fall further, but subsidies to off-shore windmills will be increased. It also plans to review the energy tax and subsidy systems to raise incentives to switch from fossil fuels to electricity from renewables in non-EU-ETS sectors. Furthermore, Denmark could work at the EU level towards the introduction of a common strategy to support renewables with a view to minimise costs and risks, and to limit the race between EU countries in terms of support to these technologies.

Reducing GHG emissions in sectors not covered by the EU ETS

A wide range of instruments are used in sectors not covered by the EU ETS, with fossil fuels used in transport and heating being heavily taxed compared to other OECD countries, both through the carbon tax and energy taxes. Furthermore, a large number of standards and other policies encourage energy efficiency gains in buildings. However, GHG emissions in these sectors have barely declined (Danish Energy Agency, 2011). Granted, these emissions would have risen strongly without these policies, particularly in transport, but this outcome also reflects the fact that abatement opportunities in Denmark are generally costly.

As in most OECD countries, energy taxes lead to different implicit carbon prices, with for instance CO_2 emissions from coal and diesel taxed less than those from petrol. This implies that emissions are not necessarily cut where it is the cheapest, raising overall abatement costs. Energy taxes should be adjusted to ensure a more uniform implicit carbon price. In the transport sector, various taxes apply, on top of carbon and energy taxes, including a motor vehicle registration tax, which depends on the fuel efficiency of the vehicle, with electric cars to be exempted until 2015 (the basic rate is 105% on the value of the car below EUR 10 000 and 180% above this threshold). This vehicle tax provides a one-off incentive to purchase a less emitting car but no incentive for further abatement after the purchase (OECD, 2010d). Furthermore, the high level of the tax may discourage purchases, implying that older and less efficient cars are used. As emissions vary with motor vehicle use, it would be more cost-effective to tax motor vehicles less and fuels more as long as this adjustment does not lead to a large increase in border trade.

In the residential sector, low-cost abatement opportunities are likely to remain, especially for existing buildings. Denmark has already introduced a series of stringent regulations to increase energy savings in buildings and has pioneered a number of

innovations in this area (Figure 13, Panel B). Higher taxes on fossil fuel energy or carbon would reinforce incentives to implement energy improvements in connection with renovation and replacement carried out for other reasons.

While GHG emissions from agriculture have already declined as a result of water quality policies, there are still cost-effective GHG mitigation options in this area although achieving large emission reductions in this sector may be costly. Pricing non-CO_2 GHG emissions from agriculture would help achieve the target for non-EU-ETS sectors. However, GHG emissions from agriculture cannot be measured directly and need to be estimated for each farm on the basis of types of inputs used. Furthermore, as agricultural policies are largely set at EU level, an EU-wide instrument to limit these emissions would be a first best. At the EU level, Denmark could push for the adoption of policies that indirectly put a price on these emissions, one imperfect option being to tax agriculture inputs.

Box 5. **Energy and climate change policy recommendations**

- Regularly reassess national targets in the light of international and technology developments. Adjust accordingly the share of GHG emissions cuts to be achieved domestically by financing GHG emission cuts outside Denmark.
- Push for more binding caps in future EU negotiations.
- Ensure that policies towards renewable energy support least-cost abatement options and avoid supporting one technology in particular. Work at the EU level towards the introduction of a common strategy to help meet EU renewable targets at least cost.
- Rationalise the Danish energy tax system to harmonise the implicit carbon price. In particular, raise tax rates on coal and diesel to reduce the gap with the implicit carbon price on petrol.
- At the EU level, push for the adoption of a common policy to limit non-CO_2 emissions from agriculture.

Bibliography

d'Addio, A. (2011, forthcoming), "Social Mobility in OECD Countries: Evidence and Policy Implications", *OECD Social Employment and Migration Working Papers*.

Arnold, J., B. Brys, C. Heady, Å. Johansson, C. Schwellnus and L. Vartia (2011), "Tax Policy for Economic Recovery and Growth", *Economic Journal*, Vol. 121, Issue 550.

Bassanini, A., L. Nunziata and D. Venn (2009), "Job Protection Legislation and Productivity Growth in OECD Countries", *Economic Policy*, Vol. 24, Issue 58.

Boucholst, V.B. (2010), "Liquidity in Danish Covered and Government Bonds", *DNB Monetary Review*, Quarter 1, Part 1.

Causa, O. and Å. Johansson (2009), "Intergenerational Social Mobility", *OECD Economics Department Working Papers*, No. 707.

Danish Competition Authority (2010), *Competition Report 2010*, Copenhagen.

Danish Economic Council (2008), *Danish Economy Autumn 2008*, Copenhagen.

Danish Economic Council (2010), *Danish Economy Autumn 2010*, Copenhagen.

Danish Economic Council (2011), *Economy and Environment, 2011*, Copenhagen, May.

Danish Energy Agency (2011), *Danish Energy Outlook*, Copenhagen, May.

Danish Government (2011a), *Reformpakken 2020*, Copenhagen, April.

Danish Government (2011b), *Energy Strategy 2050: From Coal, Oil and Gas to Green Energy*, Copenhagen, February.

Danish Government (2011c), *Vores Energi*, Copenhagen, November.

Danish National Bank (2010), *Monetary Review*, 2nd Quarter, Part 2.

Danish National Bank (2011), *Financial Stability Report*, Copenhagen.

de Serres, A., J. Llewellyn and P. Llewellyn (2011), "The Political Economy of Climate Change Mitigation Policies: How to Build a Constituency to Address Global Warming?", *OECD Economic Department Working Papers*, No. 887.

Financial Stability Board (2011), *Policy Measures to Address Systemically Important Financial Institutions*, Basel.

Growth Forum (2011), *Ny Vaekst Danmark Hovedkonklusioner Fra Vaekstforum*, Copenhagen.

Hagemann, R. (2010), "Improving Fiscal Performance through Fiscal Councils", *OECD Economics Department Working Papers*, No. 829.

Hopenhayn, H. and R. Rogerson (1993), "Job Turnover and Policy Evaluation: A General Equilibrium Analysis", *Journal of Political Economy*, Vol. 101, No. 5.

IMF (2010), "Denmark: 2010 Article IV Consultation", *IMF Country Report*, No. 10/365.

Joumard, I. and P. Kongsrud (2003), "Fiscal Relations across Government Levels", *OECD Economics Department Working Papers*, No. 375.

Joumard, I., P. Hoeller, C. André and C. Nicq (2010), *Health Care Systems: Efficiency and Policy Settings*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264094901-en*.

Nusche, D. (2009), "What Works in Migrant Education?: A Review of Evidence and Policy Options", *OECD Education Working Papers*, No. 22.

Nusche, D., G. Wurzburg and B. Naughton (2010), *OECD Reviews of Migrant Education: Denmark*, OECD, Paris, *www.oecd.org/dataoecd/54/17/44855206.pdf*.

OECD (2005), *OECD Economic Surveys: Denmark*, Paris.

OECD (2009), *OECD Economic Surveys: Denmark*, Paris.

OECD (2010a), *OECD Economic Outlook* No. 87, *Special Chapter: Returning to Work*, OECD, Paris.

OECD (2010b), *Sickness, Disability and Work: Breaking the Barriers – A Synthesis of Findings across OECD Countries*, OECD, Paris.

OECD (2010c), *Annual Report on Competition Policy Developments in Denmark 2009*, Paris.

OECD (2010d), *Taxation, Innovation and the Environment*, OECD, Paris.

OECD (2011a), *Compendium of OECD Well-Being Indicators*, Paris.

OECD (2011b), *Taxing Wages*, OECD, Paris.

OECD (2011c), *Fostering Innovation for Green Growth*, Paris.

Sabel, C., A. Saxenian, R. Miettinen, P. Kristensen, and J. Hautamäki (2010), "Individualized Service Provision in the New Welfare State: Lessons from Special Education in Finland", *Copenhagen Business School Working Papers*, No. 73.

Schich, S. and B. Kim (2010), "Systemic Financial Crises: How to Fund Resolution", *Financial Market Trends*, No. 2.

Shewbridge, C., E. Jang, P. Matthews and P. Santiago (2011), *OECD Reviews of Evaluation and Assessment in Education: Denmark*, OECD, Paris.

Vastrup, C. (2002), "Bankproblemer i Danmark 1984-1994", paper presented at a conference arranged by the Banking, Insurance and Securities Commission of Norway, September.

ANNEX A1

Progress in structural reform

This annex follows up on recommendations set out in previous *OECD Economic Surveys*.

Recommendations from previous *Surveys*	Action taken since the November 2009 *Survey*
Labour market	
Phase out the Voluntary Early Retirement Pension (VERP) scheme.	With the reform of the early retirement scheme adopted in 2011, the entry age to this programme has increased by four years (up from two years as planned previously) and this increase is brought forward by five years to start in 2014. As previously agreed, the national old-age pension age has been raised by two years from 65 to 67, but this rise is also brought forward by five years to start in 2019. Further increases in both of these entry ages will take place in line with increases in life expectancy, as previously agreed.
To move the unemployed into employment faster, the unemployment benefit entitlement period should be cut from four to two years.	With the 2010 Fiscal Consolidation Agreement, the maximum duration of unemployment benefits is cut from four to two years. However, the new government has postponed the implementation of the reform by six months.
Consider gradually reducing the unemployment benefit replacement rate over the benefit entitlement period.	No action.
To improve the effectiveness of active labour market policies, all the unemployed should be required to take a one-week job search training course within three months of becoming unemployed.	Since the summer of 2009, the first compulsory job interview and compulsory activation have been brought forward to one month after unemployment for unemployment benefit recipients aged below 30 years.
To help manage the inflow into disability pension entitlement, a new development path should be established for people whose low working capacity has some potential to be improved.	No action.
Reduce the maximum *Fleksjob* wage subsidy further to be equal to the disability pension or lower, and pay a lower benefit for the hours not worked. Review each *Fleksjob* case on a regular basis and scale down the wage subsidy when the person's work ability improves.	No action.
To better align funding with municipalities' responsibilities for labour market programmes, municipalities should receive proportionally less reimbursement for the costs of public benefits the longer a person is receiving benefits.	The reimbursement scheme has been reformed in 2011 in order to enhance municipalities' economic incentives to activate unemployed people through job training or formal education.
Productivity	
Further income tax cuts for higher incomes would promote entrepreneurship and human capital formation.	The 2010 Fiscal Consolidation Agreement postponed the increase in the threshold for paying the upper marginal tax.
Entrepreneurship policies should not focus too narrowly on young high-growth firms since there is evidence that not all high-growth firms are young.	A loan guarantee scheme available to all firms has been boosted in 2009-10. The government proposed a new package of measures entitled "Denmark as a growth country" in May 2011, focusing on boosting the growth of small and medium-sized companies by strengthening their financial options, enhancing their internationalisation and reducing administrative barriers. In this context, the existing but provisional working capital guarantee scheme managed by the export credit agency was made permanent. In November 2011, a new programme called "Growth Through Leadership" was set up to assist SME managers with a view to boost SME growth.
Entrepreneurship education programmes need to be designed in a way that incorporates practical work experience as an employee in order to improve students' understanding of running a business.	The Danish Foundation for Entrepreneurship was established in 2010 as part of the "Strategy for Education and Training in Entrepreneurship" and is intended to create a coherent national commitment to education and training in entrepreneurship.

Recommendations from previous *Surveys*	Action taken since the November 2009 *Survey*
Further efforts are needed to streamline immigration processing to ensure that high-skilled workers can quickly and easily migrate to Denmark.	A high-level working group established in 2011, to discuss initiatives on how to create optimal conditions for recruiting high-skilled labour. A special, lower tax bracket has been established for international scientists and experts working in Denmark.
Consideration needs to be given to whether tax incentives could be used as well as, or instead of, direct expenditure as a tool to promote investment in R&D.	A tax credit for R&D activities of some enterprises has been proposed in the Fiscal Bill for 2012.
Human capital	
Since pre-school class has been made compulsory, further strengthening its educational content should be undertaken to make it effectively the first year of primary education.	In 2010, a common framework for early language support of all children from the age of three was created.
The voluntary 10th year could be scaled back and targeted at those students most in need of further development.	Since 2010, municipalities can collaborate with an institution for vocational education and training on the 10th form, with a view to make it the beginning of youth education rather than the conclusion of the basic school.
Develop school management and incentives to get more value for the comparatively ample resources that are available for compulsory education in Denmark. Develop outcome measures and hold managers accountable.	No action. However, the "360 degrees review" in early 2010 recommended to offer school leaders and municipal education directors special management training to focus more on targets and results.
Introduce accreditation of teachers and give more weight to teachers' specific competencies when allocating tasks among staff. Introduce more wage flexibility.	No action.
Continue to develop the "culture of evaluation" in the school system by improving local implementation of the national policy framework, enhancing data collection and providing more training on evaluation techniques for school staff.	Actions to stimulate evaluation and assessment activities include new national bodies to monitor and evaluate quality in compulsory education, new national measures on student outcomes in compulsory education, introduction of compulsory electronic tests and requirements for municipalities to produce annual quality reports on their school systems.
A broad strategy is needed to better integrate immigrants and the second generation in the education system, starting at compulsory level.	In 2010, the government's Task Force for Teaching Bilingual Children launched a national campaign to raise awareness of weak academic performance of bilingual children, and provides schools with a range of tools and methods to address the issue. Since 2010, a report on the high drop-out rate of minority male students from vocational training has been published, giving advice on good teaching practices. In 2011, the government allocated 42 million DKK for a development programme, aimed at strengthening the academic performance of bilingual children in compulsory education.
Increasing completion rates must be a top priority. It requires review of the disparate array of paths/degrees.	Legislation was passed in August 2010 giving more responsibility to educational institutions as regards improving completion rates.
Review the structure of apprenticeships and programmes to make sure that they are well anchored into a generic competence structure. Consider whether practical elements can be introduced earlier in vocational education programmes.	As part of the Youth Packages 1 and 2 in Autumn 2009, vocational training curricula were evaluated to assess whether unnecessarily stringent demands were made on students in terms of theoretical knowledge. Also, school-based practical training was extended for youth who fail to obtain an apprenticeship. In October 2011, the new government announced its aim to ensure that all trainees obtain apprenticeships in order to finish their vocational education and training.
Reconsider the recent rise in earnings ceilings under the very generous public grants for student living costs.	No action.
Consider gradually replacing some of today's student grants with loans, particularly if studies are prolonged.	No action.
Move gradually towards a system where not only non-EU students, but also Danish and EU students are charged for tuition, while extending income-contingent loans to finance tuition costs.	No action.
Universities should be given greater flexibility and incentives to improve, including through tuition fees.	No action.
Continue to focus on the factors affecting integration of immigrants into the labour market, including visa processing and qualification recognition.	Visa processing is currently being modernised by developing a new online system. The new government aims to improve the qualification recognition process through enhanced co-operation with foreign education authorities, and to design flexible training courses, enabling foreign workers to become certified in fields such as engineering and medical work. In February 2010, a work plan entitled "Denmark 2020" was launched to strengthen the integration of migrants into the labour market. In October 2010, a "Four Partite Agreement" was signed to improve education for the offspring of immigrants in order to provide them with more labour market opportunities.
Encourage private institutions to establish more international schools to cater for children of foreign workers living temporarily in Denmark.	In April 2010, new legislation was introduced for privately owned and self-administered international schools, allowing them to establish branches away from their own premises.

Chapter 1

Consolidating public finances

Denmark stands out as a country with sound public finances. Public debt and the deficit are relatively low. So is the foreseeable impact of ageing on public finances compared with many other OECD countries. Nevertheless, the very high level of public expenditures and hence, of taxes, as well as difficulties in controlling these expenditures, have negative effects on the economy and could threaten public finances in the longer run. Consolidating public finances would require addressing the core of the problem, which partly lies in the fiscal relations between levels of government. There is also room to increase the efficiency of public spending in some areas such as health and education.

Denmark's public finances are sound compared with many other OECD countries. The debt-to-GDP ratio increased during the economic and financial crisis, but remains well below the 60% EU ceiling. The fiscal deficit, close to 4% of GDP in 2011, is far below the EU and OECD averages. Going forward, the impact of ageing is expected to be limited, partly because the pension age has already been indexed to life expectancy. A Consolidation Agreement plan was introduced in 2010 and the newly elected government has announced it will comply with EU commitments under the Stability and Growth Pact.

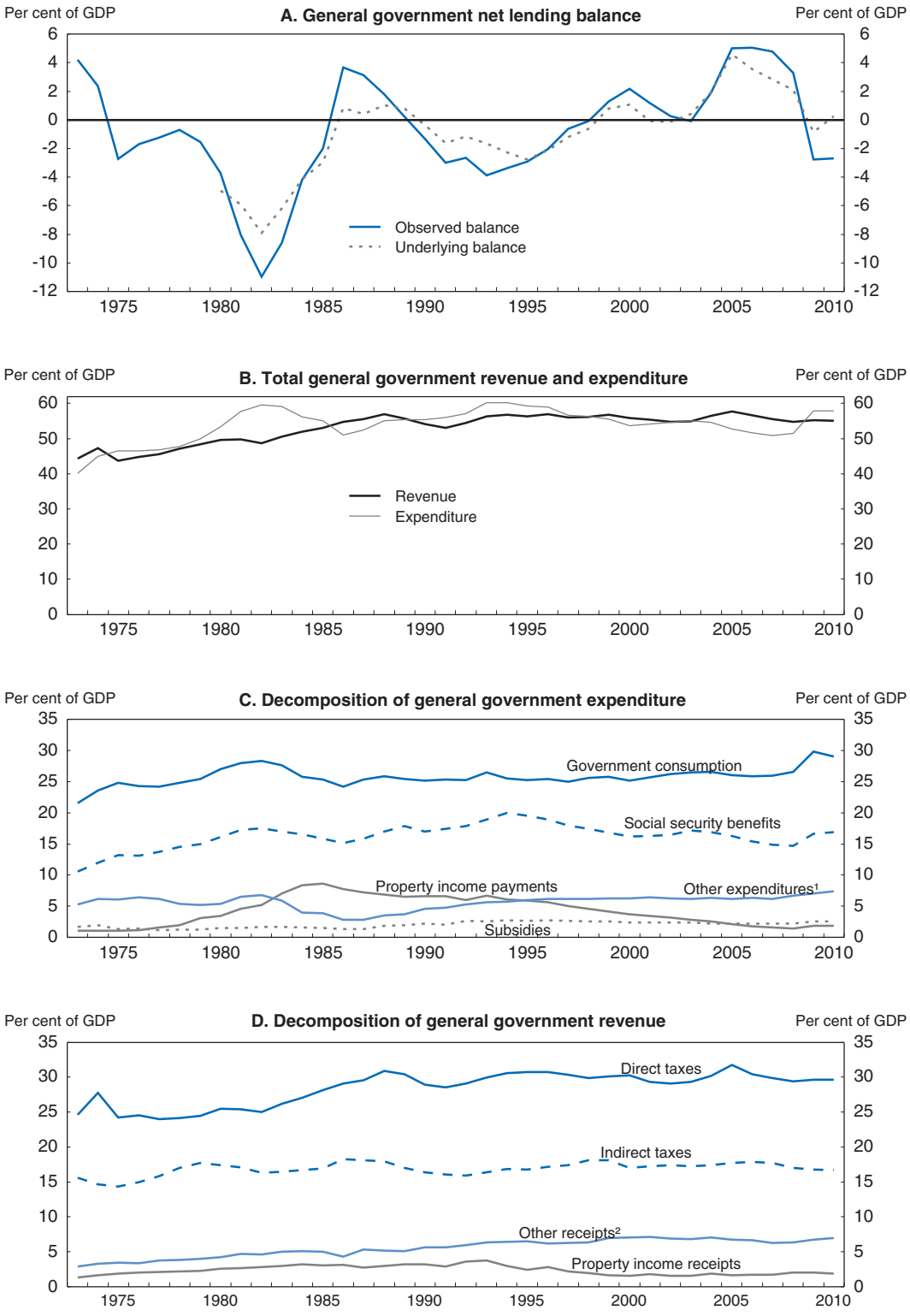
Nevertheless, Denmark faces a number of fiscal challenges. The global crisis led to an increase in government outlays, which are now the highest in the OECD as a share of GDP. This is not necessarily a problem *per se*, but it implies a heavy tax burden and past experience shows that Denmark has often failed to control public expenditures, including in times of strong economic growth. To finance these large expenditures, the tax burden has to be high – the highest among OECD countries. The large size of the public sector and high taxes, especially on labour, have negative effects for the economy, contributing to relatively weak productivity growth although the mix of expenditures can to some extent mitigate this negative effect (Cook *et al.*, 2011; Bassanini *et al.*, 2001).

Consolidating public finances in Denmark appears at first sight to require only moderate efforts: the deficit is not large, there are margins to reduce public expenditure at a relatively low social cost and there is some consensus for reducing at least some of these expenditures. However, past efforts to contain public expenditure have failed, suggesting that the problem does not stem from a lack of plans and targets but from weak implementation. This chapter sets out ways to consolidate public finances in Denmark by addressing the core of the problem, which mainly lies in the fiscal relations between levels of government. The chapter also discusses how to boost the efficiency of public spending and to improve the tax system. Reforms along these lines should help Denmark reduce the growth-inhibiting effects of high taxation.

Controlling public expenditure is a long-standing challenge

In many respects, Denmark's current public finance position compares favourably with most other OECD countries with a debt-to-GDP ratio below 50% and a general government deficit at less than 3% of GDP in 2010. This is largely because Denmark built up sizeable general government surpluses in the 2000s, following earlier spells of fiscal stress (Figure 1.1). The fiscal situation has deteriorated substantially during the current crisis, but as Denmark entered the crisis in a strong position, the budget deficit has remained moderate both compared to Denmark's past experience and to other OECD countries. The deterioration primarily reflected a large increase in public expenditure, due to both relatively large automatic stabilisers and discretionary measures, from already high levels. Indeed, Denmark failed to take advantage of buoyant economic times to bring spending down. Concomitantly, tax pressure remained very high, with ample revenues from North Sea oil and gas contributing to large budget surpluses.

Figure 1.1. **Public finance trends in Denmark**



1. Includes government investment, other current payments, capital transfers paid and other capital payments minus government consumption of fixed capital.
2. Includes social security contributions, other current receipts, capital tax and transfers receipts.

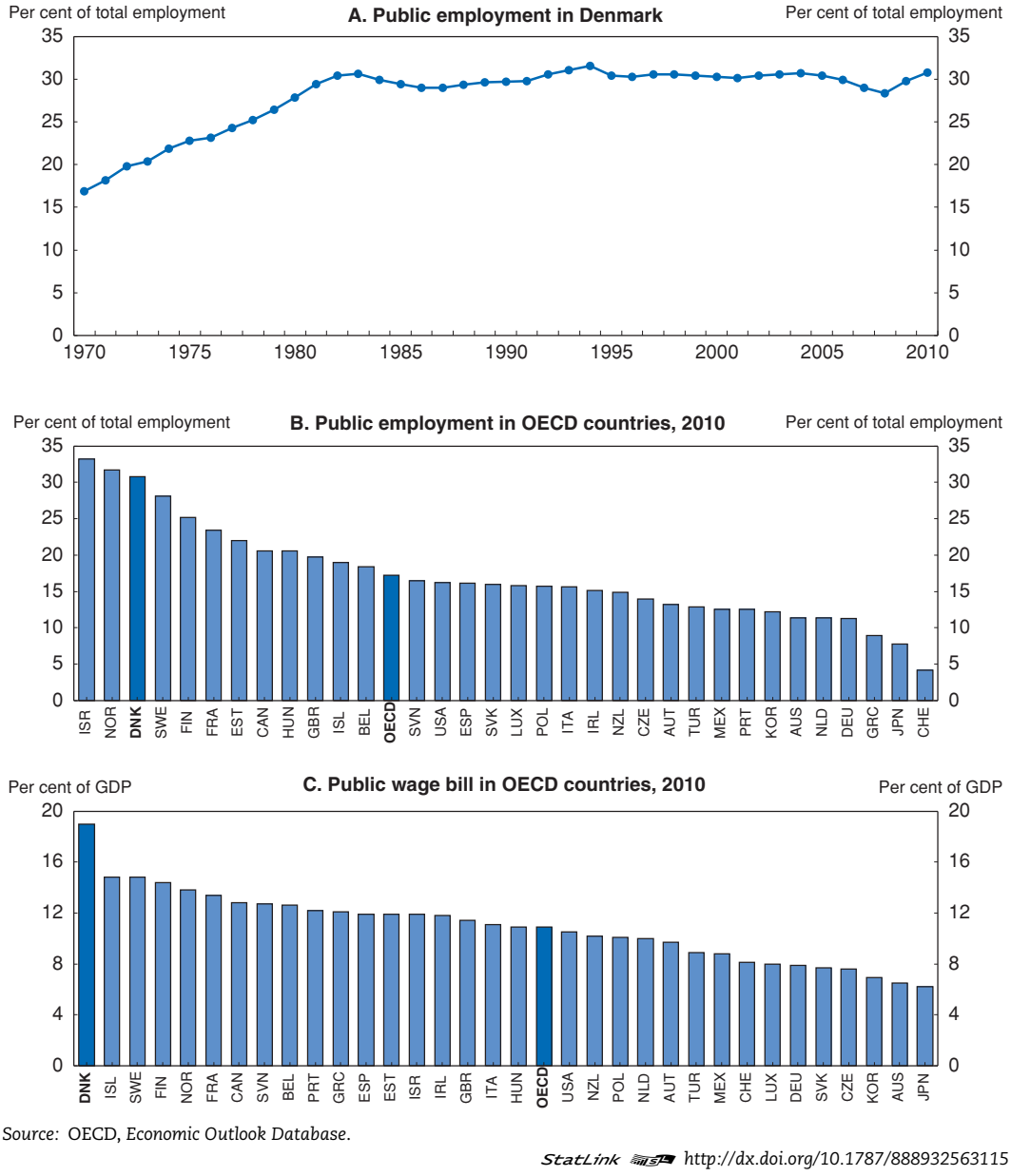
Source: OECD, *Economic Outlook Database*.

StatLink http://dx.doi.org/10.1787/888932563096

Government consumption accounts for the bulk of public expenditure, reflecting high public employment (Figure 1.2). The share of public employment has remained around 30% over the past three decades, one of the largest shares in the OECD, and public expenditure on wages (in relation to GDP) is the highest in the OECD.

Denmark's very high level of public expenditure reflects a generous welfare system that provides a broad range of services to the population, including education and health, has helped keep inequality in check and has ensured a high level of well-being (Figure 1.3). Social expenditures, in particular on incapacity, unemployment and health benefits, are

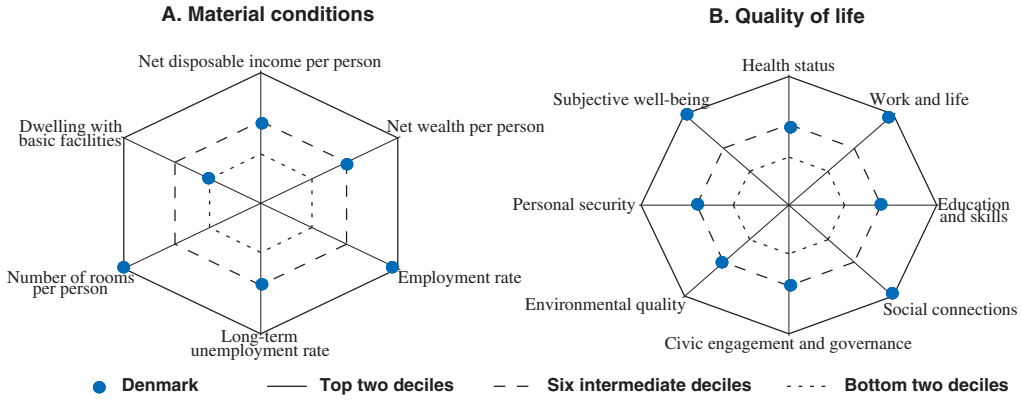
Figure 1.2. **Wages and employment in the public sector**



Source: OECD, *Economic Outlook Database*.

StatLink http://dx.doi.org/10.1787/888932563115

Figure 1.3. **Well-being indicators**[1]



1. The figure shows for each of the indicators that have been selected in the Compendium of OECD well-being indicators how Denmark ranks compared to other OECD countries. For example, Denmark is in the top two deciles for the employment rate, and in the bottom two deciles as regards dwellings with basic facilities.

Source: OECD (2011), *Compendium of OECD well-being indicators*.

StatLink http://dx.doi.org/10.1787/888932563134

high compared with other OECD countries, although once the impact of the tax system and of private benefits on social expenditure is accounted for, Denmark's net social spending ranks somewhat lower (Table 1.1, Adema and Ladaique, 2009). However, a high overall level of public expenditure can also have detrimental effects on the economy (Box 1.1).

Looking forward, Denmark will face additional public finance pressures. Spending related to population ageing and health care will rise, though less than in many other OECD countries (European Commission, 2009; IMF, 2010). Overall, population ageing is expected to be limited compared to other EU countries, but it is already well advanced, with the peak of the working-age population likely reached in 2009 and a marked ageing of the population expected for the next two decades. Furthermore, while Denmark has benefited from migration inflows at times when the unemployment rate was very low, immigration could be less important in future as neighbouring countries such as Germany and Sweden, also age. Revenues from North Sea petroleum, which amounted to 1.6% of GDP per year on average over 2004-09, are expected to decline sharply after 2040.

Some measures have been introduced to consolidate public finances and to limit public debt accumulation to prudent levels. The May 2010 Fiscal Consolidation Agreement, which included a plan to have zero growth in public consumption in real terms for 2011-13, was to improve the structural balance by 1.5% of GDP over this period. Furthermore, the adoption in December 2011 of the reform of the voluntary early retirement programmes significantly improves long-term public finances (see below). However, in its Budget Bill for 2012, the new government has announced some increases in public expenditures that would require raising taxes further to meet the EU commitment for 2013 (under the excessive deficit procedure) and its target to have a structural fiscal balance by 2020.

Better public expenditure control is called for to avoid the size of the public sector being too much of a drag on economic growth. Public expenditure rose markedly during the crisis and was around 58% of GDP in 2011. Just returning to the pre-crisis public expenditure-to-GDP ratio would necessitate a major adjustment in spending growth.

Table 1.1. **Social public expenditure in OECD countries**

Per cent of GDP in 2007

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

1. Weighted average of 34 countries.
2. Active labour market programmes.
3. Net publicly mandated social expenditure, which account for the effect of government intervention through the tax system on social spending. It includes: *i)* direct taxes and social security contributions on cash transfers, *ii)* indirect taxes on goods and services bought by benefit recipients and *iii)* tax breaks with a social purpose.

Source: OECD (2010), *Social Expenditure Database*, 1980-2007, Paris (*www.oecd.org/els/social/expenditure*).

Taking measures to better control public expenditure and to consolidate public finances in the longer term would leave room for short-term policy action, such as the fiscal stimulus presented by the new government. In fact, it would enhance its effectiveness in so far as Ricardian equivalence effects are less potent when the government is seen to have a better grip on public spending, so that firms and households anticipate that more spending today will be financed by less spending in good times rather than by higher taxes (Corsetti *et al.*, 2010).

Box 1.1. **Some links between the size of the public sector and productivity growth**

The large size of the public sector is the counterpart of the Danish welfare system that aims at providing free and wide access to education and health, at supporting those in need and at other objectives such as being a safe and clean country. This system has succeeded in providing the Danes with a high level of well-being in terms of material conditions and quality of life. However, a high level of public expenditures can also have some negative effects on the economy and act as a drag on productivity growth:

- High public expenditures require high taxes. While the design of the tax system can help limit economic distortions (Arnold *et al.*, 2011), the higher the burden of taxes, the more difficult it becomes to find a structure of taxes that limits distortions on labour and investment in particular. High marginal taxes on income discourage workers from taking more demanding and more productive jobs. High taxes can also be a barrier to attract productive workers or firms from other countries.
- The large size of the public sector may have led to some labour misallocation. The public sector employs a relatively large share of highly-educated workers (Danish Economic Council, 2010a). High marginal tax rates, better work conditions in the public sector and relatively moderate wage dispersion may have discouraged skilled workers from taking jobs with high productivity growth potential in the private sector. It can also be argued that, given high tax rates, students don't face strong incentives to undertake courses in more promising but also more demanding fields. The ensuing misallocation of skilled workers in the economy may partly explain the weak Danish productivity growth (OECD, 2009), especially in an era of globalisation that makes it even more important to develop highly skilled and innovative activities.
- The large size of the public sector also implies that some sectors of the economy are likely to be less open to competition. This is the case for instance of the health sector, in which the dominance of public sector provision can reduce incentives to innovate and to raise productivity.

Strengthening the fiscal framework at the central level

Denmark has been gradually formalising and strengthening its policy framework since the early 1990s. The EU deficit and debt norms and the requirement to provide a convergence programme were a first step. In 1997, the government published its first medium-term plan, *Denmark 2005*, which included fiscal targets and various labour market and social policy goals. Since then, the government has presented regular medium-term fiscal programmes with targets for the debt-to-GDP ratio, the structural budget balance and real public consumption growth, the latest one being the *2020 Fiscal Strategy* (released in early 2011). In addition, there is a long tradition of focusing on long-term issues, notably under the aegis of the Danish Economic Council and various commissions including the Growth Forum.

The current framework generally seems strong: it is transparent, looks at a medium-to-long-term horizon, and combines budget and expenditure rules that are generally found to be most effective for fiscal consolidation (Ayuso-i-Casala *et al.*, 2007; Guichard *et al.*, 2007). Nevertheless, fiscal outcomes have been mixed. The main targets covering the structural balance and long-term fiscal sustainability have generally been met. However, public consumption real growth targets have been systematically overshot,

so that, by 2007, the share of public consumption in GDP was 3 percentage points above the target implied by the successive medium-term frameworks. The gaps between outcomes and targets suggest that the fiscal framework should be strengthened.

As past rules on government spending and debt failed to contain public expenditures, previous governments tried to act on the revenue side by introducing a so-called "tax freeze" in 2001. The freeze applied to both direct and indirect taxes (OECD, 2006). For taxes set in *ad valorem* terms, the rates could not be raised and for taxes set as nominal amounts, the latter could not be raised either. The tax on real property was initially based on a percentage of the assessed property value, but under the tax freeze, the valuation could not exceed the 2001 valuation plus 5%. The main advantages of the tax freeze were its simplicity and that it may have acted as a disciplining device. However, it failed to contain public expenditures, even though they might have grown faster in the absence of the tax freeze. The failure of the tax freeze partly comes from weaknesses of the instrument. A tax freeze may in fact hinder tax cuts insofar as governments may be reluctant to lower tax rates knowing that the tax freeze will make it difficult to raise them in the future. Another weakness of a tax freeze is that it may lock inefficiencies into the tax structure, by making it impossible to raise efficient taxes while leaving inefficient ones in place, even if the result is revenue neutral. For instance, it has led to low property taxes, which contributed to the housing market boom (see below). The Budget Bill for 2012 has effectively put an end to the tax freeze with increases in indirect taxes while the property value tax will continue to be frozen (Box 1.2).

Some features of the Danish political system may have contributed to the weak enforcement of fiscal rules. The election process, since it determines the extent to which policymakers will be held responsible for their actions, can play an important role in fiscal outcomes (von Hagen, 2002). The Danish election system rests on proportional representation, which tends to lead to higher levels of general public goods than plurality voting systems (Persson and Tabellini, 1999). This is because proportional representation weakens personal accountability, as voters can assess only the average performance of all candidates elected from the party list. Another important feature of the Danish system is that most governments have been coalition governments, which favours cross-party compromises on policies.

Against this backdrop, it is particularly important to have mechanisms that ensure enforcement of fiscal rules. A centralised and transparent budget process may help (von Hagen, 2002). Also, the probability of meeting fiscal rules is greater when they have a legal basis with no margin for adjusting the objectives, are monitored by independent authorities and by the media and include automatic correction and sanction mechanisms in case of non-compliance (European Commission, 2006 and Ayuso-i-Casals *et al.*, 2007).

The new government has recently proposed to introduce expenditure ceilings anchored into a law, one for each level of government (state, regions and municipalities), which is a step in the right direction and should help avoid fiscal slippages (Box 1.2). These expenditure ceilings should cover a medium-term horizon and include most public spending (not only public consumption) though perhaps excluding investment and cyclically-sensitive spending such as unemployment benefits. It is also important to have mechanisms to correct for deviations from the intended path. Prioritising public expenditures can help here by providing a basis for postponing or giving up some

expenditures. In Sweden for instance, expenditures are ranked according to their costs and benefits and any increases are examined in relation to the fiscal space associated with the expenditure ceiling and the surplus target (Swedish Ministry of Finance, 2011). This can also help limit the risk that temporary increases in revenues lead to permanent increases in spending. Having public expenditure ceilings with strong enforcement mechanisms is particularly important for Denmark given its large and volatile revenues (from taxes on North Sea oil production and on pension fund earnings). Entrusting the Danish Economic Council more explicitly with the assessment of long-term fiscal sustainability and the fulfilment of expenditure ceilings and giving it broad access to the needed data would also help contain public expenditure growth.

Box 1.2. **Recent and proposed public finance measures**

Fiscal stimulus and new expenditures

The Budget Bill for 2012, unveiled by the new government on 3 November 2011, includes a fiscal stimulus package amounting to 1% of GDP in total (DKK 10 billion in 2012 and DKK 8 billion in 2013). It consists of investments in highways, schools, hospitals and energy efficiency, with 40% of them corresponding to the front-loading of public investments planned for 2014-20.

In addition, expenditure increases have been proposed in various areas, including the following ones:

- *Labour market.* The duration for receiving unemployment benefits, which had been cut from four to two years as part of the May 2010 Fiscal Consolidation Plan, is temporarily extended by six months for the unemployed who will have exhausted their unemployment benefits in the second half of 2012. The price ceiling on the six-week courses in which the unemployed can enrol – and which are paid for by public employment services – is abolished for low-skilled and vocationally educated workers. Recipients of social assistance will be able to take up to five weeks of holidays and continue to receive benefits.
- *Education.* The size of classes should not exceed 28 pupils on average in high schools. Funding is increased for vocational training. The proposal made by the previous government to reduce the duration of grants in tertiary education is withdrawn.
- *Health.* Funding is increased and user fees are reduced for some specific treatments and vaccination.
- *Poverty.* The rules for entitlement to social assistance are eased. In particular, the rule that used to require that spouses who both receive cash assistance and are able to work must have worked within the last 12 months, is abolished. The ceiling on the overall amount of social assistance and housing benefits that can be received is removed and the special low rates for new migrants are abolished. A job premium is tested in a two-year pilot scheme: recipients of social assistance who take a job earning more than DKK 15000 per month will receive a 4% tax-free premium. Case management is strengthened for the weakest recipients of social assistance.
- *Environment.* New spending concerns the development of buffer zones around water wells to reduce water pollution and measures to limit the use of dangerous chemicals.

Box 1.2. **Recent and proposed public finance measures** *(cont.)*

Taxation

A "fat tax" took effect on 1 October 2011, of DKK 16 (EUR 2.1) per kilogramme of saturated fat on any food that contains more than 2.3% thereof.

The Budget Bill for 2012 puts an end to the tax freeze, with increases in excise taxes, in taxes on soft drinks, chocolate and sweets, ice cream and air pollution (nitrogen oxides), the abolishment of tax exemptions for private health insurance and some other changes.

The new government has also announced a tax reform to raise labour supply (see below).

Fiscal targets

- Improvement of the structural budget balance by 1.5% of GDP over 2011-13, in line with the EU Stability and Growth Pact requirements.
- Structurally balanced public finances in 2020.
- Public debt below the EU threshold.

The new government has announced that a budget law will be proposed in Spring 2012 to introduce mandatory spending limits for the state, the municipalities and the regions.

These goals are to be achieved thanks to an increase in the labour supply by 135 000 persons by 2020 (about 4%) combined with a better management of public expenditure. The reforms of the unemployment benefit system as part of the May 2010 Fiscal Consolidation Plan and of the early retirement schemes are expected to raise the labour force by 80 000 persons. The remaining part of the increase (55 000) would be achieved through a tax reform and structural reforms yet to be specified as well as through negotiations with labour organisations.

Sub-central governments' public finances

The 2010 Fiscal Consolidation Agreement included measures to better control expenditures and taxes levied by municipalities:

- The possibility to cut the block grant by DKK 3 billion per year (or less than 0.2% of GDP) if actual or budgeted municipal expenditures increase more than agreed upon. 60% of the cut would apply to municipalities that do not comply with target and the rest to municipalities collectively.
- Increased sanctions, in the form of reduced grants, for the municipalities that increase taxes in a situation where the municipalities as a whole do not comply with the agreement on municipal taxation.
- Obligation to have political approval of the semi-annual accounts.
- Elements to improve the financial management and monitoring of hospitals by regions.

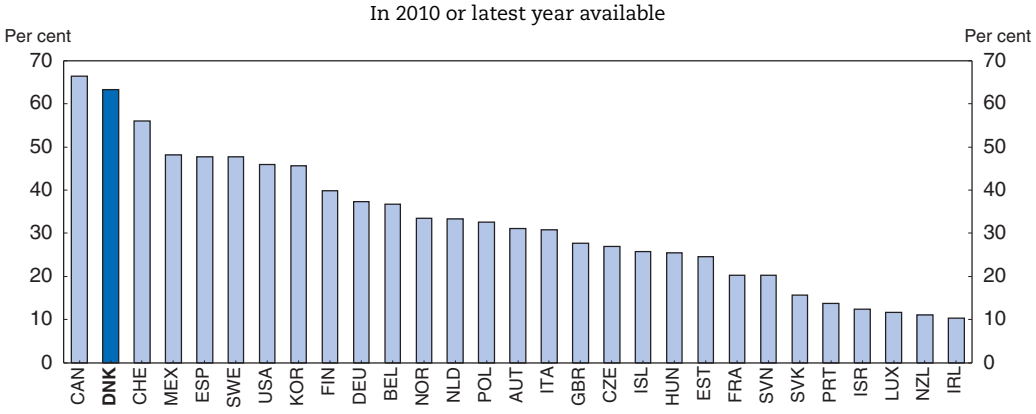
Strengthening the fiscal framework and enhancing self-governance at the sub-central levels

Efforts to contain municipalities' expenditures

Denmark is the OECD country with the second largest share of public expenditure at the local level (Figure 1.4). The increase in public spending observed at the general government level has been driven by sub-central levels, mainly municipalities, while spending from the central level has generally decreased (Figure 1.5). Even in 2004-06, when growth was very strong, spending at the local level as a share of GDP barely declined.

Figure 1.4. **Share of sub-central in total expenditure in OECD countries**[1]

In 2010 or latest year available

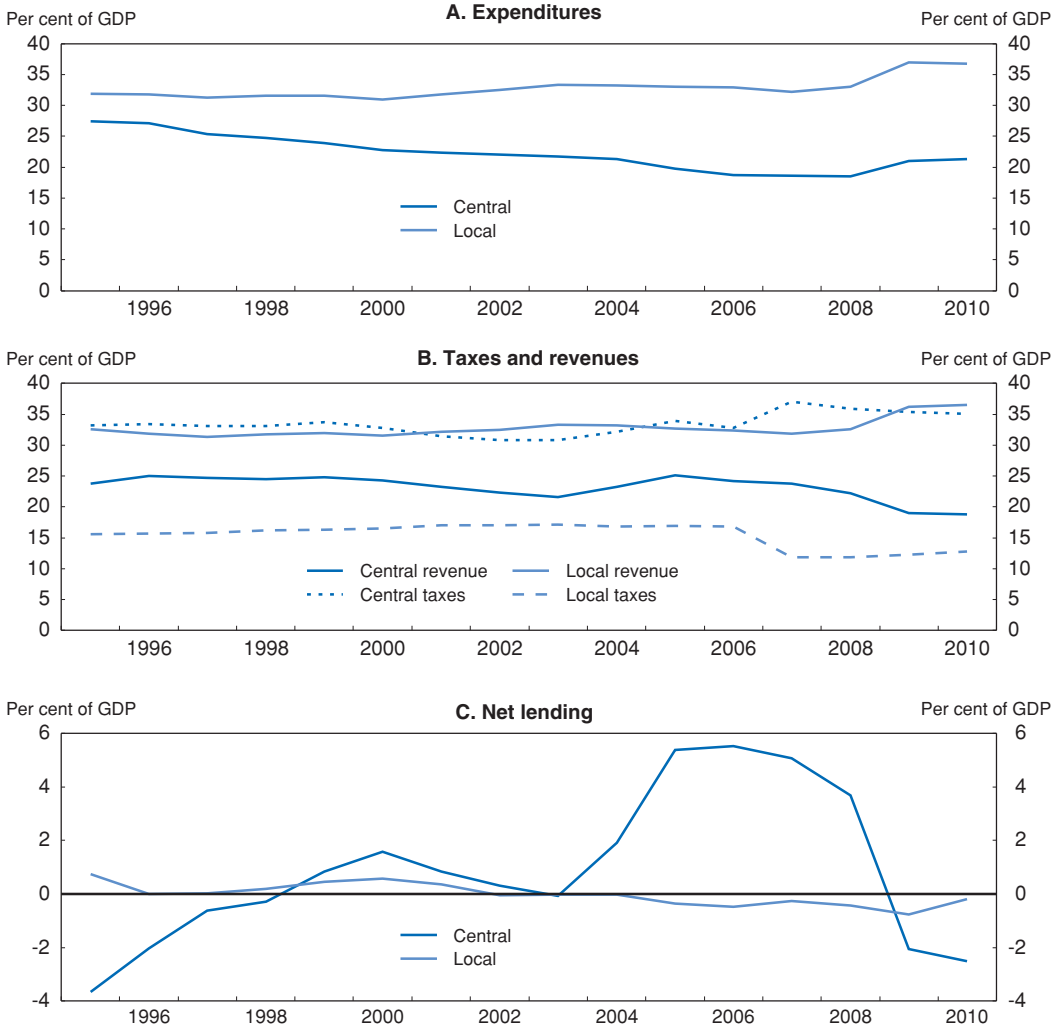


1. For Austria, Belgium, Canada, Germany, Mexico, Spain and Switzerland, "sub-central expenditures" include expenditures made at the state and local levels. For the United States, they show expenditures made at the state level.

Source: OECD, *Fiscal Decentralisation Database* (*www.oecd.org/ctp/federalism/stats*).

StatLink http://dx.doi.org/10.1787/888932563153

Figure 1.5. **Evolution of public finances at the central and local government levels**



Source: OECD, *Fiscal Decentralisation Database* (*www.oecd.org/ctp/federalism/stats*).

StatLink http://dx.doi.org/10.1787/888932563172

The role of municipalities increased as a number of responsibilities were gradually decentralised, but expenditure increases went beyond what the government had been expecting. This occurred despite fiscal rules for municipalities, including a prohibition on borrowing and a balanced budget requirement (Sutherland *et al.*, 2005) as municipalities used other sources of revenue such as own land. Moreover, while spending ceilings are negotiated with the central government (see below), they have consistently been exceeded in the past two decades. In addition to these rules, the central government has made various attempts to control sub-central outlays. In 2003, as part of the "tax freeze" introduced in 2001, municipalities were henceforth forbidden from collectively raising the average tax rate, with hikes in individual municipalities' tax rate having to be offset by cuts in other municipalities. This contrasts with the previous situation, where local governments had the right to fix their own tax rates.

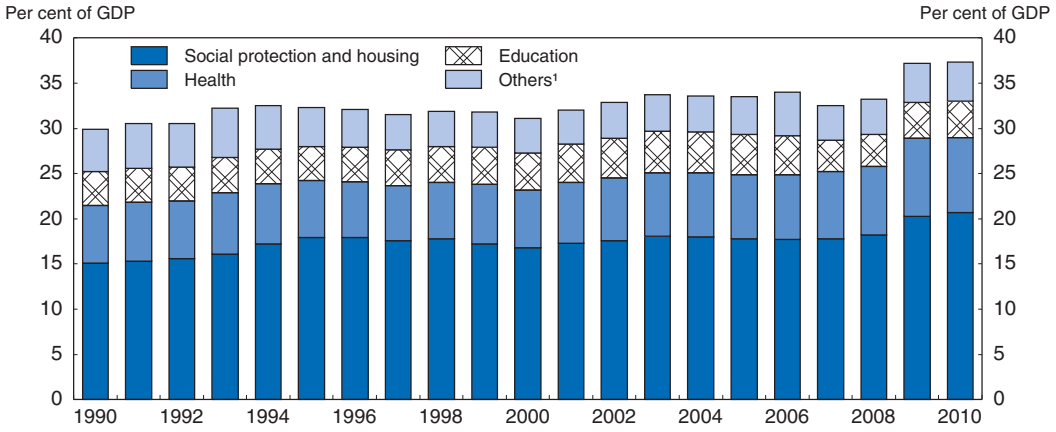
In 2007, a major institutional reform merged municipalities (reducing their number from 271 to 98), replaced the 13 counties by five regions, re-allocated tasks across levels of government, and changed financing and equalisation rules. The main objective was to adapt public service delivery to technological change and increasing demand (some small municipalities being unable to provide some social services). Nevertheless, the reform was also expected to contain expenditure by fostering economies of scale, though the government was recognised that such mergers might temporally push up expenditure (Ministry of Interior and Health, 2005). Municipalities have had to bear the costs of the mergers but were allowed to borrow to finance them and could keep the gains. For the moment, the reform has resulted in an increase in grants from the central government to finance services transferred to municipalities and regions (Blöchliger and Vammalle, 2012). For the reform to be cost-neutral, these additional costs will have to be compensated by future savings generated by the new set-up.

Reasons for the slippages in sub-central government budgets

The central government's failure to control local government finances, despite relatively stringent fiscal rules and various additional efforts reflect several factors, starting with the nature of local government spending. A large share thereof is on social protection policies and health, which have trended up (Figure 1.6). Social protection expenditures are politically sensitive, highly pro-cyclical and therefore difficult to control, especially at the local level. Fiscal pressures coming from population ageing have already started, with the share of people older than 65 on the rise. Furthermore, as productivity gains may be limited in some of these services (such as long-term care), employers may have to raise wages beyond productivity gains to attract workers, putting pressures on municipalities' expenditures. This factor may have played a role in Denmark, where unemployment fell significantly during the 15 years preceding the crisis, with some tight labour market spells. The 2007 local government reform might help contain the impact of rising costs in the health sector on local public expenditure, but its benefits will take time to materialise.

In Denmark, taxes accounted for 50% of total revenues of sub-central governments before the 2007 institutional reform and only 33% after the reform as tax revenues of regions have been replaced by grants (Figure 1.7). Taxes represent around 60% of municipalities' revenues, the remaining part primarily coming from grants. Financing through grants weakens the link between the costs of primarily services and taxes, creating an

Figure 1.6. **Local government expenditures by function in Denmark**



1. It corresponds to general public services; economic affairs; environment protection; defence; public order and safety; recreation, culture and religion.

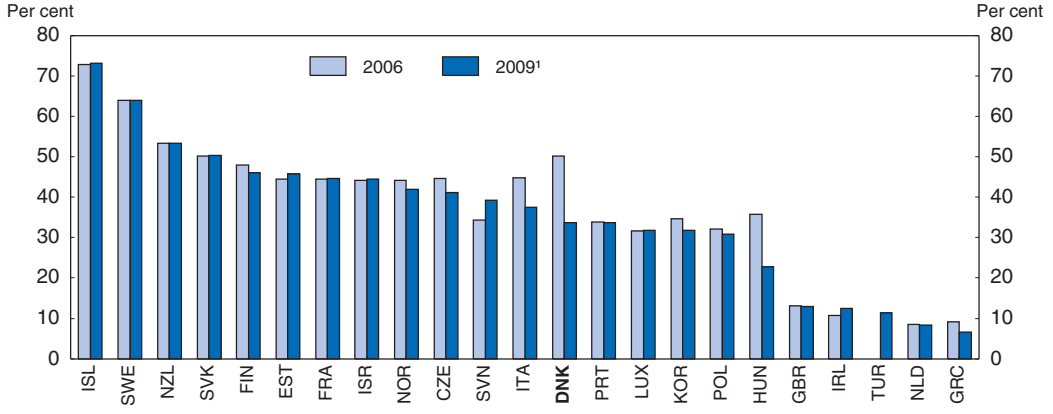
Source: OECD, *National Account Database*.

StatLink http://dx.doi.org/10.1787/888932563191

incentive at the local level to demand more services, even if the marginal benefit does not exceed the marginal cost and therefore leads to higher outlays and deficits (Hallerberg and Von Hagen, 1999; Careaga and Weingast, 2000; Blöchliger and Petzold, 2009). Grant systems may also cause sub-central governments to be less vigilant with their finances. Aware that the central government is helping them out, they increase their deficit, expecting to obtain higher grants in the next period. They then face a soft budget constraint and the growth of transfers from the central government becomes endogenous (Tanzi, 1995; Ter-Minassian, 1999). Indeed, grants were raised to finance overruns of spending. Nevertheless, since 1988, 29 municipalities have faced financial problems and have been subjected to special arrangements (Mau, 2011). These problems resulted from budget errors, non-compliance with borrowing regulations and overestimation of the tax base.

Figure 1.7. **Revenue composition of sub-central governments**

Share of local taxes in total revenues, consolidated account



1. Or latest year available.

Source: OECD, *Fiscal Decentralisation Database* (*www.oecd.org/ctp/federalism/stats*).

StatLink http://dx.doi.org/10.1787/888932563210

Furthermore, some of the specificities of the Danish set-up increase the risks of having the second type mechanism at work, *i.e.* a soft-budget constraint with endogenous transfers. Local spending for the following year, grants, expected price and wage developments in the public sector, expected tax revenues and net borrowing are all negotiated between the central government and the local government association representing municipalities (called KL). This was supposed to create agreement between central and sub-central governments in which the former gets support for its policy and can influence local public expenditure and taxes, while municipalities have a say on the level of grants. However, in practice the system has generally failed to achieve its objectives. It has been in place for 31 years but the agreements were enforced only between 1983 and 1991, when local tax hikes beyond those agreed in negotiations were sanctioned by cuts in general grants (Lotz, 2010). As those sanctions were aggressive, they were thought to have ruined the negotiation system and were then abandoned until recently.

The negotiation process between the government and KL tends to soften municipalities' budget constraint for several reasons (Lotz, 2010):

- The agreement that sets a ceiling for local public expenditure and grants to municipalities is negotiated by KL, not directly by municipalities, and is not legally binding. Hence, individual municipalities do not feel strongly bound by the agreement and, in practice, ceilings have been systematically overshot. The national budget, which can include measures that affect local public finances, is adopted by Parliament after local budgets have been drawn up, which gives incentives to re-negotiate the agreement (Danish Economic Council, 2002). In recent years (2009 and 2010), municipalities have generally planned to have expenditures in line with the negotiated ceiling in their budgets but some slippages have been observed.
- The formula to set grants is very complex, as these grants are used to finance various policies that are mainly decided at the central level. This gives municipalities some leeway to try to negotiate higher grants.
- Once an agreement has been reached as a result of the negotiation process, it is presented to Parliament. In practice, Parliament has found itself obliged to accept the proposed agreement, because of the large costs and uncertainties of reopening the negotiations.

The tax freeze may also have weakened municipalities' budget constraint, contributing to a lack of control of local public expenditures. As taxes were frozen, municipalities have managed to find other sources of revenue, such as their own resources (land for instance) and higher grants. The tax freeze has put more pressure on the negotiation process between the government and KL as it became even more crucial to receive high grants since tax increases were constrained. It has also discouraged municipalities from cutting tax rates (and hence expenditure), as there was a risk of not being able to increase them again in the future. Following the tax freeze, few municipalities lowered their tax rates and the average tax rate remained broadly constant.[1] The government tried to remedy this problem by guaranteeing municipalities that, if they reduce their tax rates, they will be allowed to raise them again in the future without individual sanctions. Overall, the tax freeze has led to a situation where some municipalities benefiting from good demographic and economic conditions could have cut their tax rates, but dared not do so; while others with unfavourable conditions were in need of tax increases they were unable to make.

Finally, another feature of the Danish system is the disconnect between the large share of decentralised public expenditures and the real power of municipalities over them in areas where they are largely determined by regulations and standards set at the central level (Table 1.2). When municipalities have limited power over their budgets, they may tend to function as agencies funded and regulated by the state government rather than as independent policymakers, which might explain why they face difficulties in setting spending priorities or enforcing spending cuts. Furthermore, when local self-governance is weak, the central government is implicitly responsible for the quality of services provided at the local level, giving it a reason to intervene in the case of fiscal problems, which in turn generates expectations at the local level that fiscal problems will be solved by the central government. A pilot OECD survey has measured the "spending power" of local government for a group of countries, including Denmark, in four policy areas – child care, elderly care, education and public transports (Bach *et al.*, 2009). The indicator measures the extent to which services provided by sub-central governments are governed by rules and regulations set centrally. It shows that in the four areas under consideration, local authorities' spending powers are limited in Denmark.[2]

Table 1.2. **Allocation of social policy responsibilities between levels of government**

	State	Regions	Municipalities
Employment	Set the framework for ALMPs and the various steps for the unemployed		Responsibility for all unemployed
			Job centres
Social services	Set guidelines and rules on the levels of social benefits for receiving them	May provide highly specialised services to specific groups on behalf of municipalities	Total regulatory, supply and financing responsibility
	Counselling through the VISO organisation		Act as a purchaser of highly specialised services from regions or can supply the same services directly
Health care	Specialty planning	Hospitals	Preventive treatment, out-patient care and rehabilitation
	Set regulations on pharmaceuticals	Psychiatry	Home care
	Decide overall expenditures for regional health care	General practitioners and specialists	Treatment of alcohol and drug abuse
	Monitor quality and efficiency		
Education	Set goals and regulations for primary, secondary and tertiary education	Development projects for youth education	Public primary and lower secondary school
	Set regulations of self-governed institutions: upper secondary schools, centres for vocational training and education, centres for adult education, academies of professional higher education and universities	May provide highly specialised education on behalf of municipalities	Specialised education. Act as purchaser of highly specialised services from regions, or may supply the same services themselves
			Educational guidance

Source: Danish Ministry of Interior and Health, *The Local Government Reform* and OECD.

Solving the problem

The 2010 Fiscal Consolidation Agreement introduced measures to better control local government spending (Box 1.2). They included sanctions in the form of reduced grants if municipalities' expenditures increased more than the set targets or if tax rates were increased beyond what was agreed upon. It is too early to assess the efficiency of these sanctions, but up to now they seem to have successfully contained municipalities' expenditures. However, past experience shows that it is necessary to remain vigilant and to be ready to increase sanctions if slippages are observed.

Having a public expenditure ceiling for municipalities anchored in a law, as currently under discussion, would strengthen the status and credibility of these fiscal rules and sanctions. A major difficulty will be enforcing the newly introduced measures. The new fiscal framework is, in itself, more binding and less easy to circumvent, but its success will also depend on the political will to enforce it.

There is also a need to reinforce mechanisms that ensure that individual municipalities feel constrained by rules covering all municipalities. KL is already in charge of setting out a distribution of expenditure ceilings for municipalities consistent with the aggregate ceiling. However, as there is no legal status for these individual ceilings, municipalities can budget expenditures exceeding the ceiling. In this case, the current rules do not allow the government to impose individual sanctions but collective sanctions will be applied. The former government proposed to allow the government to impose individual sanctions in cases where budgeted expenditures are not consistent with the aggregate ceiling. It is important to implement this change. Furthermore, negotiations on the distribution of expenditure ceilings and grants should take place once the overall ceiling and budget for grants have been fixed. In Norway for instance, there is a two-stage budget procedure, whereby the overall budget for grants is determined before the distribution formula is negotiated among sub-central governments. The Economic Council has proposed to introduce a system of tradable municipal rights, limiting overall municipalities' expenditures to the number of "rights" (Danish Economic Council, 2010b). Under this system, each municipality would be allocated an individual expenditure right and would have to buy (sell) expenditure rights to increase spending above (below) its allocated rights. The system – analogous to what exists in Austria – would make municipalities internalise the cost of raising public expenditures but may be complicated to implement.

The envisaged spending ceilings should help prevent slippages. If they were to fail to contain local public expenditures, consideration should be given to better align municipalities' spending and revenue autonomy to prevent spending and taxes from rising beyond voters' choices. A well-functioning local democracy, where the impact of taxes on the local population is transparent and with some tax competition between municipalities, would prevent spending and taxes from increasing beyond voters' choices (Joumard and Kongsrud, 2003). Voters would vote for lower taxes when the cost of new services exceeds their benefits. Sweden, for instance, which is also a relatively decentralised country (albeit less so than Denmark), has managed to create a local democracy that functions well, and has helped to contain local government expenditures (Box 1.3). Hence, improving local self-governance is the key to preventing expenditure from rising permanently when taxes are hiked temporarily. This could be done by:

- Limiting the use of transfers. Transfers should be used for specific purposes (such as fiscal equalisation and in case of economic shocks), decided before the beginning of the budget year and should not be adjusted afterwards or at least only under very specific conditions. Transfers could be reduced to encourage municipalities to realise the economies of scale that the merging of municipalities in 2007 was supposed to generate and to raise the efficiency of their expenditures.
- Matching municipal autonomy in terms of taxes with real power on spending. Therefore, the sharing of responsibilities between the central government, regions and municipalities could be limited. This concerns specific areas such as health (see below).

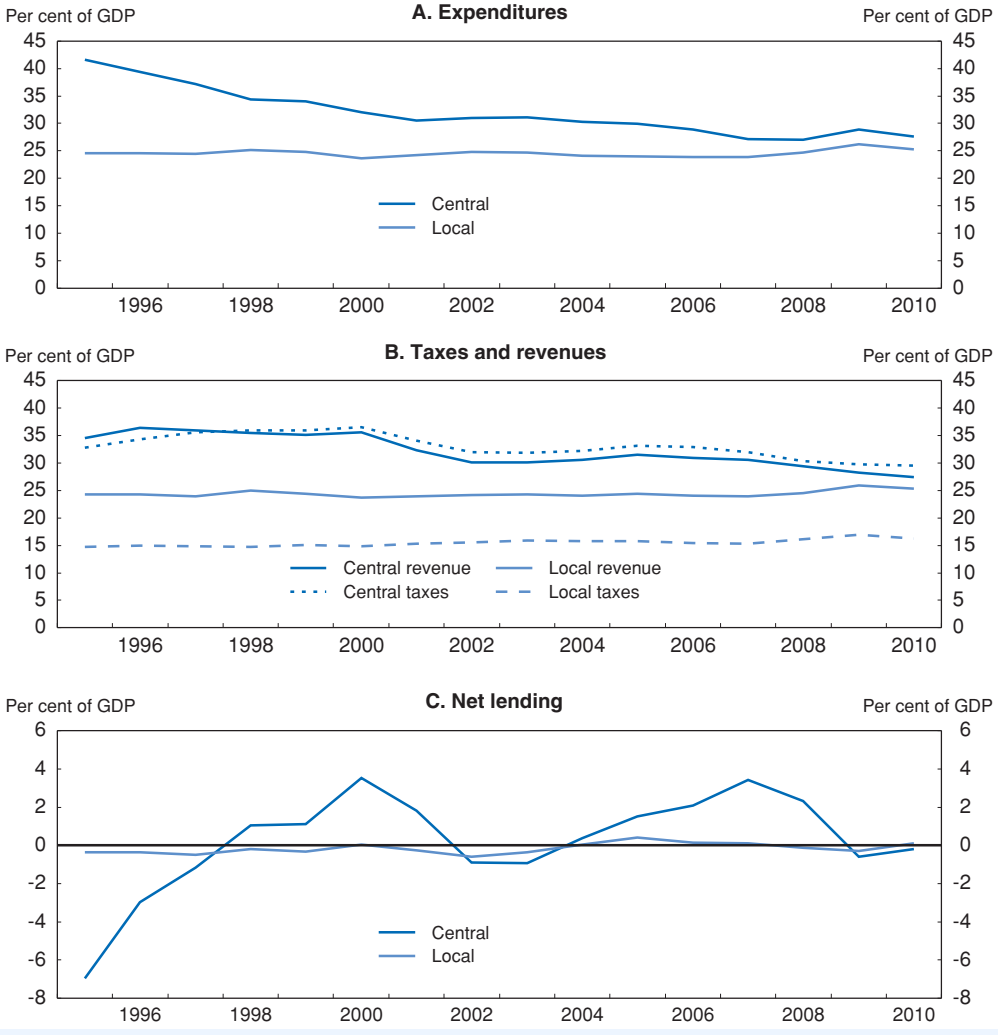
More generally, a cost-benefit analysis of standards and regulations imposed at the central level for decentralised policies should be carried out.

- Continuing efforts to provide more information (via websites) on services provided by municipalities, their quality, their costs and tax rates.

Box 1.3. **The Swedish policy framework for sub-central governments**

Sweden is also a highly decentralised country, with local governments being responsible for 45% of overall public-sector expenditures. Developments in Swedish local government finances have been very different from those in Denmark. The share of expenditures, revenues, and transfers from the centre have been constant as a share of GDP since 1990, apart from the increase in 2009 as a consequence of the global crisis (Figure 1.8).

Figure 1.8. **Developments in Swedish sub-national government finances**



Source: OECD, *Fiscal Decentralisation Database* (*www.oecd.org/ctp/federalism/stats*).

StatLink http://dx.doi.org/10.1787/888932563229

Box 1.3. **The Swedish policy framework for sub-central governments** *(cont.)*

The fiscal framework for local governments is mainly based on a balanced-budget requirement which covers current expenditures while in Denmark, capital expenditures are also covered. Sweden's framework differs from Denmark's in several ways:

- The balanced budget requirement is strictly defined. Every year, local governments are required by law to define a budget and a financial plan for the next three years (including the budget year). If new expenditures are introduced during the current budget year, their funding has to be decided upon. A local government that reports a deficit *ex post* must adopt an action plan to return to a balanced budget within three years. The local government balanced-budget requirement is a minimum requirement. The Swedish Local Government Act stipulates that municipalities and county councils shall also take into account future costs, including those from ageing.
- The Swedish fiscal framework includes an expenditure ceiling covering transfers to local governments, but local public expenditures are not all covered by the ceiling.
- Any measures decided by the central government that directly affect the activities of the local governments should be financed by adjusting the state grant.
- Local governments are allowed to borrow to finance their capital expenditure. In principle, the market could exert pressures for fiscal discipline (Ter-Minassian,1999), especially when there is a strong commitment from the central government not to bail out sub-central governments, as is the case in Sweden. However, due to the right to levy taxes, the Swedish Constitution does not allow local governments to declare bankruptcy. A local government cannot decide to cease to exist and only Parliament can decide to merge local governments. In this case, the responsibility for assets and liabilities is transferred to another local government. In practice, market pressures may nonetheless have contributed to the healthy fiscal position of Swedish local governments, and thus to their high creditworthiness.
- Swedish municipalities have greater spending powers than their Danish counterparts. In Denmark, the central government has the ultimate responsibility for ensuring a sustainable development of public services, while the supremacy of the central government in this area is less clear in Sweden. Local self-governance is stronger in Sweden than in Denmark.

Overall, the Swedish framework has led to good outcomes, but it is criticised for contributing to a pro-cyclical policy at the local level. Since the municipalities and county councils are required to plan for balanced budgets each year and transfers are strictly limited, there is a risk that they tend to reduce expenditure when tax revenues fall. This happened during the recent crisis. The government has acknowledged this problem and recently appointed a committee to propose solutions. In particular, the committee will look into the case for a mandatory "rainy day" fund to which municipalities and county councils would be obliged to contribute in "good" years and from which they would receive payments in "bad" years.

A strong fiscal framework with multi-annual spending rules for general government, a system of credible sanctions and well functioning local governance could prevent expenditure from rising permanently when tax revenues increase temporarily, because of a cyclical upswing for instance. However, these changes may take time to deliver their effects and containing municipalities' expenditure may be harder to achieve in a recovery period when tax revenues will expand. Furthermore, in practice, several imperfections

– asymmetries of information between policymakers and voters, myopic behaviour on both sides, and policy pressures to continue temporary policies – create a bias in favour of more expenditure. For these reasons, some additional mechanisms should be considered:

- One option would be to define some margins under the expenditure rules, to be exhausted only in specific cases, as in Sweden. However, Sweden's experience shows that when and how these margins can be used needs to be clearly specified.[3]
- Denmark could also refine the "tax freeze" at the local level to ensure that it prevents revenues from rising too much in periods of economic booms. For instance, in the US state of Colorado, state government revenues are not allowed to grow faster than the sum of the growth rates of the regional consumer price index and state population (OECD, 2005). Revenues collected in excess of these limits must be returned to the taxpayers in the following fiscal year by any reasonable means, unless voters approve of the government keeping or spending these revenues. However, in the long run, this type of rule can create inefficiencies, as there is no clear rationale why government spending per capita should remain constant in real terms, and this formula may be inappropriate to tackle demographic changes. For a short period of time, however, this option could help to contain expenditure growth, especially in the context of an economic boom.

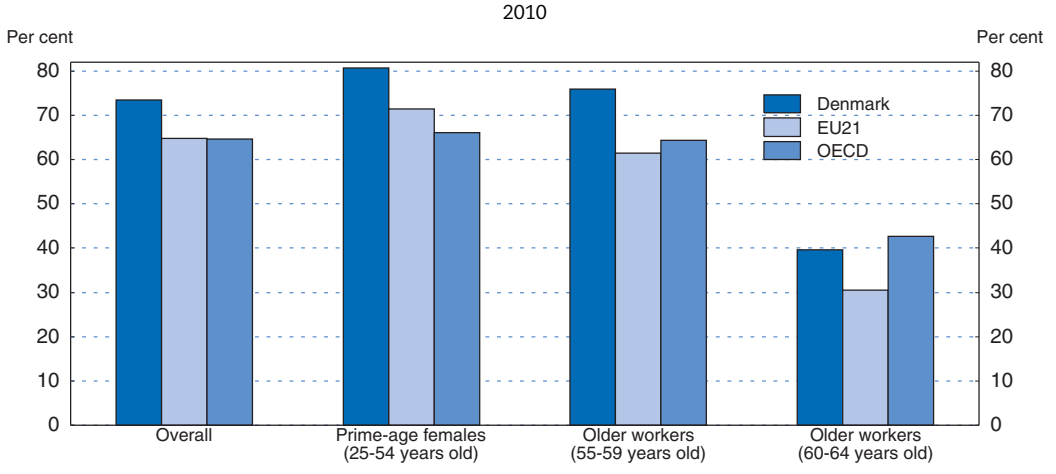
How to contain public expenditure

Strengthening the fiscal framework and rules to contain public expenditure would not necessarily harm the Danish welfare system. Indeed, the welfare system can become less costly and more efficient while continuing to stem inequality and poverty and to provide a high level of protection to individuals. This can be achieved through various channels, including reforms to boost labour supply and to improve value for money in the education and health systems.

Raising labour supply

The Danish labour market is characterised by high participation and employment rates, especially for 25 to 54 year-olds and for women generally. However, employment rates are relatively low for workers above 60 while quite high for workers aged 55-59 (Figure 1.9). Hours worked per worker are also relatively low. There is scope to boost labour

Figure 1.9. **Employment rates by age group**



Source: OECD, *ELS Database*.

StatLink http://dx.doi.org/10.1787/888932563248

utilisation, as aimed for by the government, which would lower public expenditure on programmes that support those outside the labour market and help improve fiscal sustainability. Policies to raise hours worked are discussed in the tax section below.

The employment rates of older workers are relatively low in Denmark, mainly on account of early retirement programmes (Box 1.4). In May 2011, the former government coalition signed an agreement with other parties to reform voluntary early retirement programmes (VERP), which was adopted by the Parliament in December 2011. The main measures imply raising the lowest retirement age (as the duration of VERP is shortened) and bringing forward (from 2019 to 2014) the rise in the retirement age. Estimates by the Danish Economic Council show that these reforms would substantially strengthen fiscal sustainability. Furthermore, by increasing the retirement age more rapidly than planned in

Box 1.4. **The early retirement issue in Denmark**

The issue

The voluntary early retirement scheme (VERP, "*Efterlønnen*") was introduced in 1979 at a time of high unemployment, especially amongst youth. Its purpose was to change the composition of the work force, with the idea that it would allow older people to retire in order for younger people to take their place. In fact, it led to a decrease in overall employment rates, as in many other OECD countries with similar policies.

In its current form, people who have paid their VERP contribution for 30 years and are members of an unemployment insurance fund are eligible to retire at age 60. People can benefit from the scheme until the age of 65, when the old-age pension starts.

Changes have been made over the years to the VERP in order to limit the size of the programme. In 1999 an incentive was given to postpone entrance into the VERP by two years (typically to the 62th year), by lowering the pension during the first two years. At the same time, the entry age of the old-age pension scheme was lowered from 67 to 65, which led to a decrease in the share of the working-age population on VERP after 2004 (Figure 1.10). The 2006 Welfare Agreement took a step further by raising the VERP retirement age by two years from 60 to 62, gradually from 2019 to 2022. The agreement also raised the age of the old-age pension scheme by two years from 65 to 67, gradually from 2024 to 2027 so that all generations can have five years on the VERP. Furthermore, the Welfare Agreement established a mechanism under which the retirement age is indexed on life expectancy at 60, starting in 2025. Changes will have to be announced 10 years in advance and a new decision will be made every five years.

While the Welfare Agreement took steps to postpone the retirement age, it has remained unchanged up to now and will remain so until 2019, even if life expectancy has increased. On some estimates, the expected length of retirement under the current system would rise to more than 24 years and then decrease (once the effects of the Welfare Agreement kick in) to stabilise around 22 years (Danish Economic Council, 2011).

May 2011 agreement on early retirement

In May 2011, the former government concluded an agreement with the Danish People's Party and the Danish Social-Liberal Party to further reform the system (these parties promised verbally to vote for the proposal after the elections):

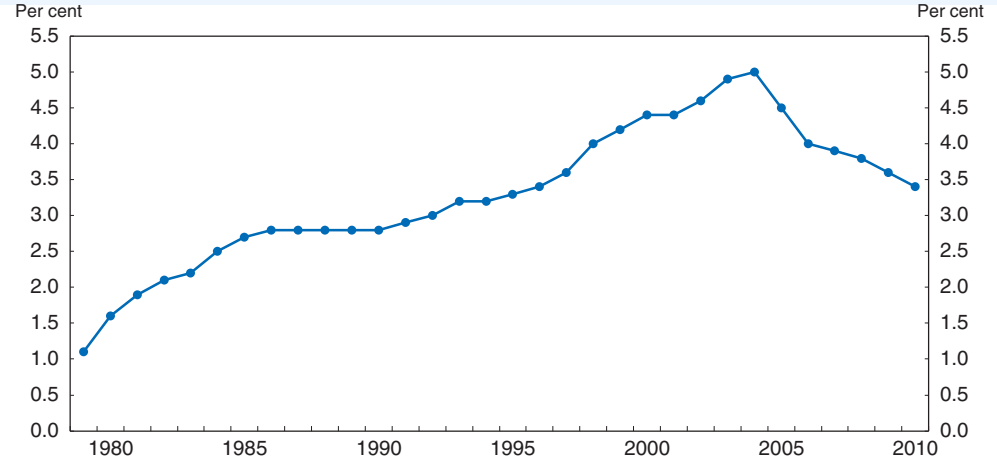
- The early retirement period is shortened from five to three years between 2018 and 2023 while the ordinary retirement age remains constant, implying an increase in the lowest retirement age, which will rise to 63 in 2020 and 64 in 2023.
- The increase in the early retirement age decided in the Welfare Agreement is moved forward by five years to 2014-17.

Box 1.4. **The early retirement issue in Denmark** *(cont.)*

- A new "senior" disability benefit scheme is introduced for those who have health problems linked to their work conditions and are within the five years of the eligibility to the old-age pension. The procedure to enter the scheme would be short (municipalities would have to decide within six months after the application).

According to the Ministry of Finance, the Agreement would increase employment by 1.8% and improve the structural balance by around 1% of GDP by 2020. The Danish Economic Council judges that the Agreement would improve fiscal sustainability and make for a more equal treatment between present and future generations.

Figure 1.10. **Share of the working-age population on voluntary early retirement programmes**



Source: Statistics Denmark.

StatLink http://dx.doi.org/10.1787/888932563267

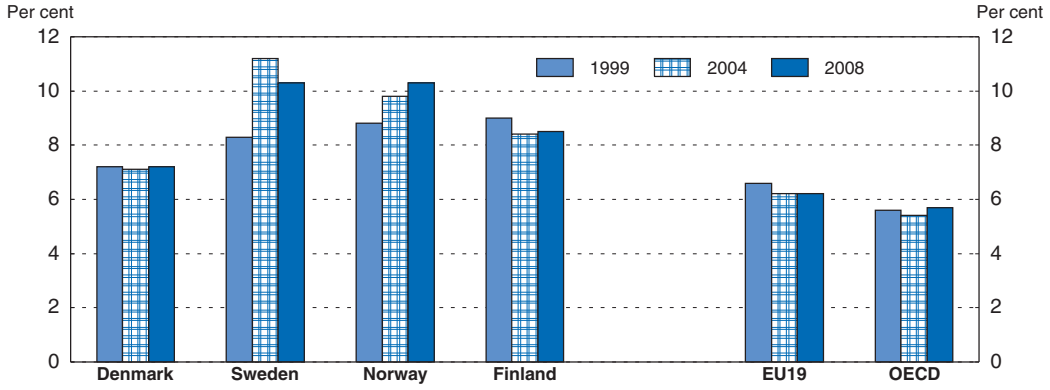
the 2006 Welfare Agreement, this reform implies a more equal treatment between present and future generations (Danish Economic Council, 2011). Hence, the decision by the new government to implement this reform is welcome.

However, the introduction of the new "senior" disability scheme and simplification of the access to disability benefit schemes proposed in the 2011 Agreement may partly offset such fiscal gains by expanding the already relatively high share of the working-age population receiving disability benefits (Figure 1.11). This share has exceeded the OECD average for decades, and may rise further as unemployment peaks tend to be followed by spikes in disability rates about two years later (OECD, 2010a). A rise in disability rates would push up already high social public expenditures (Table 1.1). Furthermore, the relatively large share of the working-age population receiving disability benefits is also a source of concern for equity reasons: a quarter of people with health problems or disability live in poverty (measured in relative terms), which is above the OECD average and far above the average for the general population (OECD, 2010b).

Bringing recipients of disability benefits with work capacity back to the job market is a challenge. The government should closely monitor VERP reform and its impact on the number of recipients. It should also persevere with efforts to improve the efficiency of

Figure 1.11. **Share of the working-age population receiving disability benefits**[1]

Percentage of the population aged 20-64



1. Disability benefits include benefits received from schemes to which beneficiaries have paid contributions (contributory), programmes financed by general taxation (non-contributory) and work injury schemes.

Source: OECD (2010), *Sickness, Disability and Work: Breaking the Barriers: A Synthesis of Findings across OECD Countries*, OECD, Paris.

StatLink http://dx.doi.org/10.1787/888932563286

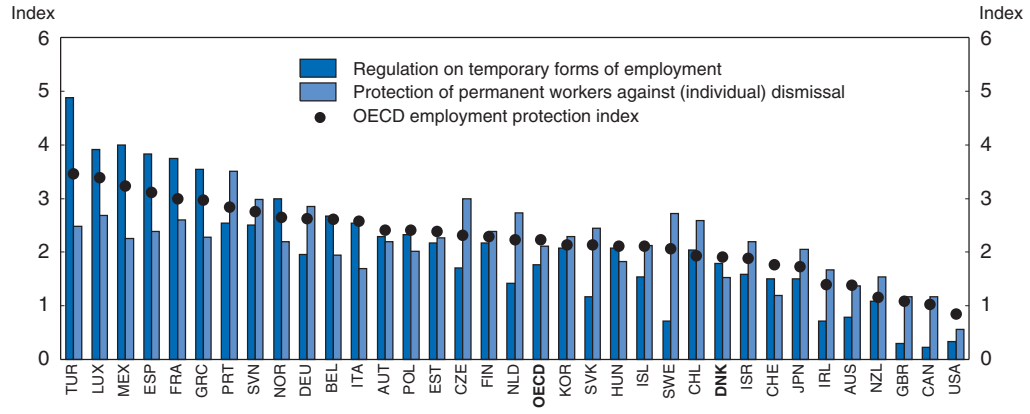
programmes to help the disabled with work capacity to find a job. The special disabled employment programme (*Fleksjob*) has led to an increase in the overall number of recipients of these programmes and therefore should be reconsidered, in particular by making it more targeted on individuals in need and less generous as the income can be higher than the previous wage. A plan to reform the special disabled employment programme following these lines was proposed in April 2011 but reforms have been postponed since then although the new government has announced a reform of the *Fleksjob* scheme (Danish Government, 2011). There is also a case for better integrating disability benefits with other policies to make work pay and helping the sick and disabled with sufficient ability to work to find ordinary employment (OECD, 2010b). The current responsibility structure, with municipalities being key players but not having the necessary powers could be improved. This reflects a larger issue of shared responsibilities between the central government and municipalities concerning labour market and social policies. While municipalities are in charge of job centres, various standards and procedures set at the central level have impeded the efficiency of those job centres. For instance, job centres could be given more responsibility with regard to medical decisions including by ensuring early involvement of municipal doctors and regular control of general practitioners' decisions (OECD, 2010b).

The shortening of the duration of unemployment benefits from four to two years as part of the May 2010 Fiscal Consolidation Agreement is also expected to raise labour supply although the new government has decided to postpone the implementation of this reform by six months. The Budget Bill for 2012 proposed some measures to ease the rules for entitlement to certain social benefits and to increase their generosity. It will be important to ensure that the potentially negative impact of these measures on labour supply is offset by other measures.

Denmark's flexicurity system will help ensure that efforts to raise labour supply translate into higher employment even though it may be tested by prolonged periods of low labour demand. It rests on three pillars: *i)* relatively flexible hiring and firing regulations (Figure 1.12); *ii)* a generous social safety net, and *iii)* strong and developed active labour market policies (ALMPs). Designing efficient ALMPs is particularly challenging. Evidence on the efficiency of these programmes is mixed with some studies finding them to be efficient

Figure 1.12. **Job protection in OECD countries**[1]

2008



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

StatLink http://dx.doi.org/10.1787/888932563305

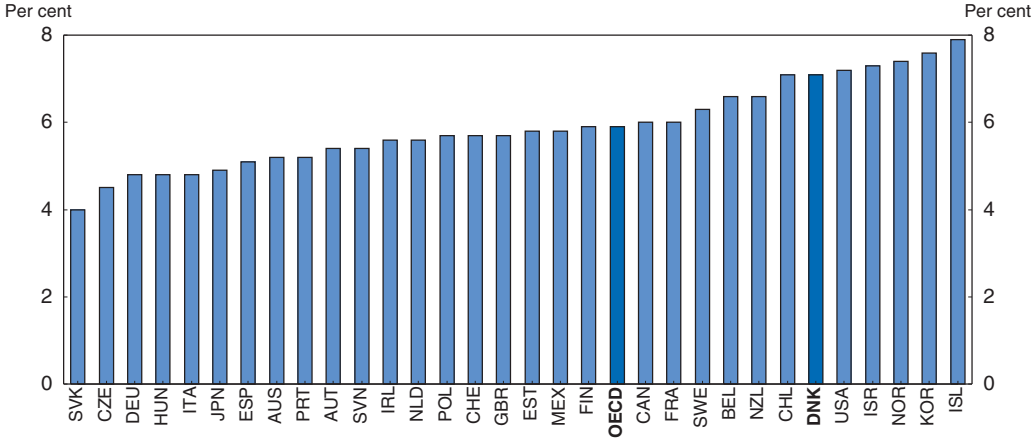
(Heinesen *et al.*, 2011) and others not (Munch and Skipper, 2005). However, according to Andersen and Svarer (2008), these programmes also have indirect effects as the activity requirement to receive unemployment benefits raises the incentives to look for a job and accept it before having been placed in one of these programmes (pre-programme effect). These effects are very strong, explaining the success of the Danish system.

Raising the efficiency of the education system

Various indicators suggest that education is an area where public spending efficiency can be raised. Denmark has relatively high outlays per student (Figure 1.13), yet, the performance of the education system is mixed. On the one hand, education attainment is high in Denmark and youth unemployment has not been a major problem (OECD, 2010c). On the other hand, PISA results are slightly above average for Danish students in general, and rather poor for immigrants. Furthermore, the share of youth with no upper secondary education is at the OECD average (Figure 1.14; OECD, 2009). Formal analysis of the efficiency

Figure 1.13. **Expenditure on educational institutions for all education levels**

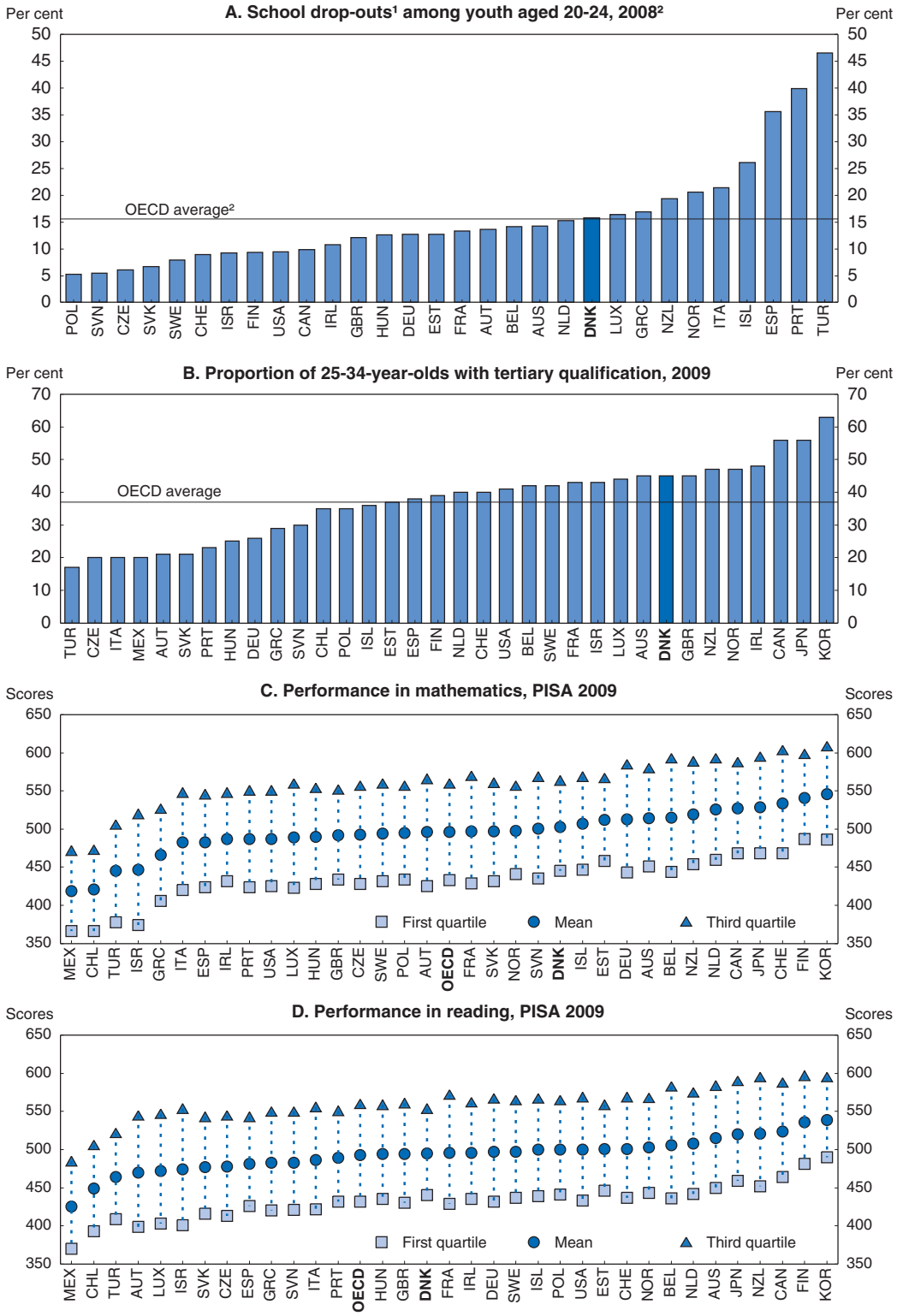
As a per cent of GDP in 2008



Source: OECD (2011), *Education at a Glance 2011*, OECD, Paris.

StatLink http://dx.doi.org/10.1787/888932563324

Figure 1.14. **Indicators of the performance of the education system**



1. No longer in education without International Standard Classification of Education upper secondary level (ISCED level 3).
2. 2006 for Australia. Unweighted average of countries shown.

Source: OECD (2010), *Jobs for Youth: Denmark 2010*, OECD, Paris; OECD (2011), *Education at a Glance 2011*, OECD, Paris; OECD (2010), *PISA 2009 Results: What Students Know and Can Do*, Volume I, OECD, Paris.

StatLink http://dx.doi.org/10.1787/888932563343

of public spending in primary and secondary education suggests that maintaining the same level of expenditure and moving towards best practice would lift performance substantially, or that moving towards best practice would help to achieve the same performance at a much lower cost (Sutherland *et al.*, 2007). Raising the performance of the education system would also help boost productivity growth (OECD, 2009; Danish Economic Council, 2010b). Better human capital lifts productivity in existing jobs and facilitates restructuring towards higher-value-added activities, entrepreneurship and R&D.

The previous *OECD Economic Survey* proposed a set of recommendations to raise human capital (OECD, 2009). One weakness it identified is the assessment and evaluation framework. As there is a high degree of school autonomy in Denmark and municipalities are responsible for the quality of compulsory education for public schools (and parent-elected boards for private schools), the evaluation and assessment framework plays a key role for central and local authorities to promote and monitor quality and focus on improvement. Evaluation gives incentives to both students and teachers to perform better, but to be more effective it should come with higher pay flexibility for teachers and school managers. Similar recommendations were made in the recent OECD *Review of Evaluation and Assessment in Danish Education* that calls for stepping up the implementation of newly introduced measures to monitor and evaluate quality in compulsory education (Shewbridge *et al.*, 2011). The implementation of these measures varies among schools and municipalities and there is a need to develop evaluation and assessment at all levels of compulsory education.

Another issue raised in the previous *Survey* is the relatively high rate of drop-outs. The education system leaves a number of youth behind and fails to target special individual problems. Recent findings suggest that the education system, like labour market policies, needs to be individualised to yield good outcomes. This is a dimension that Denmark has successfully introduced in its ALMPs but to a lesser extent in education, as opposed to Finland for instance (Box 1.5). The newly introduced compulsory tests of students would

Box 1.5. **The advantages of individualised service provision**

There has long been a focus on the need for social policies to be "active" rather than "passive". Recent analysis has shown that social policies have to shift away from insurance and move towards "skill-based risk mitigation" and individualised actions (Sabel *et al.*, 2010). This concerns in particular education and ALMPs.

There are several reasons for having individualised social services. First, new findings on learning show that individuals learn differently and learning problems need not be permanent, thus calling for an individualised pedagogical approach. Another reason is the awareness that risks faced by individuals can be structural (such as for instance the fall in demand for low-skilled workers) and require individuals to have the capacity to overcome these types of disruptions. A third reason is the increasing heterogeneity of populations.

Concerning the individualisation of service provision, Denmark is an interesting case with its ALMP system being highly individualised and successful, while its education system is not. The Finnish education system, which gives very good results (measured by PISA) is much more customised to individual needs than the Danish system. In particular, the Finnish system uses testing of pupils extensively and at an early stage. These tests are not being used for sanctions, but to detect learning problems. Another feature of the Finnish system is the large use of special education, with almost one third of pupils receiving special short-term instruction, mainly in standard classrooms.

help identify the weakest students earlier on. Furthermore, for schools to better adapt to the needs of all their students, both native and immigrant, there is a need to professionalise school leadership through better training and to improve the pedagogical skills and quality of teachers (Nusche *et al.*, 2010). Specific targeted initiatives to close the performance gap between Danish and immigrant students should be developed. For instance, the previous OECD *Economic Survey* recommended targeting the optional year following the nine years of compulsory education (the "10th form") on the weakest students and to review vocational education. Reducing the size of classes in high schools, which is already relatively low compared to other OECD countries, as proposed by the Budget Bill for 2012, tends to have only a limited impact on overall performance and to be costly (Nusche, 2009).

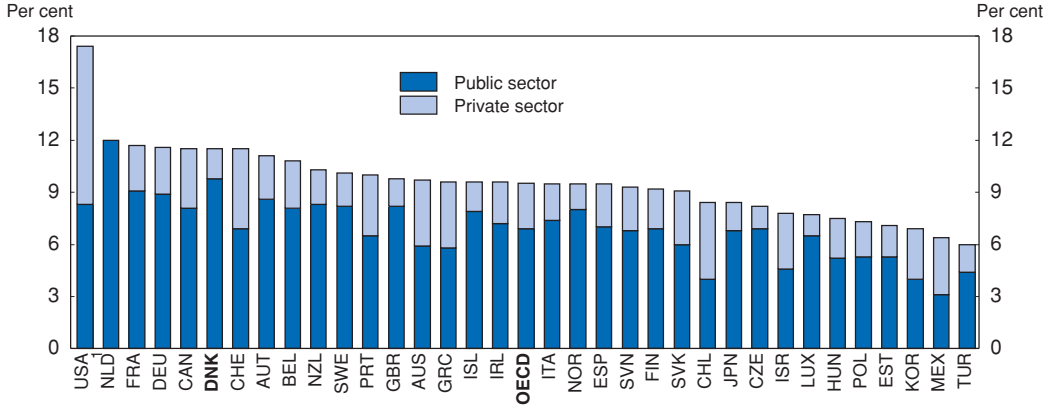
Concerning tertiary education, the main problems are that: *i)* students start tertiary education relatively late, reducing the supply of high-skilled labour (OECD, 2009); and *ii)* students tend to choose fields with relatively low business needs and weak productivity potential (Growth Forum, 2011). Gradually moving to a system that combines grants and loans in a way that encourages on-time completion – the duration of grants could be shortened – could help. Going even further, a system of tuition fees with income-contingent loans should be considered. Tuition fees would give universities more resources and/or free up public resources to be applied to other priorities in education or elsewhere. Furthermore, by creating a price signal, tuition fees would encourage students to take earnings prospects after graduation more into account when making study choices. However, care should be taken not to reduce overall incentives to take up education.

Raising the efficiency of health-care expenditures

Spending on health has increased strongly in recent years and Denmark is now one of the OECD countries with the highest spending on health, the bulk of which is public (Figure 1.15). However, in terms of health status, the country tends to underperform compared with similar countries and the OECD average (Table 1.3). Micro analysis that measures the effectiveness of health-care systems through cancer survival rates also points to weak outcomes for Denmark over 1995-2007 relative to other countries and, hence, scope for improvement (Coleman *et al.*, 2011).

Figure 1.15. **Expenditure on health in OECD countries**

As a per cent of GDP in 2009 or latest year



1. Total expenditure on health for the Netherlands, including both public and private sectors.

Source: OECD (2011), *Health Database*: Health Expenditure and Financing Account.

StatLink http://dx.doi.org/10.1787/888932563362

Table 1.3. **Health status indicators**

	Life expectancy at birth[1] 2009	Life expectancy at 65[1] Females, 2009	Life expectancy at 65[1] Males, 2009	Infant mortality[2] 2009	In-hospital case-fatality rates[3] 2007		
					Acute myocardial infarction	Ischemic stroke	Hemorragic stroke
Denmark	**79.0**	**19.5**	**16.8**	**3.1**	**2.9**	**3.1**	**16.7**
Finland	80.0	21.5	17.3	2.6	4.9	3.2	9.5
France	81.0	22.5	18.2	3.9			
Germany	80.3	20.8	17.6	3.5			
Norway	81.0	21.1	18.0	3.1	3.2	3.3	13.7
Sweden	81.4	21.0	18.2	2.5	2.9	3.9	12.8
OECD average	79.5	20.5	17.2	4.4	5.1	5.0	19.8
Best performing country	83.0	24.0	18.9	1.8	2.1	2.3	9.5
Worst performing country	73.8	15.9	13.7	14.7	8.1	9.0	30.3

1. Years.
2. Per 1 000 births.
3. Age-sex standardised rates within 30 days after admissions.

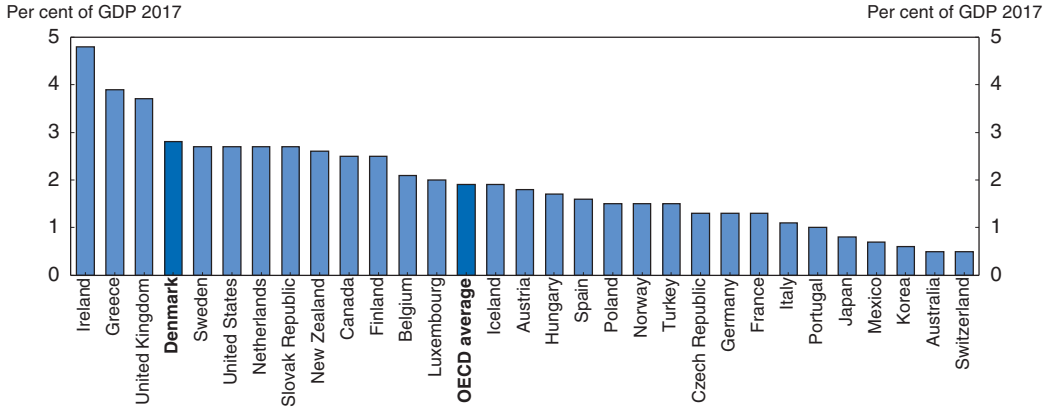
Source: OECD (2011), *Health at a Glance 2011*.

Lifestyle partly explains these health outcomes. Tobacco consumption has been very high in Denmark; more than half of adults smoked daily in the 1970s. While smoking has decreased significantly, the impact of past behaviour may contribute to current relatively low life expectancy. Alcohol consumption is also relatively high in Denmark and obesity has increased significantly. The new government has raised taxes on unhealthy food products and on tobacco (see Box 1.2 and below).

Nevertheless, even when the impact of lifestyle on life expectancy is taken into account, OECD analysis suggests that health outcomes could be better with the same level of spending on health or that these outcomes could be achieved at lower cost (Joumard *et al.*, 2010). The potential savings coming from an increase in the efficiency of the health care system are estimated at close to 3% of GDP for Denmark (Figure 1.16). Going forward, as expenditures on health are set to rise further and as they are mainly financed through taxes, it is crucial to exploit potential efficiency gains.

Figure 1.16. **Achieving efficiency gains in the health care sector**

Share of potential savings in public spending in OECD countries in 2017[1]



1. Potential savings represent the difference between a no-reform scenario and a scenario where countries would become as efficient as the best performing countries.

Source: *Health Care Systems: Efficiency and Policy Settings*, OECD, Paris, 2010.

StatLink http://dx.doi.org/10.1787/888932563381

The recently published OECD indicators on health care systems allow the features of the Danish health system and its performance to be compared with those of countries with similar health systems, *i.e.* systems based on a "command-and-control" approach, little private provision, no choice of providers, little incentive for providers to respond to demand and strict gatekeeping (Joumard *et al.*, 2010).

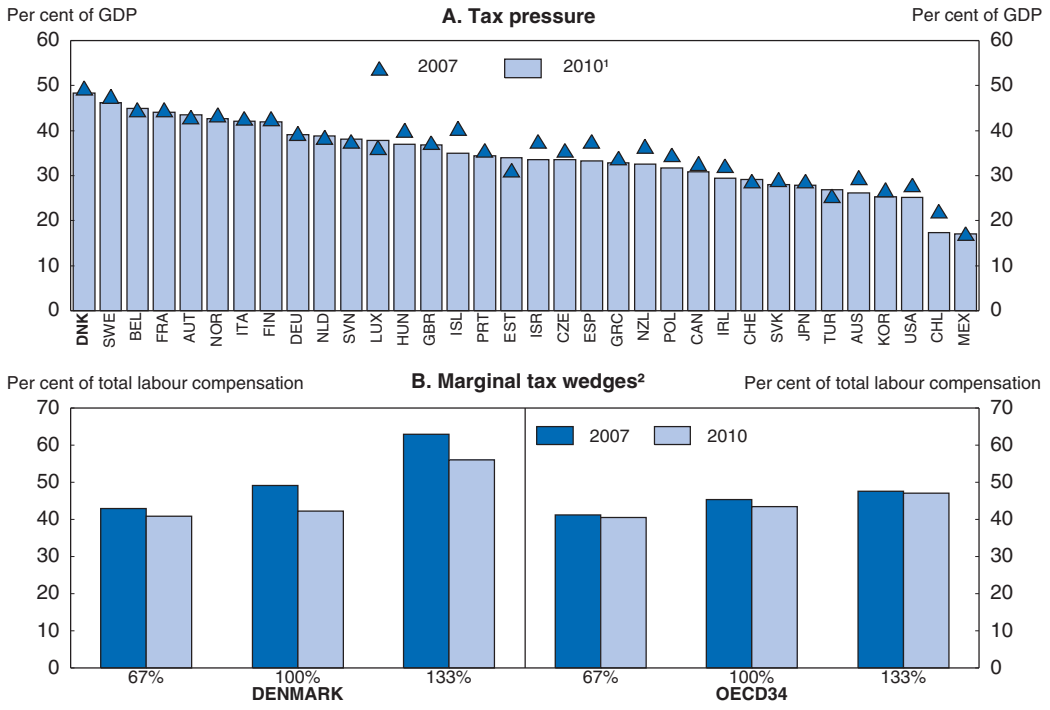
Denmark stands out as one of the OECD countries with the lowest degree of consistency in responsibility assignment across levels of governments. This is mainly because several levels of government are involved in key health care decisions, with regions being broadly in charge of hospitals and municipalities of out-patient care. However, the allocation of responsibilities is more complex than this broad picture suggests. For instance, regions negotiate tariffs and wages of practitioners and fix their number. Furthermore, while regions are in charge of hospitals, the Ministry of Health sets the payment methods for hospitals and the number of hospitals per region. Regions' expenditures are mainly financed by a state block grant that amounts for 75% of their revenues. The involvement of several levels of government can lead to waste through duplication, lax control over spending when responsibilities overlap and insufficient exploitation of economies of scale (Joumard and Kongsrud, 2003). Furthermore, this allocation of responsibilities requires having an incentive system that ensures that each level of government does not try to transfer costs to the other level. For instance, under the current system, as regions cannot fully control costs, they have an incentive to ask for higher grants. Municipalities have limited incentives to develop preventive measures as they only partly bear hospital costs. Indeed, while they contribute 20% to the financing of hospitals, only half of this contribution depends on their use of regional services. The allocation of responsibilities and resources across different levels of government could thus be rationalised. Furthermore, funding should be refined further to give incentives to achieve good performance. In particular, remuneration of doctors and out-of-pocket payments are very low in Denmark. Another option would be to change the assignment of responsibilities, with either the regions or the central level being fully in charge of health issues. More detailed recommendations on health were made in an earlier *Economic Survey of Denmark* (OECD, 2008).

Revisiting the tax structure

Taxes on labour remain high compared with other OECD countries, despite a decrease in the tax and social security burden on labour over the past 11 years (OECD, 2009, 2011). This is not conducive to entrepreneurship and labour mobility and undermines Denmark's attractiveness for skilled workers, thereby exerting a drag on productivity growth.

In particular, marginal tax rates on higher income are high (Figure 1.17). While this reflects a social choice for an equal society, it reduces hours worked, can be a barrier for workers to choose highly productive and demanding jobs, contributing to low productivity growth, and diminishes the attractiveness of higher education. The former government had decided to increase the income threshold from which the top tax rate applies in 2009, but postponed the increase to 2013 as part of its fiscal consolidation plan. When fiscal consolidation has been achieved and public expenditure is under control, marginal taxes on labour could be lowered further, by raising the tax threshold for the top personal income tax rate or cutting the marginal tax rate. The new government has announced a fully-financed tax reform, including a reduction in labour income taxation.

Figure 1.17. **Tax pressure and marginal tax wedges**



1. Or latest year available.
2. Evaluated at 67%, 100% and 133% of average earnings for a single person with no child.

Source: OECD Analytical Database and *OECD Tax Database*.

StatLink http://dx.doi.org/10.1787/888932563400

Reducing marginal taxes on higher income would have distributional effects and tend to raise income inequality, but this can be at least partly offset by raising taxes on property, which are low in Denmark. Indeed, property value taxes have been frozen in nominal terms since 2002. This can have distributional implications as higher-income households are more likely to be homeowners. In addition, low taxes on property value have adverse efficiency effects on housing and other markets by distorting the allocation of saving and investment (Andrews *et al.*, 2011). In particular, the property tax freeze arguably contributed to the housing market boom that destabilised the economy, adding to the problems Denmark faced during the global financial crisis (Danish National Bank, 2011).

More generally, there is room to extend the tax base by removing some tax expenditures, while lowering tax rates. Tax expenditures are relatively high in Denmark, at over 4% of total tax revenues in 2006 (OECD, 2010d), as a result of the Danish government's desire to alleviate the impact of high tax rates on some groups of the population and on some activities. However, the role and costs of these tax expenditures are not always transparent, partly because their costs, both in terms of lost revenues and administrative burden, and their effects are not fully reported by the Ministry of Finance (Danish National Audit Office, 2007).

A notable recent tax change is the increase in indirect taxes on unhealthy products (see Box 1.2). Such increases contribute to making room over the longer term for enhancing the efficiency of the tax structure by reducing taxes on income. Denmark is the first country[4] to introduce a "fat tax" on saturated fat, after pioneering strict regulations on the use of transfat (commonly used in industrially produced food) in 2004. The fat tax is meant to help address overweight and obesity problems, and thereby, to reduce the occurrence of

cardiovascular diseases. While the share of the obese in the population is still relatively low from an international perspective, it has been on the rise over the past 15 years (Rockwool Foundation Research Unit, 2011). The effect of the fat tax on health status is unclear, however, as health depends on the overall diet, not only on fat intake, and on the overall nutrients contained in food. The proposal made in the Budget Bill for 2012 to raise taxes on other unhealthy products could help to improve the overall diet and thereby enhance the effect of the fat tax. The latter will have distributional impacts: *i)* in the short term, lower-income households will be particularly affected as food accounts for a larger share of their spending, especially in so far as the demand for these products is inelastic; *ii)* in the longer term, as these households are also those who are the most exposed to obesity problems, they may benefit from the tax, provided that they do not switch to products with higher detrimental effects on health. The effect of the tax on prices and consumption patterns will be central in this respect. Early observations suggest that the prices of some food products (such as butter) have risen by more than the amount of the new tax, possibly reflecting insufficient competition in the retail sector.[5] It will therefore be important to monitor and assess the impact of the fat tax in the near future.

Box 1.6. **Main recommendations to consolidate public finances**

Strengthening the fiscal framework at the central and sub-central levels

- Introduce expenditure ceilings at general government level covering most public spending (not only public consumption, though perhaps excluding investment and cyclically-sensitive spending such as unemployment benefits) at a medium-term horizon.
- Give the Economic Council more of a fiscal council role and to this end grant it access to the necessary information, including the detailed government accounts.
- Continue with the use of sanctions to contain local public expenditures and consider raising them further if slippages reappear.
- If the new sanctions and envisaged spending ceilings fail to contain local public spending, consider limiting the use of grants to sub-national governments to specific purposes and reducing the sharing of responsibilities between levels of government.

Measures on the expenditure side to contain public expenditure growth

- In the implementation of the 2011 reform of the early retirement scheme, make sure that the provision concerning the "new" senior disability scheme does not lead to an unwarranted increase in the number of recipients of these benefits.
- Improve work incentives and targeting of support for the sick and disabled with ability to work, while tightening eligibility conditions, and reassess entitlements regularly. In particular, the special disabled employment programme (*Fleksjob*) should be reconsidered. It should be better targeted, work ability should be regularly reassessed, and the wage subsidy should be lowered.
- Continue to improve and develop the evaluation and assessment framework for both students and school staff. Improve targeted initiatives for pupils most in need.
- Gradually move to a system that combines educational grants and loans in a way that encourages on-time completion.

Taxation

- Reduce marginal taxes on higher incomes, by raising the tax threshold or cutting the marginal tax rate, once fiscal consolidation has been achieved and public spending is better controlled. Increase property taxes by restoring the tax base once the housing market has recovered.

Notes

1. Over 1985-91, 80 of the 276 municipalities have reduced their tax rates while this number fell to eight over 2000-06 (Lotz, 2010). The average municipal tax rate increased by 1 percentage point over 1985-91, and by 0.2 percentage point over 2000-06.
2. Numerous binding regulations of ALMP programmes set at the central level have also weakened the efficiency of job centres (now run by municipalities).
3. In 1998-2000 when the Swedish economy was benefiting from strong growth, decreasing unemployment, low inflation and hence, less pressures on expenditures, expenditure margins were almost fully exhausted (Hansson Brusewitz and Lindh, 2008).
4. Taxes on unhealthy products also exist in Denmark as well as in the United States, for instance, where some states have introduced a tax on soft drinks.
5. "Supermarkets Using Tax Fat to Fatten Bottom Line", *Copenhagen Post*, 31 October 2011.

Bibliography

Adema, W. and M. Ladaique (2009), "How Expensive is the Welfare State?: Gross and Net Indicators in the OECD Social Expenditure Database (SOCX)", *OECD Social, Employment and Migration Working Papers*, No. 92.

Andersen, T. and M. Svarer (2008), "The Role of Workfare in Striking a Balance Between Incentives and Insurance in the Labour Market", *CESifo Working Paper*, No. 2267.

Andrews, D., A. Caldera Sánchez and Å. Johansson (2011), "Housing Markets and Structural Policies in OECD Countries", *OECD Economics Department Working Papers*, No. 836.

Arnold, J., B. Brys, C. Heady, Å. Johansson, C. Schwellnus and L. Vartia (2011), "Tax Policy for Economic Recovery and Growth", *Economic Journal*, Vol. 121, Issue 550.

Ayuso-i-Casals, J., D. Gonzalez Hernández, L. Moulin and A. Turrini (2007), "Beyond the SGP. Features and Effects of EU National-level Fiscal Rules", paper presented at the 9th Banca d'Italia Workshop on Public Finance.

Bach, S., H. Blöchliger and D. Wallau (2009), "The Spending Power of Sub-Central Governments: A Pilot Study", *OECD Economics Department Working Papers*, No. 705.

Bassanini, A., S. Scarpetta and P. Hemmings (2001), "Economic Growth: The Role of Policies and Institutions: Panel Data Evidence from OECD Countries", *OECD Economics Department Working Papers*, No. 283.

Blöchliger, H. and O. Petzold (2009), "Taxes and Grants: on the Revenue Mix of Sub-Central Governments", Fiscal Federalism Network, OECD Publishing.

Blöchliger, H. and C. Vammalle (2012), *Reforming Fiscal Federalism and Local Government: Going Beyond the Zero-Sum Game*, OECD Publishing, Paris, forthcoming.

Careaga, M. and B. Weingast (2000), "The Fiscal Pact With the Devil: A Positive Approach to Fiscal Federalism, Revenue Sharing, and Good Governance", *Working Paper*, Stanford University.

Coleman, M. *et al* (2011), "Cancer Survival in Australia, Canada, Denmark, Norway, Sweden, and the UK, 1995-2007 (the International Cancer Benchmarking Partnership): An Analysis of Population-Based Cancer Registry Data", *The Lancet*, Vol. 377, Issue 9760.

Cook, D., C. Schousboe and D. Law (2011), "Government and Economic Growth: Does Size Matter?", *New Zealand Treasury Paper*, No. 11/01.

Corsetti, G., K. Kuester, A. Meier and G. Müller (2010), "Debt Consolidation and Fiscal Stabilization of Deep Recessions", *American Economic Review*, Vol. 100, No. 2.

Danish Economic Council (2002), *Danish Economy: Spring 2002*, May.

Danish Economic Council (2010a), *Danish Economy: Autumn 2010*, May.

Danish Economic Council (2010b), *Danish Economy: Spring 2010*, October.

Danish Economic Council (2011), *Economy and Environment 2011*, May.

Danish Government (2011), *Reformpakken 2020*, Copenhagen, April.

Danish Ministry of the Interior and Health (2005), *The Local Government Reform*, Copenhagen.

Danish National Audit Office (2007), *Annual Report*, Copenhagen.

Danish National Bank (2011), *Financial Stability Report*, Copenhagen.

European Commission (2006), *Public Finances in EMU*, Brussels.

European Commission (2009), *The 2009 Ageing Report: Economic and Budgetary Projections for the EU-27 Member States (2008-2060)*, Brussels.

Growth Forum (2011), *Ny Vaekst Danmark Hovedkonklusioner Fra Vaekstforum*, Copenhagen.

Guichard, S., M. Kennedy, E. Wurzel and C. André (2007), "What Promotes Fiscal Consolidation: OECD Country Experiences", *OECD Economics Department Working Papers*, No. 553.

Hallerberg, M. and J. von Hagen (1999), "Electoral Institutions, Cabinet Negotiations, and Budget Deficits in the European Union", in J. Poterba and J. von Hagen (eds.), *Fiscal Institutions and Fiscal Performance*, University of Chicago Press, Chicago.

Hansson Brusewitz, U. and Y. Lindh (2008), "Expenditure Ceilings and Fiscal Policy: Swedish Experiences", in *The Quality of Public Finances – Findings of the Economic Policy Committee-Working Group (2004-2007)*, European Commission.

Heinesen, E., L. Husted and M. Rosholm (2011), "The Effects of Active Labour Market Policies for Immigrants Receiving Social Assistance in Denmark", *IZA Discussion Paper*, No. 5632.

IMF (2010), "Macro-Fiscal Implications of Health Care Reform in Advanced and Emerging Economies", Fiscal Affairs Department, December 28.

Joumard, I. and P. Kongsrud (2003), "Fiscal Relations across Government Levels", *OECD Economics Department Working Papers*, No. 375.

Joumard, I., P. Hoeller, C. André and C. Nicq (2010), *Health Care Systems: Efficiency and Policy Settings*, OECD Publishing, Paris, *http://dx.doi.org/10.1787/9789264094901-en*.

Lotz, J. (2010), "Central Local Co-ordination and Responsibility in Local Government Finances in Scandinavian Countries", speech given in Reykjavik, Iceland, 22 January.

Mau, N. J., (2011), "Prevention of Local Government Unsustainable Behaviour – Some Danish Experiences", paper prepared for the 2011 Copenhagen Workshop: *Normative Frameworks of Decentralisation and Intergovernmental Fiscal Relations: Efficient Instruments for Desired Balance between Decentralisation and Merit*.

Munch J.R. and L. Skipper (2005), "The Consequences of Active Labour Market Programme Participation in Denmark", mimeo.

Nusche, D. (2009), "What Works in Migrant Education?: A Review of Evidence and Policy Options", *OECD Education Working Papers*, No. 22.

Nusche, D., G. Wurzburg and B. Naughton (2010), *OECD Reviews of Migrant Education: Denmark*, OECD, Paris, *www.oecd.org/dataoecd/54/17/44855206.pdf*.

OECD (2005), *OECD Economic Surveys: United States*, Paris.

OECD (2006), *Tax Policy Reforms in Denmark*, Paris, *www.oecd.org/dataoecd/49/28/37154664.pdf*.

OECD (2008), *OECD Economic Surveys: Denmark*, Paris.

OECD (2009), *OECD Economic Surveys: Denmark*, Paris.

OECD (2010a), "Return to Work After the Crisis", *Economic Outlook* No. 87, OECD, Paris.

OECD (2010b), *Sickness, Disability and Work: Breaking the Barriers – A Synthesis of Findings across OECD Countries*, OECD, Paris.

OECD (2010c), *Jobs for Youth: Denmark 2010*, OECD, Paris.

OECD (2010d), "Choosing a Broad Base-Low Rate Approach to Taxation", *Tax Policy Study*, No. 19.

OECD (2011), *Taxing Wages*, OECD, Paris.

Persson, T. and G. Tabellini (1999), "The Size and Scope of Government: Comparative Politics with Rational Politicians", *European Economic Review*, Vol. 43, Issue 4-6.

Rockwool Foundation Research Unit (2011), "Health, Well-being and Overweight among Danes", *Newsletter*, May.

Sabel, C., A. Saxenian, R. Miettinen, P. Kristensen, and J. Hautamäki (2010), "Individualized Service Provision in the New Welfare State: Lessons from Special Education in Finland", *Copenhagen Business School Working Papers*, No. 73.

Shewbridge, C., E. Jang, P. Matthews and P. Santiago (2011), *OECD Reviews of Evaluation and Assessment in Education: Denmark*, OECD, Paris.

Swedish Ministry of Finance (2011), *The Swedish Fiscal Policy Framework*, Information material Skr. 2010/11:79.

Sutherland, D., R. Price and I. Joumard (2005), "Fiscal Rules for Sub-central Governments: Design and Impact", *OECD Economics Department Working Papers*, No. 465.

Sutherland, D., R. Price, I. Joumard and C. Nicq (2007), "Performance and Indicators for Public Spending Efficiency in Primary and Secondary Education", *OECD Economics Department Working Papers*, No. 546.

Tanzi, V. (1995), "Fiscal Federalism and Decentralisation: A Review of Some Efficiency and Macroeconomic Aspects", *Annual Bank Conference on Development Economics*, World Bank, Washington, DC.

Ter-Minassian, T. (1999), "Decentralization and Macroeconomic Management", in K. Fukasaku and L. de Mello (eds.), *Fiscal Decentralization, Intergovernmental Fiscal Relations and Macroeconomic Governance*, OECD Development Centre, Paris.

von Hagen, J. (2002), "Fiscal Rules, Fiscal Institutions and Fiscal Performance", *The Economic and Social Review*, Vol. 33, No. 3.

Chapter 2

Towards green growth: Improving energy and climate change policies

Denmark's green growth strategy focuses on moving the energy system away from fossil fuels and investing in green technologies, while limiting greenhouse gas (GHG) emissions. On the whole, current policies should allow Denmark to reach near-term climate change targets, but may not be sufficient to achieve its most ambitious targets. The challenge is to achieve objectives in a cost-effective manner and to ensure that these ambitions contribute as much as possible to global GHG emissions mitigation and to stronger and greener growth in Denmark. Better exploiting interactions with EU and international policies, finding the appropriate way to support green technologies and reducing GHG emissions in sectors not covered by the EU emission trading scheme are key issues which need to be addressed to meet this challenge.

Green growth ranks high on Denmark's policy agenda. The country has taken measures and developed plans to reduce the use of fossil fuels and limit greenhouse gas (GHG) emissions, as well as other forms of pollution, while investing in green technologies as a potential new source of growth. The target of eliminating fossil fuels without the use of nuclear energy by 2050 stands out. In many respects, this strategy is visionary. However, it also illustrates the difficulties to achieve various green growth objectives when uncertainties and irreversibilities surround technological choices even as international policies and actions are evolving.

As in many other countries, energy policy in Denmark was dominated historically by concerns about the security of energy supply rather than climate change. After the first oil crisis in 1973, energy policy aimed at making the energy system less dependent on imported oil. Since the mid-1980s, most energy policies focussed on reducing the dependence on foreign suppliers and on improving supply security by increasing energy efficiency. Governments have also introduced actions and plans to shift away from energy sources that are likely to become scarce, and to move towards renewables.

These various policies have led to considerable energy efficiency gains and a more diversified energy supply based, in addition to oil, on coal, natural gas and renewables. The utilisation of oil and gas resources from the North Sea and, more recently, the expansion of wind power have turned the country into a net energy exporter. These policies have also helped lower GHG emissions. Denmark took measures to reduce CO_2 emissions during the 1990s, ratified the Kyoto Protocol and participates in EU climate policies. More recently, the new government has announced a target to reduce GHG emissions by 40% in 2020 from the 1990 base, which is, with Norway, the largest reduction pledged by a developed country.

Denmark thus pursues a mix of energy and climate change policies and stands out by the ambition of its objectives. The challenge is to achieve these objectives in a cost-effective manner and to ensure that these ambitions contribute as much as possible to global GHG emissions mitigation and to stronger and greener growth in Denmark.

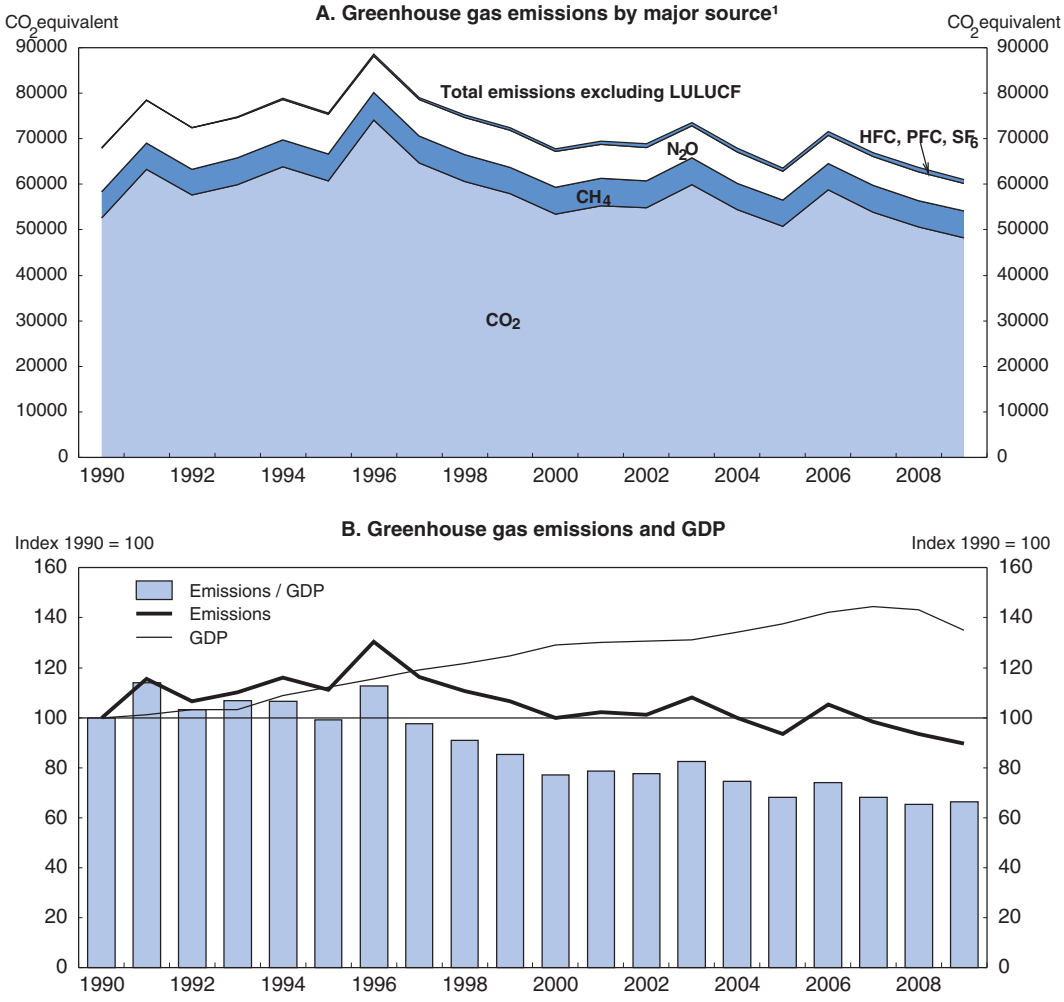
This chapter assesses Danish energy and climate policies and discusses how they could be improved to ensure that objectives are met at least cost. It first depicts the evolution of GHG emissions and the energy mix since 1990. It then puts energy and climate policies and targets into perspective and sets out the main challenges. The final section assesses how policies could be shaped to enhance the efficiency of these targets and minimise their costs.

Past energy and GHG emission trends

Danish GHG emissions (excluding emissions from Land Use, Land Use Change and Forestry – LULUCF) peaked in 1996 and have steadily declined thereafter, to just above 60 million tonnes in 2009, *i.e.* 10% below their 1990 levels (Figure 2.1, Panel A). This GHG emission reduction is relatively high as emissions increased OECD-wide over the same period. Nevertheless, Denmark's GHG emissions per capita were 22% above the EU average

in 2009, though in line with the OECD average (Table 2.1, Panel B). Danish emissions fluctuate around their downward trend, reflecting trade in electricity with Nordic neighbours.[1] CO_2 amounts to around 80% of these emissions, a proportion that has remained stable over time. GHG emissions have been increasingly decoupled from GDP since the early 1990s (Figure 2.1, Panel B).

Figure 2.1. **Evolution of greenhouse gas emissions in Denmark**



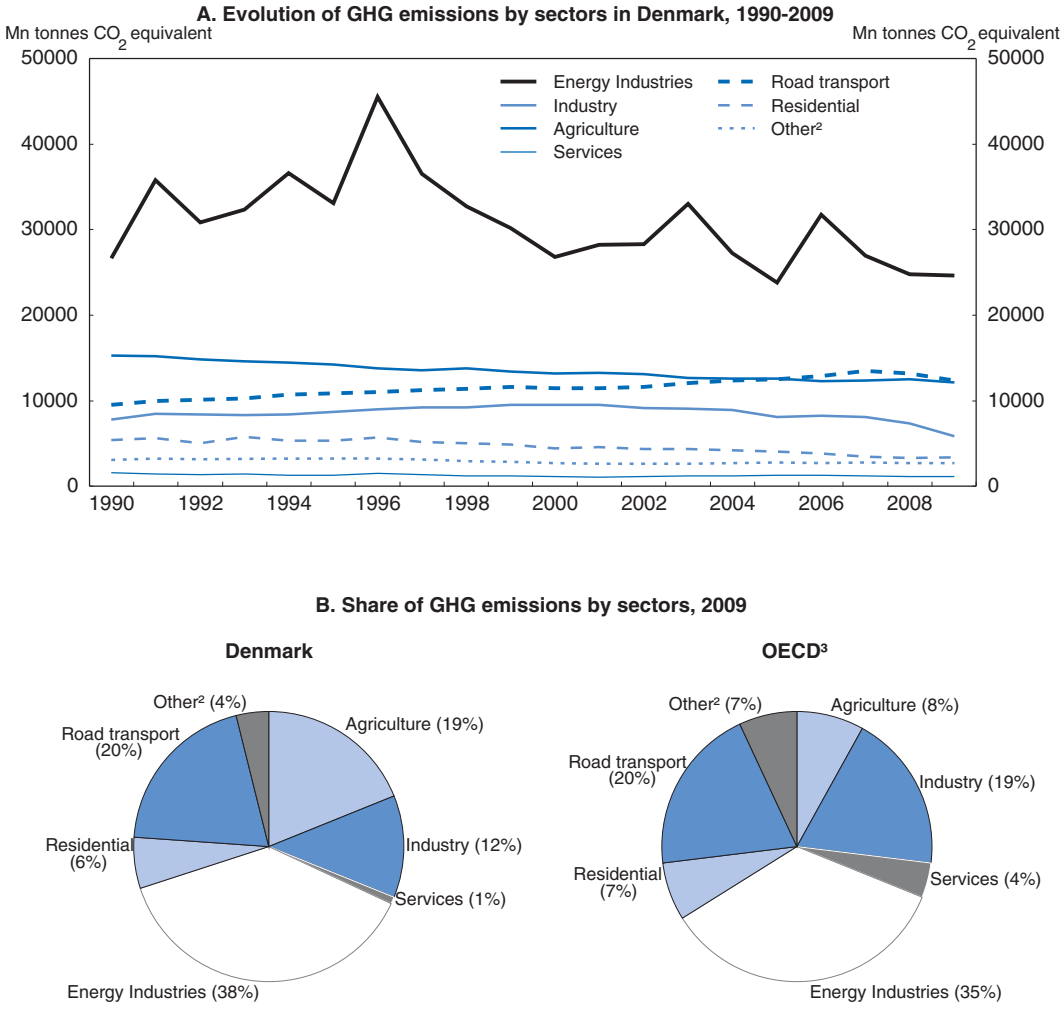
1. Carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride (HFC, PFC, SF_6). In CO_2 equivalent excluding net CO_2, CH_4 and N_2O from LULUCF.

Source: UNFCCC and OECD, *Analytical Database*.

StatLink http://dx.doi.org/10.1787/888932563438

The fall in GHG emissions has mainly come from energy industries, agriculture and the residential sector, while emissions from transport have continued to increase steadily (Figure 2.2). Compared to other OECD countries, emissions from agriculture are high – with a share of 19% compared with 8% for the EU average in 2009, mainly coming from the livestock. The proportion of GHG emissions generated by the energy sector is close to the OECD average.

Figure 2.2. **Sectoral contributions to greenhouse gas emissions**[1]



1. Total CO_2 equivalent emissions without land use, land-use change and forestry.
2. Includes waste, other transport, solvent and other product use and other not elsewhere specified.
3. The OECD aggregate is an unweighted average and excludes Chile, Israel, Korea and Mexico.

Source: United Nations Framework Convention on Climate Change Database.

StatLink http://dx.doi.org/10.1787/888932563457

GHG emissions per capita coming from the energy sector (including electricity generation and transport) were below the OECD average in 2009, but higher than in Sweden and France for instance (Table 2.1, Panel B). This reflects high GDP per capita coupled with a relatively high emission intensity of energy. In contrast, Denmark belongs to the group of countries that use energy most efficiently but this is not enough to put the country in the low-emission group.

Energy-related GHG emissions per capita declined more in Denmark over 1990-2009 than OECD-wide (Table 2.1, Panel C). Nevertheless, several countries (Germany, United Kingdom, Sweden) reduced their emissions per capita more than Denmark. This mostly reflects limited gains in energy efficiency, stemming from the fact that Denmark already used energy relatively efficiently in 1990 (Table 2.1, Panel A). The drop in the emission intensity of energy in Denmark was in line with countries that also started from

Table 2.1. **Decomposition of energy GHG emissions**[1]

Panel A. Emissions 1990

Country/region (%)	GHG emissions/capita[2]	A = B × C × D	B	C	D
		Energy GHG emissions/capita[2]	GDP per capita[3]	Energy GHG emissions/energy[4] use	Energy use/GDP[5]
USA	24.6	21.1	31.8	2.8	0.24
UK	13.6	10.6	23.7	3.0	0.15
Germany	15.7	12.8	25.9	2.9	0.17
France	9.7	6.6	24.3	1.7	0.16
Italy	9.2	7.4	23.8	2.9	0.11
Denmark	**13.5**	**10.3**	**25.4**	**3.1**	**0.13**
Sweden	8.5	6.2	24.6	1.1	0.22
Norway	11.7	7.0	32.1	1.4	0.15
OECD	13.1	10.7	22.6	2.5	0.19
EU27	11.8	9.1	18.3	2.6	0.19

Panel B. Emissions 2009

Country/region (%)	GHG emissions/capita[2]	A = B × C × D	B	C	D
		Energy GHG emissions/capita[2]	GDP per capita[3]	Energy GHG emissions/energy[4] use	Energy use/GDP[5]
USA	21.5	18.7	41.1	2.7	0.17
UK	9.2	7.8	32.0	2.5	0.10
Germany	11.2	9.3	32.2	2.4	0.12
France	8.1	5.7	29.4	1.4	0.14
Italy	8.2	6.8	26.5	2.5	0.10
Denmark	**11.3**	**8.9**	**32.0**	**2.7**	**0.11**
Sweden	6.5	4.8	32.2	1.0	0.15
Norway	10.6	8.1	47.1	1.4	0.12
OECD	11.4	9.6	29.4	2.2	0.15
EU27	9.2	7.3	27.1	2.2	0.12

Panel C. Average annual growth in emissions 1990-2009

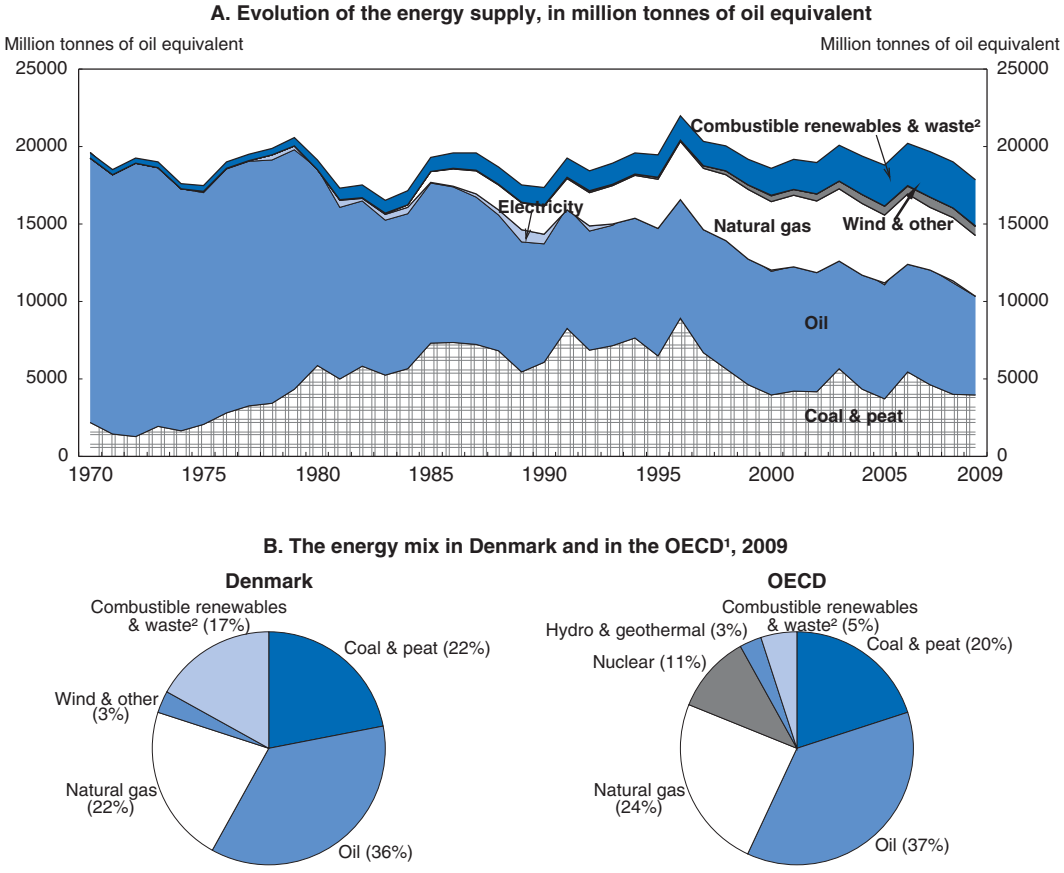
Country/region (%)	GHG emissions/capita	A ≈ B + C + D	B	C	D
		Energy GHG emissions/capita	GDP per capita	Energy GHG emissions/energy use	Energy use/GDP
USA	–0.7	–0.6	1.4	–0.2	–1.8
UK	–2.0	–1.6	1.6	–1.0	–2.1
Germany	–1.8	–1.7	1.2	–1.0	–1.8
France	–0.9	–0.8	1.0	–1.0	–0.7
Italy	–0.6	–0.4	0.6	–0.8	–0.5
Denmark	**–0.9**	**–0.8**	**1.2**	**–0.7**	**–0.9**
Sweden	–1.4	–1.3	1.4	–0.5	–2.0
Norway	–0.5	0.8	2.0	0.0	–1.2
OECD	–0.7	–0.6	1.4	–0.7	–1.2
EU27	–1.3	–1.2	2.1	–0.9	–2.4

1. Energy GHG emissions/head = (GDP/head) × (Energy GHG emissions /energy) × (energy/GDP). In recent years, GHG emissions have been strongly affected by the global economic and financial crisis.
2. In tonnes of CO_2eq per head.
3. In thousand USD using PPP exchange rates for the year 2005.
4. For total final energy consumption in ktoe/billion PPP USD for the year 2005.
5. For total final energy consumption in Mt CO_2eq/ktoe. In Ktoe/billion PPP USD for the year 2005.

Source: OECD calculations and UNFCCC.

high levels in 1990 (United Kingdom and Germany). Hence, even though the emission intensity of energy in Denmark has dropped, it remains relatively high, reflecting the evolution of the energy mix. Since the early 1990s, the share of coal and oil in total energy consumption has tended to decline, and that of natural gas and renewables to rise but since 2000, the fall in the use of coal has stopped (Figure 2.3, Panel A). This energy mix, which relies mostly on fossil fuels (80% of total primary energy demand), generates fairly high GHG emissions (Figure 2.3, Panel B). Countries with a lower proportion of fossil fuels in their energy mix generally use nuclear power and/or hydro. Denmark has decided that nuclear energy is not an option and hydropower cannot be developed because of the country's geography.

Figure 2.3. **The energy mix**



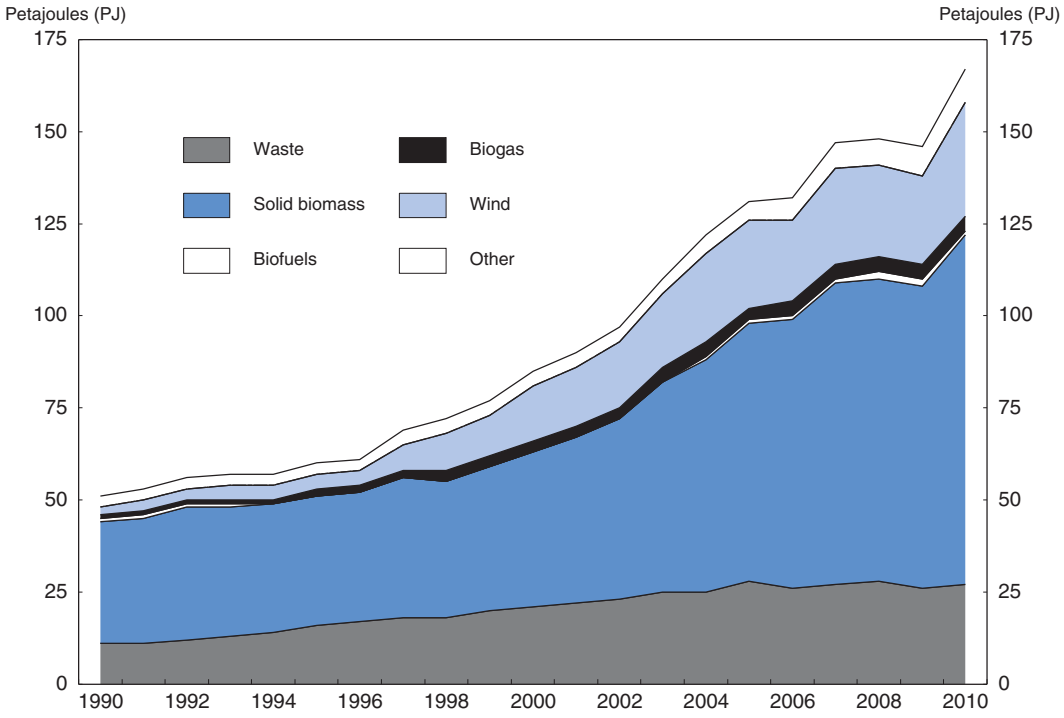
1. As a share of total primary energy supply (TPES).
2. Includes non-renewable municipal waste, industrial waste, electricity trade and other sources of primary energy.

Source: IEA (2011), *Energy Balances of OECD Countries*.

StatLink http://dx.doi.org/10.1787/888932563476

Renewables have been developed vigorously and their share in energy supply amounted to almost 20% in 2008 versus an OECD average of 7%. Among renewables, most of the increase came from the use of solid biomass for heating and wind power for electricity generation. Wind accounted for 3% of the energy supply in Denmark in 2009 while its contribution was close to 0% OECD-wide. In contrast, the use of biofuels and biogas remains marginal (Figure 2.4).

Figure 2.4. **The take-off of renewables**[1]



1. In gross energy consumption. Corrected for electricity trading. Historical figures are climate adjusted.
Source: Danish Energy Outlook (2011).

StatLink http://dx.doi.org/10.1787/888932563495

In sum, total GHG emissions in Denmark have declined more than the OECD average (and roughly in line with other EU countries) since 1990, but in per capita terms they remain just at the OECD average. This is because: i) its energy mix implies higher emissions per energy unit; and ii) GHG emissions from agriculture are high. Going forward, the potential for reducing GHG emissions in Denmark relies mostly on changing the energy mix away from carbon-rich fossil fuels and reducing non-CO_2 emissions from agriculture.

Danish climate change and energy policies in perspective

Main targets and current policies

Denmark has long considered policies to reduce GHG emissions as part of a set of broader objectives and has been a pioneer in climate change mitigation policies. In 1992, Denmark was one of the first countries, just after Sweden, to introduce carbon taxation, with a carbon tax on some energy uses by households and space heating in industry, which has since been increased and extended to other industrial processes (OECD, 2007a). The tax rate differed across users and sectors, with households paying most (Table 2.2). Much lower rates applied to energy-intensive industries on the ground of competitiveness concerns. In addition, these industries benefited from tax rebates in the context of voluntary agreements with the authorities for implementing energy-saving measures. The revenues of the carbon tax were earmarked to subsidise environmental innovation. CO_2 is also indirectly taxed through energy taxes that have been increased, and in effective terms Denmark now has the highest taxation of energy among EU countries (Figure 2.5).

Table 2.2. **Carbon tax rates**

Euros/tonnes of CO_2 equivalent, nominal

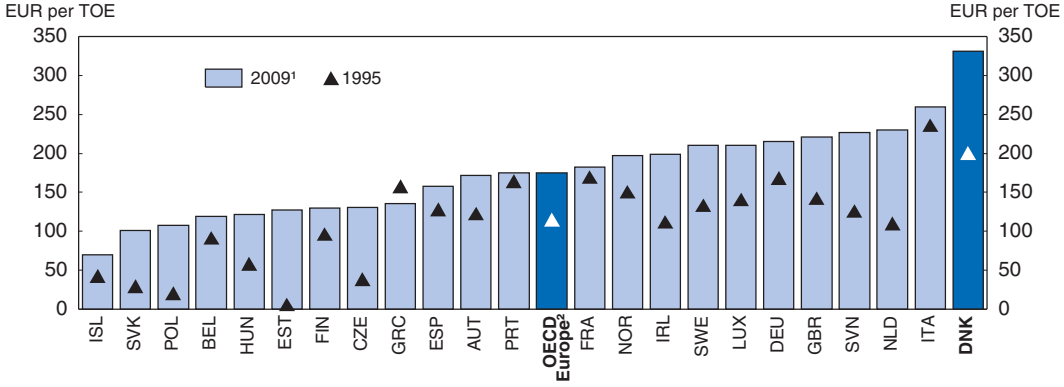
	1996	2000-04	2005	2008	2011
Denmark					
Households (basic rate)	13.4	13.4	12.1	20	21.3
Industry					
Heating (basic rate)	13.4	13.4	12.1	20	21.3
Light processes:					
Without voluntary agreement	6.7	12.1	12.1	20	21.3
With voluntary agreement	6.7	9.1	9.1	20	21.3
Energy-intensive processes					
Without voluntary agreement	0.7	3.4	3.4	20	21.3
With voluntary agreement	0.4	0.4	0.4	20	21.3
Sweden					
General carbon tax rate	40.0	69.3	98.7	108.9	114.0

Source: OECD (2007a), Danish Ministry of Taxation, and Swedish Ministry of Finance.

In addition, during the 1990s, Denmark implemented an extensive set of command-and-control and subsidy instruments in order to boost the production of renewable energy and increase energy efficiency. In particular, support to wind technology has taken the form of a feed-in tariff that guarantees a price to producers to cover their costs and hence involves a supplement to the market price.

Figure 2.5. **Effective taxes on energy**

EUR per tonnes of oil equivalent (TOE), base year 2000



1. The last available year is 2008 for Hungary, Portugal and Norway and 2006 for Iceland.
2. The OECD Europe aggregate is a simple average and does not include Switzerland and Turkey.

Source: European Commission (2011), *Taxation Trends in the European Union: Data for the EU Member States, Iceland and Norway*. StatLink http://dx.doi.org/10.1787/888932563514

Over the past decade, Denmark has had the goal of meeting the emission reduction targets under the Kyoto Protocol and the EU Burden Sharing Agreement in a cost-effective way (Ministry of Climate and Energy, 2009; Box 2.1). It set itself an ambitious target of cutting emissions by 21% over 2008-12 relative to base-year levels – one of the steepest reductions among EU countries which called for new measures.[2] These included:

- The introduction of a cap-and-trade system. Denmark introduced it for electricity generation in 2001, with a free allocation of permits based on firms' past emissions and provisions for banking. The system was extended in 2003 and replaced in 2005 by the EU emission trading scheme (ETS).

- A harmonisation and increase in the carbon tax rate. Differences in rates across industries were reduced in 2005 and abolished in 2008 (Table 2.1). The rate was raised to EUR 20 per tonne of CO_2 in 2008, which was the expected carbon price in the EU ETS. It is, however, much below the statutory rate in Sweden, which exceeded EUR 100 in 2008. Since then, the carbon tax rate has been lifted by 1.8% per year. The coverage has been reviewed after the introduction of the EU ETS but some sectors are still taxed twice. This is the case for producers of district heating that are covered by the carbon tax regardless of whether they are inside or outside the EU ETS.
- The use of the flexible mechanisms considered in the Kyoto Protocol: Joint Implementation (JI) and Clean Development Mechanism (CDM).
- The cost of developing the capacity of electricity production from wind turbines is gradually passed on to all domestic consumers of electricity through a "public service obligation", which is paid by electricity consumers and finances the supplement to the electricity market price guaranteed to electricity producers. Other renewables also benefit from the system, but to a lesser extent than wind.
- To ensure some uniformity of abatement efforts between ETS and non-ETS sectors as well as to identify additional cost-effective measures to meet the EU Burden-Sharing target, a benchmark of EUR 16 (DKK 120) per tonne of CO_2eq. was set as a basis for implementing domestic measures outside the sectors covered by the EU ETS. This benchmark can be adjusted over time.

Box 2.1. **Main climate change mitigation and energy targets**

Near-term targets

Under the EU burden sharing agreement of the Kyoto Protocol, Denmark should reduce GHG emissions by 21% below 1990 levels for the average level of GHG emissions over 2008-12.

Under the 2008 Agreement on Danish Energy Policy, the share of renewables in gross energy supply should be raised to 20% by 2011.

Targets for 2020 and 2050

EU targets for 2020

As an EU member, Denmark has to contribute to the achievement of EU targets, which are:

- A 20% reduction in GHG emissions relative to 2005 levels. This reduction can be scaled up to as much as 30% should there be a new global climate change agreement with other developed countries making comparable efforts.
- A 20% share of EU energy consumption from renewables.
- A 10% share for renewables in the transport sector.
- A 20% reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency.

Richer EU countries are expected to contribute more than poorer ones. For Denmark, the specific targets are:

- A decrease in emissions of sectors outside the EU ETS by 20% between 2005 and 2020, which is the steepest reduction for Member States.
- An increase in the share of energy supply from renewables from 17% in 2005 to 30% in 2020.

Box 2.1. **Main climate change mitigation and energy targets** *(cont.)*

National targets

The new government has reaffirmed Denmark's target to become "independent from fossil fuel" in 2050, which means that the share of energy from renewables would have to reach 100%. In addition, the new government has announced four sub-targets:

- By 2020, 50% of electricity would come from wind.
- A 40% cut in GHG emissions is to be achieved mainly domestically by 2020 relative to 1990 levels.
- The use of coal for power generation and of oil boilers for residential heating would be phased out by 2030.
- Electricity and heating supply would be fully covered by renewable energy by 2035.

In 2007, Denmark also set itself an objective of independence from fossil fuels by 2050. The new government has reiterated this target, by stating that 100% of energy should come from renewables by 2050 and adding some sub-targets (Box 2.1). In particular, it has announced a new target to cut GHG emissions by 40% by 2020 relative to 1990 levels, with at least a large portion of this reduction to be achieved domestically. This target comes on top of Denmark's commitment to reducing GHG emissions in sectors outside the EU ETS by 20% in 2020 relative to their 2005 levels as part of the 2008 EU climate and energy package.

Efforts required to comply with targets

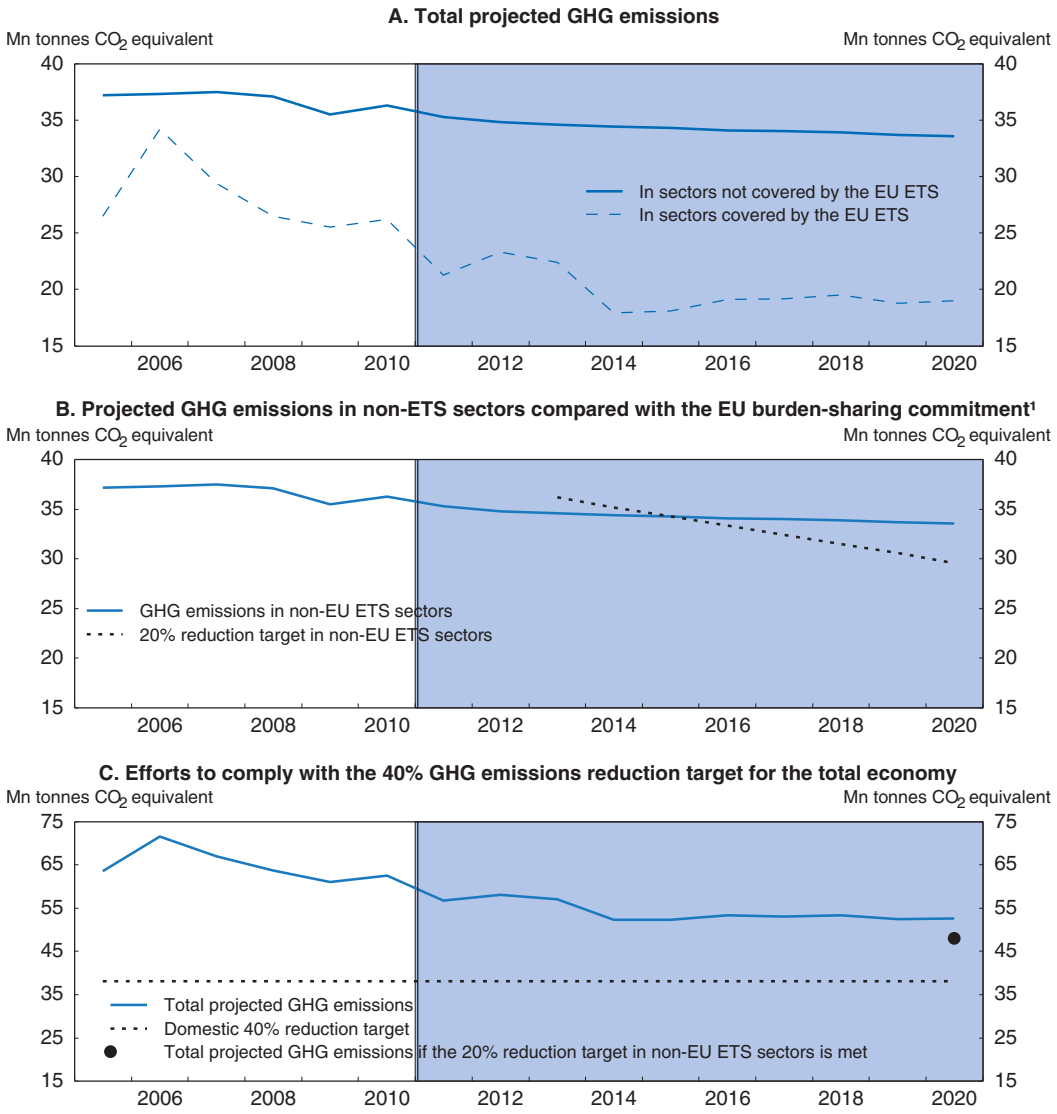
The Danish Energy Agency has carried out projections through 2025 that give some information on the size of the efforts that will be required to achieve the Kyoto targets and 2020 targets (Danish Energy Agency, 2011). These projections are very sensitive to assumptions regarding policies and future economic growth, fuel prices, technology and the carbon price. Concerning policies, the projection only includes measures already adopted by end-2010, *i.e.* an increase in energy saving as part of the 2008 Energy Agreement, the 2009 tax reform that raised some energy taxes and some measures in the transport sector, and the EU ETS. Projections of fossil fuel and EU ETS allowances are based on the IEA's *World Energy Outlook* 2010 and growth projections are from the Ministry of Finance. As illustrated by the large and unexpected fall in energy consumption in 2008-09 due to the recession, such assumptions are fragile.

Bearing that caveat in mind, the projections suggest that Denmark can meet its Kyoto target. The latter caps Danish GHG emissions at an annual 54.8 million tonnes of CO_2eq. on average during 2008-12, as against a recorded 62.1 million in 2008-09. The gap between the two would be filled through the use of credits from forest carbon sinks and flexible mechanisms (CDM and JI) combined with a continued decline of GHG emissions in non-EU ETS sectors that can however be difficult to achieve if the economy grows faster than expected.

The 2020 GHG emission targets are very ambitious (a 20% cut relative to 2005 levels in non-EU ETS sectors and a 40% cut relative to 1990 levels in all sectors) and would require significant new measures unless they are achieved by financing GHG emission cuts outside Denmark. Up to now, GHG emissions have been mainly reduced in sectors covered by the EU ETS while they have barely declined in sectors outside the EU ETS (Figure 2.6, Panel A).

This partly reflects difficulties to cut GHG emissions in the transport sector. The Danish Energy Agency projections show that emissions in non-EU ETS sectors would exceed the level implied by the 20% reduction target significantly (Figure 2.6, Panel B). The newly-introduced 40% reduction target covering all sectors introduces even stronger constraints. Indeed, under the Danish Energy Agency scenario, even if the 2020 20% reduction target in non-EU ETS sectors were achieved, GHG emissions in all sectors would be 10% above the level implied by the 40% reduction target (Figure 2.6, Panel C).

Figure 2.6. **Projected greenhouse gas emissions compared to targets under an unchanged policy scenario**[1]



1. The projection includes the effects of measures already adopted, *i.e.* the 2008 Energy Agreement, the 2009 tax reform and the review of the latter in 2010, and the EU ETS.

Source: Danish Energy Outlook (2011).

StatLink http://dx.doi.org/10.1787/888932563533

Reaching targets for the development of renewable energy will also be challenging. In the Danish Energy Agency scenario, the share of renewables in total energy consumption would reach 28%, just below the 30% target to which Denmark has committed itself at the EU level. The corresponding share for the transport sector would be only 6%, well below the 10% EU target. In 2009, around 19% of domestic electricity came from wind power. Under the Danish Energy Agency scenario, the share of electricity from wind would rise slightly above 30% by 2020, hence also well below the new target to have 50% of electricity coming from wind by 2020. This scenario assumes an expansion of offshore wind turbines as already contracted and the replacement of onshore wind turbines by more efficient ones. The expansion of onshore wind turbines is uncertain as capacity constraints are already almost fully exploited. Hence, it is very likely that the capacity will have to be mainly extended offshore to meet the 50% target, which is likely to remain more costly than onshore technologies for quite some time (Table 2.3).

Table 2.3. **Cost projections for renewable electricity generation**

	Investment cost USD/kW		Operation and maintenance cost USD/kW/yr	
	2010	2050	2010	2050
Biomass steam turbine	2 500	1 950	111	90
Geothermal	2 400-5 500	2 150-3 600	220	136
Large hydro	2 000	2 000	40	40
Small hydro	3 000	3 000	60	60
Solar PV	3 500-5 600	1 000-1 600	50	13
Solar CSP	4 500-7 000	1 950-3 000	30	15
Ocean	3 000-5 000	2 000-2 450	120	66
Wind onshore	1 450-2 200	1 200-1 600	51	39
Wind offshore	3 000-3 700	2 100-2 600	96	68

Note: Estimates of costs and efficiencies in 2050 are inevitably subject to great uncertainty. These data refer to plants in the US.
Source: IEA (2010), *Energy Technology Perspectives*.

On the whole, although government projections suggest that Denmark is on course to meet its commitments, additional efforts are required to ensure their fulfilment. One of the major challenges will be to bring down emissions in the non-ETS sectors, more than 70% of which are accounted for by emissions from agriculture and transport. Marginal abatement costs are expected to be high in a number of activities outside the EU ETS (Ministry of Climate and Energy, 2009). Another challenge will be to expand wind power capacity at least cost.

There are some risks for a small country to adopt very ambitious targets, mainly in terms of overall cost (Box 2.2). The bulk of the GHG emission cuts could be achieved at a lower cost by financing emissions reductions outside Denmark. There are also potential gains from having ambitious targets as green growth may create new opportunities and could help boost potential growth in Denmark. However, identifying these new growth opportunities *ex ante* is difficult and depends *inter alia* on the choices other countries will make.

Box 2.2. **The pros and cons of ambitious domestic energy and climate targets**

There are pros and cons for adopting stringent targets. The advantages include the following:

- The announcements by successive governments regarding energy and climate change mitigation targets demonstrate their strong commitment to act, and send credible signals that fossil fuel and GHG emissions will be taxed in the future. This removes part of the uncertainty surrounding the international framework and hence encourages investment. So does having targets extending beyond the EU horizon.
- At the international level, strong actions by some countries, even if they contribute only modestly to world GHG emissions, may reinforce the credibility of mitigation policies and encourage others to act likewise.
- Greening growth will require expanding some of the existing technologies and finding new ones. There is also growing demand from consumers and investors for more environmentally-friendly products. Hence, there are opportunities for new markets and industries and some potential gains for being a leader in this area (OECD, 2011a). Such a strategy would also attract skilled workers. Being a leader in the area of "clean" technologies may boost productivity growth, which has been weak in Denmark over the past 15 years.

The main drawbacks of adopting ambitious energy and climate targets pertain to their potential costs:

- In a small country that has already cut its GHG emissions significantly, low-cost abatement opportunities are expected to be rare and overall marginal abatement costs to be high. Hence, reaching ambitious targets can be very costly. As climate is a global good, where GHG emissions are cut does not affect the overall outcome, hence, GHG emissions should be reduced where it is cheapest.
- The irreversibility of the Danish strategy is also part of the cost (IEA, 2007a). There is a strong irreversibility associated with the wind technology as the turbine cost typically represent about 75% of the total cost, with infrastructure, grid connection and foundations accounting for the rest. Furthermore, as the best spots have been sought out first, they tend to be occupied by rather old and inefficient technologies that need to be replaced, generating some additional dismantling costs. If new less costly technologies appear or if some existing technologies become less costly, these investments would be lost. For instance, the full availability of the carbon capture and storage technology at a competitive price would make the target to move away from fossil fuel much less relevant.
- Having a large share of electricity coming from wind generates costs beyond investment and maintenance. One particular issue concerning wind technology is that output varies with wind and hence, wind plants do not operate at full power all the time. Higher penetration of this technology requires increasing the flexibility of wind power systems with smart grids, including interconnection and storage. Similarly, the penetration of electric cars would require the development of public and private recharging infrastructure.
- Furthermore, ambitious domestic policies to reduce emissions in sectors already covered by the EU ETS will not lead to lower GHG emissions at the EU level as long as the EU cap is fixed (see below).

Proposed policies towards a future without fossil fuels

The new government has confirmed the long-term vision of relieving Denmark completely of its dependence on fossil fuels, indicating how this target will be achieved in *Our Future Energy* (Danish Government, 2011a). This document follows up on the *Energy Strategy 2050* developed by the previous government (Danish Government, 2011b), which built on the analysis of the Commission on Climate Change Policy discussing out how to acheive independence from fossil fuels. The challenge is a formidable one, as 80% of primary energy consumption now comes from fossil fuels. The definition of independence used by the Commission is that "no fossil energy is used/consumed in Denmark, and the average annual domestic production of electricity based on renewables must at least equal Danish consumption" (Danish Commission on Climate Change Policy, 2010). Under this definition, Denmark can continue to trade electricity with countries where it is based on fossil fuels provided this is offset by exports of renewable energy, but cannot continue to consume oil in the transport sector and to compensate for this by exporting electricity based on renewables. The definition of independence used in *Our Future Energy* is that the energy and transport network should rely solely on renewables. This definition is more ambitious than the one used by the Commission on Climate Change Policy.

The Commission offered 40 specific recommendations, involving a massive conversion to electricity from offshore wind turbines, complemented by biomass as a backup for wind turbines as well as for part of the transport sector that can hardly rely on electricity. Nuclear power was rejected by the Danish Parliament in 1985 and is not considered as a cost-effective option for this transition. In terms of market-based instruments, the Commission recommended to have an energy tax (expressed in DKK per energy unit) applied uniformly to all fossil fuel uses and gradually increasing over time. It also recommended equalising the domestic carbon tax to the carbon price on the EU ETS market so as to approximate a cost-effective allocation of emission abatements across ETS and non-ETS sectors.

The Commission concluded that the aggregate economic cost of achieving full fossil fuel independence is very low – only a 0.5% of GDP by 2050, with GDP projected to more than double over that period. This stems from a number of factors including that: *i)* fossil fuel prices are projected to increase substantially in the business-as-usual scenario, which makes the reduction of their use profitable in any event; *ii)* the conversion of the energy system is gradual and takes place over a long horizon; and *iii)* reducing fossil fuel use would cut GHG emissions and hence, limit the number of allowances to be bought by Denmark. However, the Commission recognises that many uncertainties surround these estimates.

The conversion of the Danish energy system, as proposed in *Our Future Energy* (and in line with *Energy Strategy 2050*), is meant to follow the process proposed by the Commission. This would involve:

- Far-reaching improvements in energy efficiency, notably via the replacement of combustion by electric motors.
- Almost complete electrification of the energy system (heating, industry and transport).
- Increasing the share of wind power electricity, first by replacing existing onshore wind turbines, then by expanding offshore ones; increasing utilisation of biomass for combined heat and power plants and of biofuels for very energy-intensive transport modes such as aircraft or heavy lorries.
- Developing electricity storage and integrating the Danish electricity grid more into the European grid to address the volatility of electricity coming from wind power.

To this end, the main proposed measures are:

- Greater support for renewables but structured differently (*inter alia*, by removing existing subsidies on onshore wind turbines and introducing new subsidies for biogas); calls for tender for expanding the capacity of offshore wind turbines; price deregulation for heating.
- Removal of the restrictions that hinder increased use of energy based on biomass.
- Additional standards to raise the energy efficiency of consumption and buildings. For instance, it is proposed to expand saving obligations to all companies while targeting them to building renovation and conversion, coupled with a tightening of energy standards for buildings.
- Increasing the electricity price paid by consumers. The expansion of renewables up to 2020 will be financed through the "public service obligation". In addition, a new public service obligation will be introduced for gas consumers in order to finance the cost of converting the grid from natural gas to biogas.
- The introduction of a new "security-of-supply" tax on all fuels for space heating (coal, oil, gas and biomass), in order to provide an incentive for additional energy efficiency improvements and to provide revenues to the government (see below).
- At an international level, actions to promote the phasing-out of fossil-fuel subsidies, at the EU level, pushing the EU to raise the 2020 reduction target from 20% to 30% (compared with 1990 levels).
- As these new taxes and subsidies will increase the complexity of the Danish energy tax system, a re-examination of the current system of energy taxes and subsidies is proposed.

The transition to fossil fuel independence is thus meant to be primarily financed by energy consumers, with tax revenue losses resulting from lower fossil fuel consumption being compensated by the introduction of a new security-of-supply tax on all fuels for space heating.

According to the government's estimates, measures proposed in *Our Future Energy* would ensure that the target to have 50% of electricity consumption supplied by wind in 2020 will be met and would put Denmark on track with other energy sub-targets for 2030-35. These measures would lead to a cut by 35% of GHG emissions in 2020 relative to 1990 levels and a cut by 16% relative to 2005 levels in non-ETS sectors. Hence, the measures proposed in *Our Future Energy* are not sufficient to achieve both the national and EU climate targets by 2020. The government has announced that a climate plan will be presented in 2012 to ensure the achievement of both sets of targets.

To what extent would fossil fuel independence enhance energy security?

Energy security may be defined as a low risk of disruption to energy supply, both in terms of quantity and price (Bohi and Toman, 1996).[3] Physical shortage of oil is likely to be short-lived as international prices adjust, given the fact that oil markets are fairly integrated and governments have built strategic stocks. However, natural gas shortages may last longer due to market segmentation and the relative inflexibility of gas-pipeline infrastructure. The coal market is also fragmented. Price instability remains a concern over the longer term insofar as the supply of fossil fuels becomes less and less elastic and concentrated into the hands of a small number of producing countries, hence raising the risk of large unexpected price shifts as a result, in particular, of political instability. While Denmark is among the countries that use energy most efficiently, energy security is an important issue as the share of oil and natural gas in total Danish energy consumption is large (Figure 2.3) and as Danish oil and gas resources in the North Sea approach exhaustion.

Policies to limit fossil fuel use and GHG mitigation policies are expected to improve long-term energy security: *i)* by reducing the energy and fossil fuel intensity in fossil fuel importing economies, hence lowering the macroeconomic cost of any future price shocks; and, *ii)* by diversifying the energy mix, hence reducing energy risk (OECD, 2009a). The latter might be partly offset, however, by additional energy-supply risk specific to some renewable, such as for instance biomass whose supply might be limited in the future at the world level, competing with the supply of food and possibly concentrated into relatively few countries with high agricultural potential. Accordingly, *Our Future Energy* considers restoring the balance between fossil fuels and biomass uses by removing the current tax exemption on biomass. Policies to limit fossil fuel use will also slow the pace of depletion of oil reserves and curb the projected significant rise in the market share of the Organisation of the Petroleum Exporting Countries (OPEC) for the next three decades. The ultimate impact on energy security would however depend on OPEC's response in terms of prices and quantities.

Raising the efficiency of Danish climate and energy policies and minimising their costs

Taking better account of interactions with EU policies

The EU ETS leads to a carbon price in sectors that are covered, promoting cost-effective CO_2 abatement options. It allows emissions to be cut in countries where it is the cheapest: countries with low abatement costs reduce their emissions while those with higher abatement costs can buy permits. In addition to the EU ETS carbon price, there are several other national policies in ETS sectors that are unlikely to bring short-term global environmental benefits, due to spillover effects across EU countries. Permits not bought by Danish ETS sectors will be available for use in other EU countries. Thus, as long as the cap on emissions remains unchanged at the EU level, abatement achieved through additional overlapping instruments in one country is offset by higher emissions in other EU countries. In particular, this is the case of policies to support wind technology as the electricity sector is covered by the EU ETS. These policies have helped to cut Denmark's emissions in the EU ETS sectors (Figure 2.6, Panel A) but have freed room under the EU cap for increases elsewhere in the EU.

Over the longer term, however, the EU-wide cap on CO_2 emissions will be renegotiated and Denmark will be in a position to push for a more stringent one, on the grounds of its domestic efforts to reduce CO_2 emissions and of the spillovers. Countries pursuing a similar approach might push in the same direction, although others may resist. Currently, the ambition of the new government is to push for a binding EU-wide reduction target of 30% in 2020 relative to 1990. Another argument in favour of national policies on top of EU ones is that they may boost the credibility of the long-term carbon price, spurring investments in abatement technologies.

In the same vein, emission reductions achieved through the domestic carbon tax in sectors within the EU ETS will also be offset by higher emissions in other EU countries. Therefore, activities that face the EU carbon price should be exempted from the domestic carbon tax. The carbon tax is currently applied to fuels used for heat generation by combined heat-and-power plants and large district heating plants on top of the EU carbon price,[4] implying CO_2 emission cuts exceeding what is cost effective. Moreover, this double taxation makes energy from these plants more costly and hence moves energy consumption from the ETS to the non-ETS sector where coal is used, leading to more GHG emissions (Danish Economic Council, 2011). Exempting heat-and-power plants from the carbon tax while increasing taxes on coal, oil, and gas would reduce emissions in non-ETS sectors.

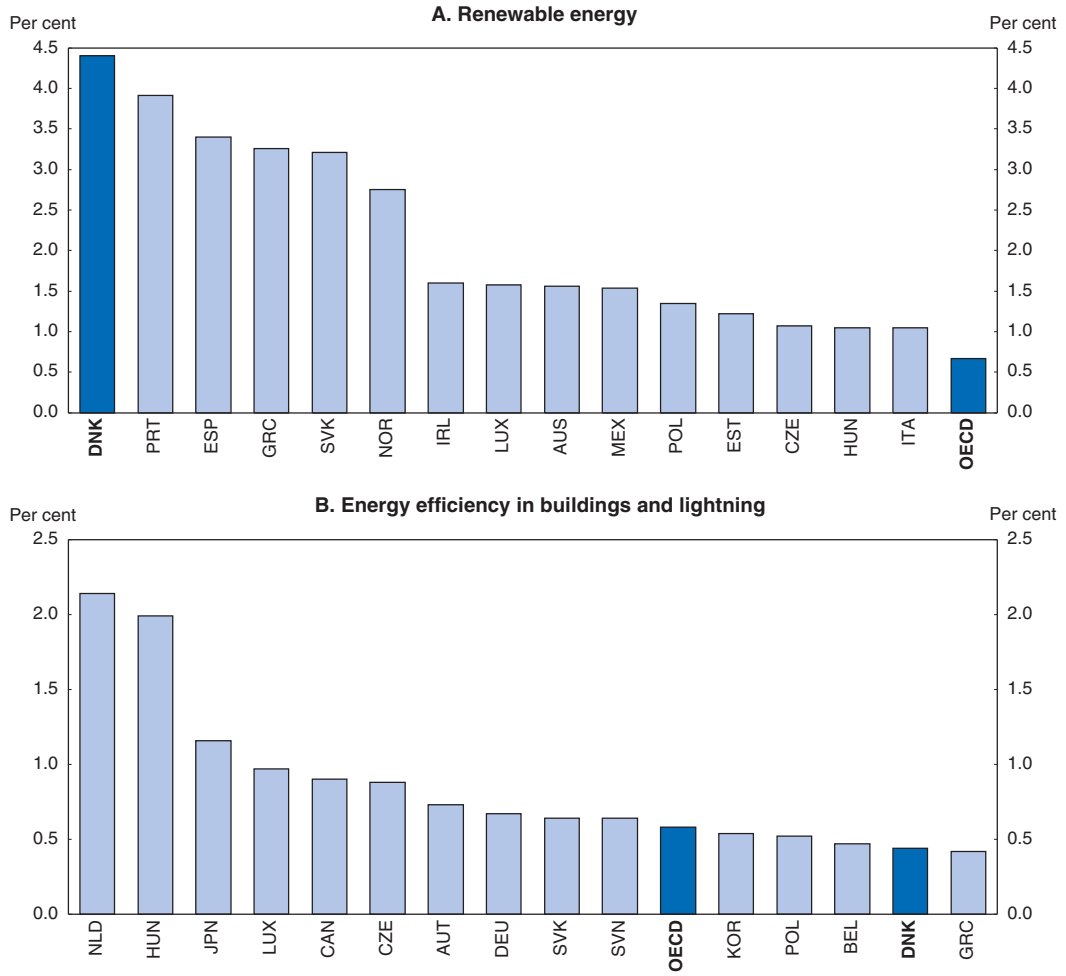
It might be argued that policies to develop electricity from renewables bolster energy security in EU countries. While under such policies less fossil fuel energy would be used in Denmark, this would lead to higher CO_2 emissions in other EU countries from some other sources covered by the trading scheme. As these CO_2 emission increases imply greater use of fossil fuels among these other sources, recourse to fossil fuels, and hence energy security would be left unchanged at the EU level (Braathen, 2011).

Exploiting the opportunities to raise growth potential through green technologies

Denmark has managed to be at the frontier in the area of renewable energy technologies, notably with respect to wind, and in technologies to increase energy efficiency in the residential sector (Figure 2.7). This is the effect of aggressive policies in these sectors. These policies have been successful partly because they came at a time when the global demand for these technologies was rising in the absence of alternative cheaper ones. However, targeting a small range of technologies entails risks, the main one being that a new more cost-effective technology emerges. Another risk is that a different country

Figure 2.7. **Denmark has largely contributed to the development of renewable energy technologies**[1]

As a per cent of total Patent Co-operation Treaty patent applications, 2003-08



1. The figure shows the first 15 best-performing OECD countries.

Source: OECD (2011), *Towards Green Growth – Monitoring Progress*.

StatLink http://dx.doi.org/10.1787/888932563552

becomes the leader and manages to exclude most competitors, all the more so as some countries support these technologies more than Denmark does. Hence, it is important to have policies that promote new green growth opportunities while limiting these risks.

Government action is essential to foster green innovation. This is because there are several well-known market failures, the main one being that if firms and households do not have to pay for the environmental damage they inflict, there will be little incentive to invest in green innovation. Boosting green innovation requires clear and stable market signals that are well established in Denmark. However, price instruments will not be enough to deliver the necessary public investment in basic, long-term research. Recent OECD analysis shows that public research will need to cover many areas, and should increasingly be based on multi-disciplinary and interdisciplinary approaches (OECD, 2011b). It should also be neutral with respect to specific technologies, as innovations may emerge from a wide range of fields. Finally, the overall financing framework should be credible and stable to foster investment in new technologies.

The Danish government has spent more and more on energy research in recent years. This was primarily to foster the market maturation of already existing technologies, although the Energy Technology Development and Demonstration Programme supports the development of new technologies. Funding to support more basic energy research performed by universities and other research institutions did not increase. By contrast, the share of public R&D funds for environmental non-energy related research has gradually been reduced since the mid-1990s. Empirical analysis based on 2000-07 Danish firm-level data concluded that there was no economic justification for targeting government R&D expenditures on energy research performed in private firms as opposed to other environmentally-related research (Danish Economic Council, 2011). Therefore, R&D policies should leave some flexibility as regards the choice of specific technology, be harmonised across technologies and re-assessed in light of the precise market failure they try to address.

A feed-in tariff system is also in place, and it is the main policy to support electricity from renewables, with tariffs being larger for wind than for other renewable energy technologies. This system provides large subsidies to these technologies as offshore wind technologies remain very expensive compared to other options (IEA, 2010). Feed-in tariffs, as opposed to electricity certificates, allow adjusting the size of the subsidy to the technology, which can be justified by differences in cost structures and maturity of technologies. For this reason, feed-in tariffs are found to encourage innovations that are further from the market than electricity certificates (Johnstone *et al.*, 2010). However, experience has shown that once granted, support in the form of subsidies can be very difficult to withdraw even when the initial justification no longer applies and rents tend to be captured by specific industries (de Serres *et al.*, 2011). The lobbying power of these industries can be large when the national strategy is built on them. To limit this risk and to ensure that least cost options are developed, differences in subsidy between technologies should be justified by differences in cost structures and maturity of technologies. In the absence of such justification, subsidies should be made more uniform across technologies. This is the case in Estonia, for instance, while in most other countries, the level of support in feed-in tariffs depends on the technology. The new government has proposed a reduction in the subsidies to future land-based windmills as their cost is expected to fall further, but subsidies to off-shore windmills will be increased. It also plans to review the energy tax and subsidy systems to raise incentives to switch from fossil fuels to electricity in non-EU-ETS sectors. The race between EU countries in terms of support to technologies through their feed-in tariffs illustrates the need for an EU policy to support renewables. A

common strategy to support renewables with a view to minimise costs and risks and to limit the race between EU countries in terms of support to these technologies would help achieve the renewable target in a cost-effective manner (OECD, 2009c). However, support would have to be restricted to technologies that require it in addition to that provided by the EU ETS carbon price.

Reducing GHG emissions in sectors not covered by the EU ETS at least cost

Sectors not covered by the ETS are subject to a specific domestic target – a cut in GHG emissions by 20% in 2020 relative to 2005. As GHG emissions in these sectors are by definition not covered by a cap, any additional emission cuts in these sectors would lead to additional cuts at EU level. However, it is likely to be difficult and costly to reduce these emissions and indeed, they have barely declined in the past (see Figure 2.6, Panel A).

GHG emission and fossil fuel use in these sectors depend on energy and carbon taxes. These taxes tend to be high in Denmark (Table 2.4). They translate into an implicit tax rate per tonne of CO_2 emitted for each fuel (Figure 2.8). In Denmark as in other countries, there is some heterogeneity in these carbon prices while a cost-effective approach to reduce GHG emissions would require a uniform carbon price across sources.

Table 2.4. **Carbon and total taxes on energy products in selected OECD countries**

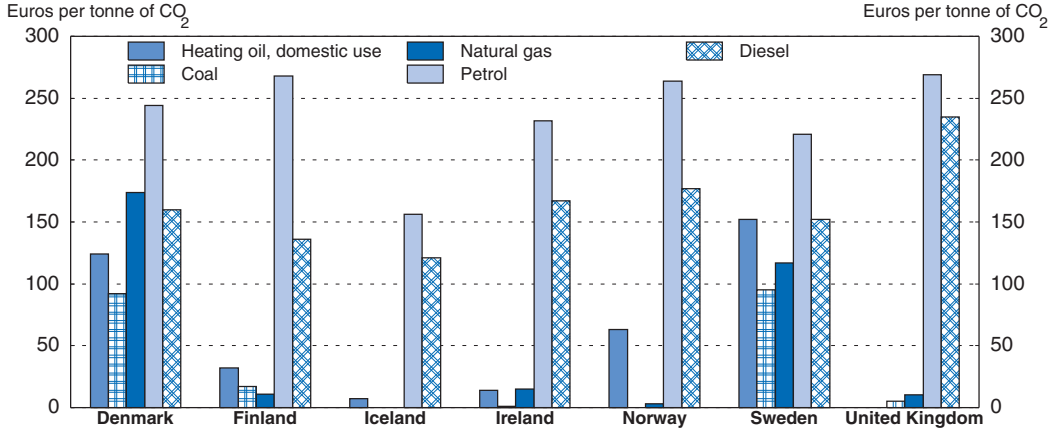
Euros, 2010

	Denmark	Finland	Iceland	Ireland	Norway	Sweden	United Kingdom
Only "carbon tax", per tonne of CO_2	~20	~30-50	~13	~15	~10-40	~100	~5-30
Heating oil, domestic use, per litre	0.33	0.087	0.02	0.04	0.17	0.41	0.0
Coal, per tonne	270.80	50.5	0.0	4.18	0.0	278.2	14.4
Natural gas, per m^3	0.35	0.02	0.0	0.03	0.01	0.24	0.02
Natural gas, per MWh	31.90	2.1	0.0	2.8	0.5	21.4	1.8
Petrol, per litre	0.57	0.63	0.36	0.54	0.62	0.52	0.63
Diesel, per litre	0.43	0.36	0.32	0.45	0.47	0.41	0.63

Note: The comparison should be used with caution, see the source for more details. Whereas the first row only reflects the so-called carbon taxes, the rows below include all excise taxes levied on the energy products listed.
Source: Braathen, 2011.

Figure 2.8. **Implicit tax rates per tonne of CO_2 emitted in a selected number of OECD countries**

Euros per tonne of CO_2, 2010



Source: Braathen, 2011.

StatLink http://dx.doi.org/10.1787/888932563571

The residential sector is an area where more emission cuts are likely to be achievable at a moderate cost (Danish Commission on Climate Change Policy, 2010). Buildings account for 40% of energy consumption in Denmark. Information problems in the residential sector lead to situations where poorly informed households and firms may act inefficiently even in the face of market incentives. For instance, landlords have better information than tenants but have little incentive to install the most energy-efficient equipment as they do not pay the energy bill (OECD, 2009a; IEA, 2007b). Well designed regulations can address these problems. Denmark has introduced a series of regulations to increase energy savings in buildings. They include stringent building codes for new buildings and regulations on energy labeling of buildings and on inspection of heating installations. There is also some support to the installation of heat pumps in areas situated outside the collective supply grid.

The Danish Commission on Climate Change Policy has concluded that, for new buildings, there is no need for further requirements beyond the already stringent existing ones. The main issues would be to implement these regulations and to monitor compliance. As there are greater opportunities to cut energy consumption in existing buildings and to exploit them at lower cost, greater incentives should be given to implement energy improvements in connection with renovation and replacement carried out for other reasons. Energy taxes contribute to these incentives as fossil fuels are still largely used for heating.

Emissions from transport account for a very large part of non-ETS emissions and these have increased steadily. The transport sector is currently largely dependent on fossil fuels and there are no alternatives to fossil fuels that are competitive in terms of technology and price. Hence reducing GHG emissions in this sector and making it "independent from fossil fuel" is the greatest challenge among Denmark's ambitions.

Shifting from road to alternative means of transportation is one way to limit emissions. However, the Danish Commission on Climate Change Policy has concluded, based on background studies to its report, that even a doubling in public passenger transport (trains and buses) will reduce car numbers by only around 15%, which will be more than offset by the expected growth in car numbers over the next ten years. Another option to limit the use of cars is road pricing, which is not used in Denmark apart from some bridges. However, the new government has proposed a congestion charge for Copenhagen in the Budget Bill for 2012 (see below and Box 2.3).

Box 2.3. **Copenhagen, a green haven?**

While cities account for a large share of GHG emissions because they also represent a large share of GDP and population, they are not always the most important polluters when emissions per capita are considered (Hoornweg *et al.*, 2011). Copenhagen stands out as an example in this respect: in 2005, CO_2 emissions per capita in the municipality of Copenhagen were about half the average country rate. This pattern reflects cities' potential to reduce GHG emissions per capita. For instance, higher population density makes public transport more attractive, limiting the use of cars, and makes it easier and less costly to develop district heating systems (OECD, 2011c). In contrast, some GHG emissions from agriculture are difficult to reduce, explaining relatively large emissions per capita in rural areas. Suburbanisation can also contribute strongly to GHG emissions.

Box 2.3. **Copenhagen, a green haven?** *(cont.)*

Copenhagen is already a low CO_2 emitting city but plans to do even more and to become the first carbon-neutral capital by 2025. Meanwhile, the city targets to cut CO_2 emissions by 20% between 2005 and 2015. Copenhagen's strategy rests on plans and policies very similar to national ones but also includes some more ambitious ones:

- 75% of the emission cut would be achieved in the energy sector by moving it away from fossil fuels. Today, most homes in Copenhagen are connected to a district heating system based on combined heat and power plants and incineration of waste, which has allowed reducing CO_2 emissions significantly but remains largely dependent on fossil fuels. Further emissions cuts would require increasing the share of renewables in electricity generation. In particular, the municipality plans to develop cogeneration from wind and biomass.
- The transport sector would account for 10% of the cut. This will be achieved by favouring walking and bicycling even more. In 2010, already 35% of all trips to work or for education in the city of Copenhagen were made by bicycle with this share rising to 50% of trips for people working and living in Copenhagen. The municipality also plans to improve the quality of public transport and to promote car-sharing. Stringent performance standards concerning CO_2 emissions from buses are being gradually introduced and the city is experimenting electric buses and municipal cars. Parking places are limited. A congestion charge will be introduced after a consultation phase. Its revenues would be used to improve public transport.
- 10% of the cut would also be achieved in buildings with particular efforts to increase energy efficiency in municipal buildings.
- The remaining 5% of the cut is expected to be achieved through changes in household and firm behaviour encouraged by information and education campaigns and through urban development.

By continuing on this path, the municipality expects to reduce CO_2 emissions by 45% between 2005 and 2025. Complete carbon neutrality would be achieved by investing in more windmills or by reforestation to capture more CO_2.

While cities have a key role to play in actions to mitigate climate change, they also need to adapt to the impacts of climate change. As a low-lying city, Copenhagen is potentially exposed to coastal flooding that will increase with climate change. The city has already undertaken a number of actions to adapt to these effects of climate change and has developed an "adaptation plan". OECD estimates suggest that, partly thanks to these actions, the city is not particularly vulnerable to sea level events (Hallegatte *et al.*, 2008).

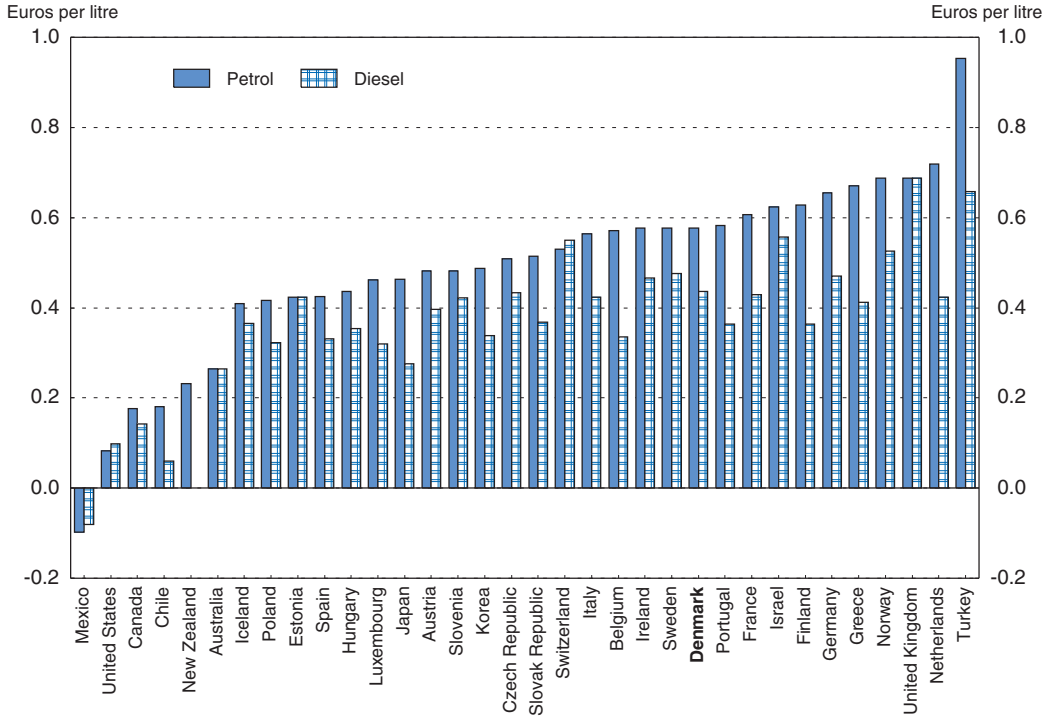
Despite these impressive achievements and objectives, Copenhagen's air quality is not among the best in selected OECD cities. Emissions of particulate matter, which have been shown to have large detrimental effects on health, were still relatively high in 2008 despite past reductions. This partly comes from pollution from diesel cars, wood stoves and other materials (OECD, 2009b). These emissions may have fallen further in the recent past with the introduction of "low emission zones"* and policies to limit CO_2 emissions will lead to less emissions of particular matter as a co-benefit (Bollen *et al.*, 2009). Nevertheless further efforts may be required in this area.

* Since 2006, the four largest cities in Denmark are allowed to introduce low-emission zones in which heavy vehicles have to meet some standards in terms of emissions of particulate matter.

Taxes on fossil fuels provide some incentives to reduce the use of cars. In Denmark as in many other countries, diesel is taxed less than petrol (Figure 2.9). As the carbon content is higher for diesel than petrol, the implicit carbon price on emissions from diesel is significantly below the one on petrol. Hence, there is room to raise taxes on diesel, although this may lead to more cross-border trade. In the transport sector, there exists, on top of the carbon tax and energy taxes, some taxes on motor vehicles to be paid regularly and a one-off motor vehicle tax for new cars. These taxes depend on the fuel efficiency of the vehicle, but on the whole, they are high in Denmark, thus providing incentives to reduce the use of cars (Braathen, 2011). The motor vehicle registration tax is particularly stiff, with a basic rate of 105% on the value of the car below EUR 10 000 and 180% above this threshold, except for electric cars, which are exempted. This tax provides a one-off incentive to purchase a less emitting car but no incentive for further abatement after the purchase (OECD, 2010a). Furthermore, the high level of the tax may discourage purchases, implying that older and less efficient cars are used. As emissions vary with motor vehicle use, it would be more cost-effective to tax motor vehicles less and fuels more as long as this adjustment does not lead to a large increase in border trade.

Figure 2.9. **Energy taxes on oil and diesel**

Euros per litre, 2011



Source: OECD-EEA Database on instruments used for environmental policy.

StatLink http://dx.doi.org/10.1787/888932563590

The development of electric car technologies is being supported through tax relief measures and subsidisation of a "test scheme". Further policies to encourage the development of electric vehicles are likely to be very costly. However, it could be argued that they could be efficient since emissions from petrol and diesel would be replaced by emissions from electricity that are capped under the EU ETS, thereby leading to an overall emission reduction.

As a large share of Denmark's expenditure is decentralised, policies at the local level to reduce GHG emissions have a key role to play. Copenhagen city aims to become carbon neutral by 2025 and has adopted a number of policies to meet this goal (Box 2.3). The city has already relatively low CO_2 emissions per capita (Figure 2.10, Panel A). Policies to further reduce these emissions in sectors not covered by the EU ETS such as the residential and transport sectors are particularly important as they will contribute to EU-wide emission cuts. Policies to reduce CO_2 emissions in the transport sector will also help lowering local air pollutant emissions, which are still relatively high (Figure 2.10, Panel B). The new government is planning to introduce a congestion tax, as in London and Stockholm for instance, to reduce congestion and local air pollution. The effect of this tax on GHG and local air pollutant emissions will depend on the design of the scheme. A toll ring, as currently under discussion for Copenhagen, may have only limited impact as it would lead to some additional traffic to circumvent the payment zone. A system such as the one envisaged at some point in the Netherlands – which was to be GPS-based, to include both a per-kilometre price and a peak surcharge and to cover all roads – would likely cut pollutant emissions more (OECD, 2010b). Furthermore, experience from other countries shows that for this tax to bring some net benefits, road congestion needs to be severe and congestion in public transportation should be low (OECD, 2011a). While road congestion may be lower in Copenhagen than in several other large cities, it has increased substantially in recent years.

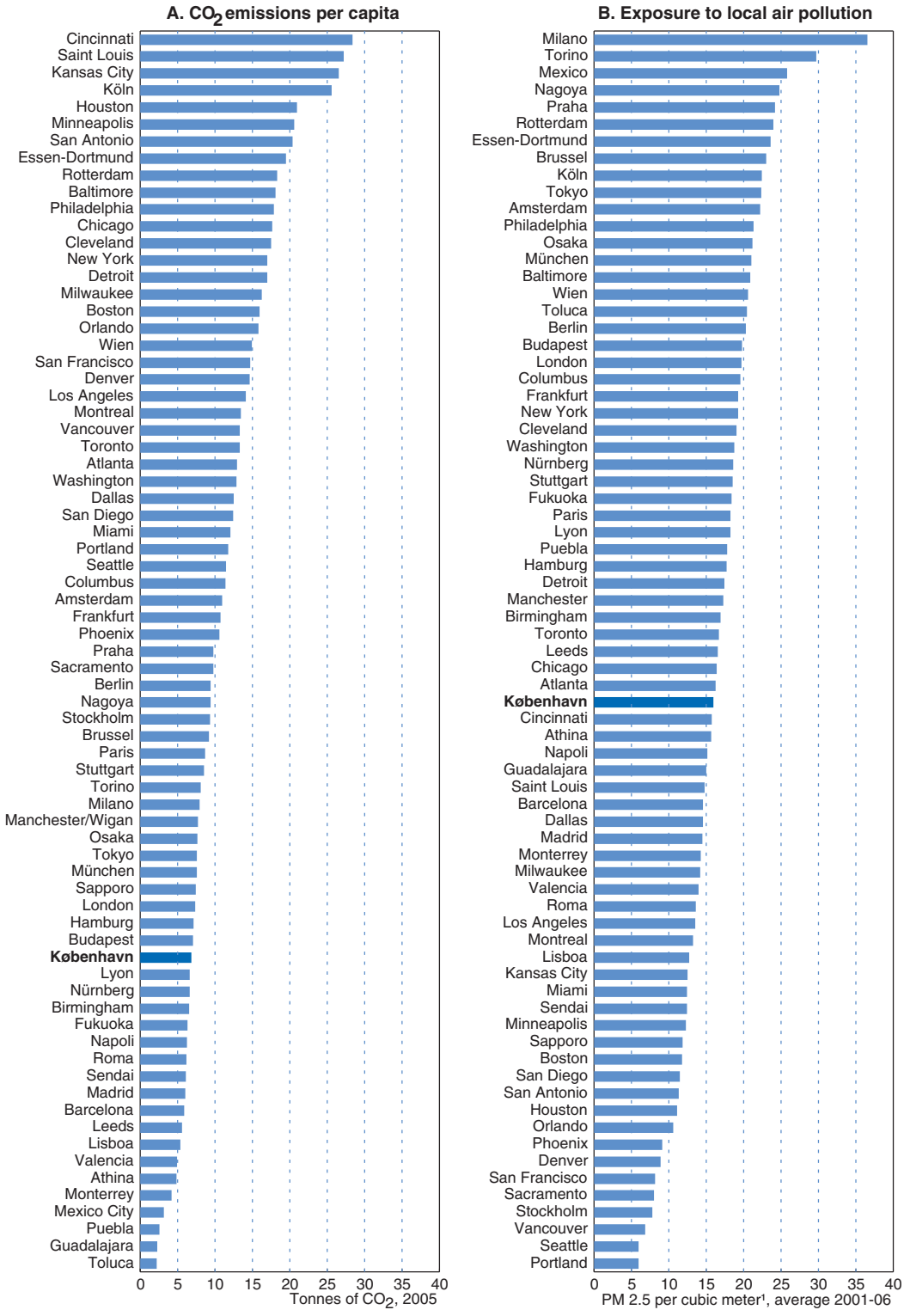
Reducing GHG emissions from agriculture

Agriculture accounts for approximately one-third of GHG emissions from non-ETS sectors. Non-CO_2 emissions from agriculture are not subject to any specific GHG taxation, but they have fallen significantly in recent years, partly because of limits on nitrogen emissions in a succession of action plans for the aquatic environment (Box 2.4).

Non-CO_2 emissions from agriculture have already fallen substantially in recent years thanks to water quality policies, and will decline further as a result of complementarities induced by increased energy taxes. In addition, there are economic benefits from introducing prices on non-CO_2 emissions from agriculture, as these would promote cost-effective mitigation while restoring the current imbalance which favours relatively energy-efficient activities that emit a lot of methane and nitrous oxide. These options include reducing intensive cultivation of low-lying agricultural land, which generates large emissions of nitrous oxide, and returning these areas to nature and/or bioenergy cultivation. There are also a number of technologies in the livestock sector for reducing methane and nitrous oxide emissions from management and storage of manure. In addition, as agriculture is subsidised at the EU level, putting a price on these emissions would generate efficiency gains, hence implying both environmental and economic benefits, in addition to other co-benefits arising from lower water pollution.

As agricultural policies are largely set at the EU level, an EU-wide instrument to limit these emissions would be first best. As methane and nitrous oxide emissions from agriculture cannot be measured directly, they need to be estimated for each farm on the basis of types of livestock and quantity of nitrogen input used, which might create problems when incorporating these emissions into the EU ETS. Alternatively, a tax could be applied directly on nitrogen input and livestock in order to reduce registration and control costs (Danish Economic Council, 2011). Denmark could push at the EU level for the adoption of policies that indirectly put a price on these emissions, one imperfect option being to tax agriculture inputs.

Figure 2.10. **GHG and local air pollutant emissions in large metropolitan areas**



1. Particulate matter (PM) 2.5 per cubic metric weighted by population, average over 2001-06.

Source: OECD (forthcoming 2012), "Redefining urban: a new way to measure metropolitan areas".

StatLink http://dx.doi.org/10.1787/888932563609

Box 2.4. **Aquatic environment policies in Denmark and their co-benefits in terms of GHG emission reductions from agriculture**

Denmark is one of the EU countries with the largest proportion of agricultural land. In the past, too much of the low-lying land was converted into farm land subject to intensive cultivation. Excessive use of fertilisers has resulted into discharges of nitrogen and phosphorus in coastal waters and lakes, together with large emissions of nitrous oxide, which is a greenhouse gas. Since the late 1980s, policies have been implemented to reduce these discharges but also to improve the quality of underground water so that the concentration of nitrates in public water supply does not exceed safety limits. These policies have more than halved run-offs from agriculture but at a considerable cost (OECD, 2007b).

The first two plans to reduce water pollution from agriculture were launched in 1987 and 1991, with the second one setting fertiliser norms for each farm and taxing any surplus use (OECD, 2003). The Action Plan for the Aquatic Environment II was launched in 1998 with the aim of reducing nitrogen leaching by a further 37 000 tonnes by 2003, bringing the total reduction relative to the mid-1980s to close 50%. This Plan included area-related measures – subsidies to convert agricultural land into wetlands, forestry, grassland, organic farming or land set aside – and farm-related measures – including changes in feeding, reduction of the livestock density, reduction in nitrogen norms and better utilisation of nitrogen in animal manure. The cost of these measures averaged EUR 2 per kg of nitrogen with large differences across measures suggesting that the reduction in nitrogen leaching could have been achieved at a lower cost. The cheaper measures included conversion to wetland, changes in feeding and better utilisation of nitrogen in manure management.

The Action Plan for the Aquatic Environment III launched in 2005 was closely related to the EU Water Framework Directive and set a number of objectives to be met by 2015, including:

- Halving agricultural excess phosphorus by 50% through a tax of DKK 4 per kg of mineral phosphorus and an improvement of phosphorus use based on new research.
- Reducing phosphorus discharge by creating 50 000 hectares of crop-free buffer zones along lakes and rivers that will retain phosphorus from other areas. Voluntary transfers of set-aside land together with an additional subsidy would contribute to creating these buffers. A new tax will be introduced on freshwater fish farming as it constitutes a significant source of phosphorus discharge.
- Further reducing nitrogen leaching by at least 13%, through setting aside land, better feed utilisation, implementation of the new EU agricultural reform as well as other specific measures (for instance, tightening of regulations regarding late crops, utilisation of nitrogen in livestock manure, and further conversion into wetlands).
- Reducing ammonia volatilisation from agriculture through optimisation of manure handling, a ban on surface spreading of manure and a ban on extension of livestock farms if such an extension would lead to increased ammonia discharges in natural areas vulnerable to ammonia.

In 2009, the previous government signed an Agreement on Green Growth with the Danish People's Party that would enable Denmark to meet its obligations under the EU Water Framework Directive and the Natura 2000 Directives and facilitate the follow-up of the Action Plan for the Aquatic Environment III. As for the reduction of GHG emissions, the initiatives proposed in the Green Growth Agreement are expected to reduce emissions from agriculture by 800 000 tonnes of CO_2eq. annually. The opportunities for further emission cuts from agriculture using market-based instruments will be analysed in more detail.

Complementarities between aquatic environment and GHG mitigation policies are likely to be important, although their measurement could be improved by further modeling work. Even so, additional specific measures to curtail GHG emissions from agriculture will probably be needed for Denmark to achieve its long-term GHG emission target.

Finding the right balance between GHG emission reductions achieved domestically and outside Denmark

Large GHG emission cuts in non-ETS sectors are expected to be difficult to achieve and costly. Model simulations show that the cost of achieving the 20% emission cut in non-EU-ETS sectors would be large if all these cuts were to be achieved domestically (Danish Economic Council, 2011). According to these estimates, assuming that all these cuts are achieved through a uniform carbon price, the price would have to be set at a very high level (of EUR 280 per tonne of CO_2), reflecting the steep marginal abatement cost curve in the non-ETS sectors. These estimates are surrounded by large uncertainties and are highly dependent on assumptions. Nevertheless, they show that, from a cost-effectiveness perspective, most actions in non-ETS sectors should probably take place at a later stage of the transition when all cheaper options in the ETS sectors are exhausted, and that Denmark should achieve part of its target by financing emission reductions abroad by buying international permits.

The level of the domestic carbon tax partly determines the trade-off between abatements achieved domestically and those achieved abroad through the purchase of emission permits. There are a priori two options to set the domestic carbon tax in non-ETS sectors:

- The tax could be set equal to the price of buying foreign emission permits or, currently, to the CDM price. This option would minimise the cost of achieving the climate target but would imply a gap in carbon taxation between ETS and non-ETS sectors as the EU ETS carbon price is likely to be higher than the CDM price, reflecting cheaper abatement opportunities in non-Annex I countries. Furthermore, relying more on abatement abroad may be less environmentally effective given the methodological and practical weaknesses underlying a mechanism like the CDM, notably difficulties in defining an appropriate baseline and additionality problems (Wara and Victor, 2008).
- Alternatively, the carbon tax rate could be set equal to the EU ETS carbon price applying to ETS sectors, as suggested by the Danish Commission on Climate Change Policy. This option would guarantee a cost-effective allocation of abatements across sectors of the Danish economy but would imply that the low-cost mitigation options available through the Kyoto flexible mechanisms are not fully used, thereby raising the cost of reaching the target. Given the large imperfections of mechanisms such as the CDM, this option might be preferable.

Denmark's ability to achieve its most ambitious targets would ultimately depend on technological developments at the international level. It will thus be important to reassess these targets in this light, notably in the transport sector, and to adjust accordingly the share of GHG emission cuts to be achieved by financing GHG emission cuts outside Denmark. Risks concern less mature technologies but also more mature ones. One challenge with the wind technology is to cope with fluctuations in electricity production and demand. This is reflected by the introduction of negative prices in 2009 on the Nordic electricity market to allow producers to pay to deliver power in the market in case of high wind rather than to have to support the imbalance costs (Nordic Energy Regulators, 2011). This option has been used by Danish producers even as their production is highly subsidised. Another issue is to address harmful effects in terms of low-frequency noise, which has caused some backlash in public opinion, especially for onshore wind turbines, while discussions on the offset of CO_2 emission reductions achieved through these technologies at the EU level are gaining prominence in the public debate.[5] Finally, if carbon capture and storage technology were to become available at competitive prices, moving away from fossil fuels would become much less relevant.

Box 2.5. **Climate change and energy policy recommendations**

- Regularly reassess national targets in the light of international and technology developments. Adjust accordingly the share of GHG emission cuts to be achieved domestically by financing GHG emission cuts outside Denmark.
- Push for more binding caps in future EU negotiations.
- Ensure that policies towards renewable energy support least-cost abatement options and avoid supporting one technology in particular. Work at the EU level towards the introduction of a common strategy to help meet EU renewable targets at least cost.
- Rationalise the Danish energy tax system to harmonise the implicit carbon price. In particular, raise tax rates on coal and diesel to reduce the gap with the implicit carbon price on petrol.
- At the EU level, push for the adoption of a common policy to limit non-CO_2 emissions from agriculture.

Notes

1. For instance in the recent period, peaks correspond to high wind power in Denmark combined with low rainfalls in Nordic countries that restrict their supply of hydroelectric power.
2. The reference year is 1990 for CO_2, methane and nitrous oxide and either 1990 or 1995 for industrial GHG. According to Denmark's 2003 Climate Strategy, the target would have been exceeded by 20 to 25 thousand tonnes of CO_2eq. annually over 2008-12 in the absence of additional measures.
3. The various channels through which oil price shocks affect economies are discussed in Wurzel *et al.* (2009).
4. As a market-oriented activity, the increase in the carbon price resulting from the introduction of the EU ETS was passed on to electricity consumers, in addition to the Danish carbon tax. In contrast, district heating produced by combined heat and power plants is a non-profit activity where the allocation of free quotas would have resulted into a reduction in price, hence the decision to maintain the carbon tax on this sector.
5. See the recent interview of one of the wise men of the Danish Economic Council ("Vismand: Flere danske vindmøller skader klimaet", *Børsen*, 8 November 2011) as well as, "An Ill Wind Blows for Denmark's Green Energy Revolution", *The Telegraph*, 12 September 2010.

Bibliography

Bohi, D. and M. Toman (1996), *The Economics of Energy Security*, Kluwer Academic Publishers, Norwell, MA.

Bollen, J., B. Guay, S. Jamet and J. Corfee-Morlot (2009), "Co-benefits of Climate Change Mitigation Policies: Literature Review and New Results", *OECD Economics Department Working Papers*, No. 692.

Braathen, N.A. (2011), "Carbon-Related Taxation in OECD Countries and Interactions Between Policy Instruments", in L. Kreiser *et al.* (eds.) (2011), "Environmental Taxation and Climate Change: Achieving Environmental Sustainability through Fiscal Policy", *Critical Issues in Environmental Taxation*, Vol. X, Edward Elgar, Cheltenham/Northampton.

Danish Commission on Climate Change Policy (2010), *Green Energy: The Road to a Danish Energy System Without Fossil Fuels*, September.

Danish Economic Council (2011), *Economy and Environment 2011*, May.

Danish Energy Agency (2011), *Danish Energy Outlook*, Copenhagen, May.

Danish Government (2011a), *Our Future Energy*, Copenhagen, November.

Danish Government (2011b), *Energy Strategy 2050: From Coal, Oil and Gas to Green Energy*, Copenhagen, February.

de Serres, A., J. Llewellyn and P. Llewellyn (2011), "The Political Economy of Climate Change Mitigation Policies: How to Build a Constituency to Address Global Warming?", *OECD Economic Department Working Papers*, No. 887.

Hallegatte, S., N. Patmore, O. Mestre, P. Dumas, J. Corfee-Morlot, C. Herweijer and R. Muir Wood (2008), "Assessing Climate Change Impacts, Sea Level Rise and Storm Surge Risk in Port Cities: A Case Study on Copenhagen", *OECD Environment Working Papers*, No. 3.

Hoornweg, D., L. Sugar and C.L. Trejos Gomez (2011), "Cities and Greenhouse Gas Emissions: Moving Forward", *Environment and Urbanization*, Vol. 23, No. 2.

IEA (2007a), *Climate Policy Uncertainty and Investment Risk*, Paris.

IEA (2007b), *Mind the Gap*, Paris.

IEA (2010), *Energy Technology Perspectives*, Paris.

Johnstone, N., I. Hascic and D. Popp (2010), "Renewable Energy Policy and Technological Innovation: Evidence Based on Patent Counts", *Environmental & Resource Economics*, Vol. 45, No. 1.

Ministry of Climate and Energy (2009), *Denmark's Fifth National Communication on Climate Change*, Copenhagen.

Nordic Energy Regulators (2011), *Nordic Market Report 2011*, No. 3.

OECD (2003), *OECD Economic Surveys, Denmark*, Paris.

OECD (2007a), *OECD Environmental Performance Review: Denmark*, Paris.

OECD (2007b), *Instrument Mixes Addressing Non-Point Sources of Water Pollution*, Paris.

OECD (2009a), *The Economics of Climate Change Mitigation: Policies and Options for Global Action beyond 2012*, OECD, Paris.

OECD (2009b), *OECD Territorial Reviews: Copenhagen, Denmark*, Paris.

OECD (2009c), *OECD Economic Surveys, European Union*, Paris.

OECD (2010a), *Taxation, Innovation and the Environment*, Paris.

OECD (2010b), *OECD Economic Surveys: Netherlands*, Paris.

OECD (2011a), *Towards Green Growth*, Paris.

OECD (2011b), *Fostering Innovation for Green Growth*, Paris.

OECD (2011c), *Cities and Climate Change*, Paris.

Wara, W. and D. Victor (2008), "A Realistic Policy on International Carbon Offsets", *Working Paper* No. 74, Stanford University.

Wurzel, E., L. Willard and P. Ollivaud (2009), "Recent Oil Price Movements: Forces and Policy Issues", *OECD Economics Department Working Papers*, No. 737.

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

The OECD is a unique forum where governments work together to address the economic, social and environmental challenges of globalisation. The OECD is also at the forefront of efforts to understand and to help governments respond to new developments and concerns, such as corporate governance, the information economy and the challenges of an ageing population. The Organisation provides a setting where governments can compare policy experiences, seek answers to common problems, identify good practice and work to co-ordinate domestic and international policies.

The OECD member countries are: Australia, Austria, Belgium, Canada, Chile, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. The European Union takes part in the work of the OECD.

OECD Publishing disseminates widely the results of the Organisation's statistics gathering and research on economic, social and environmental issues, as well as the conventions, guidelines and standards agreed by its members.

OECD PUBLISHING, 2, rue André-Pascal, 75775 PARIS CEDEX 16
(10 2012 01 1 P) ISBN 978-92-64-12678-7 – No. 59801 2012

OECD Economic Surveys

DENMARK

SPECIAL FEATURES: PUBLIC FINANCE, ENERGY AND CLIMATE POLICIES

Most recent editions

Australia, November 2010
Austria, July 2011
Belgium, July 2011
Brazil, October 2011
Canada, September 2010
Chile, January 2012
China, February 2010
Czech Republic, November 2011
Denmark, January 2012
Estonia, April 2011
Euro area, December 2010
European Union, September 2009
Federal Republic of Yugoslavia, January 2003
Finland, April 2010
France, March 2011
Germany, March 2010
Greece, August 2011
Hungary, February 2010
Iceland, June 2011
India, June 2011
Indonesia, November 2010
Ireland, October 2011
Israel, December 2011
Italy, May 2011
Japan, April 2011
Korea, June 2010
Luxembourg, May 2010
Mexico, May 2011
Netherlands, June 2010
New Zealand, April 2011
Norway, March 2010
Poland, April 2010
Portugal, September 2010
Romania, October 2002
Russian Federation, December 2011
Slovak Republic, November 2010
Slovenia, February 2011
South Africa, July 2010
Spain, December 2010
Sweden, January 2011
Switzerland, December 2011
Turkey, September 2010
Ukraine, September 2007
United Kingdom, March 2011
United States, September 2010

Please cite this publication as:

OECD (2012), *OECD Economic Surveys: Denmark 2012*, OECD Publishing.
http://dx.doi.org/10.1787/eco_surveys-dnk-2012-en

Volume 2012/2
January 2012

OECD publishing
www.oecd.org/publishing

ISSN 0376-6438
2012 SUBSCRIPTION (18 ISSUES)
ISSN 1995-3151
SUBSCRIPTION BY COUNTRY

ISBN 978-92-64-12678-7
10 2012 01 1 P