OECD Economic Surveys

DENMARK

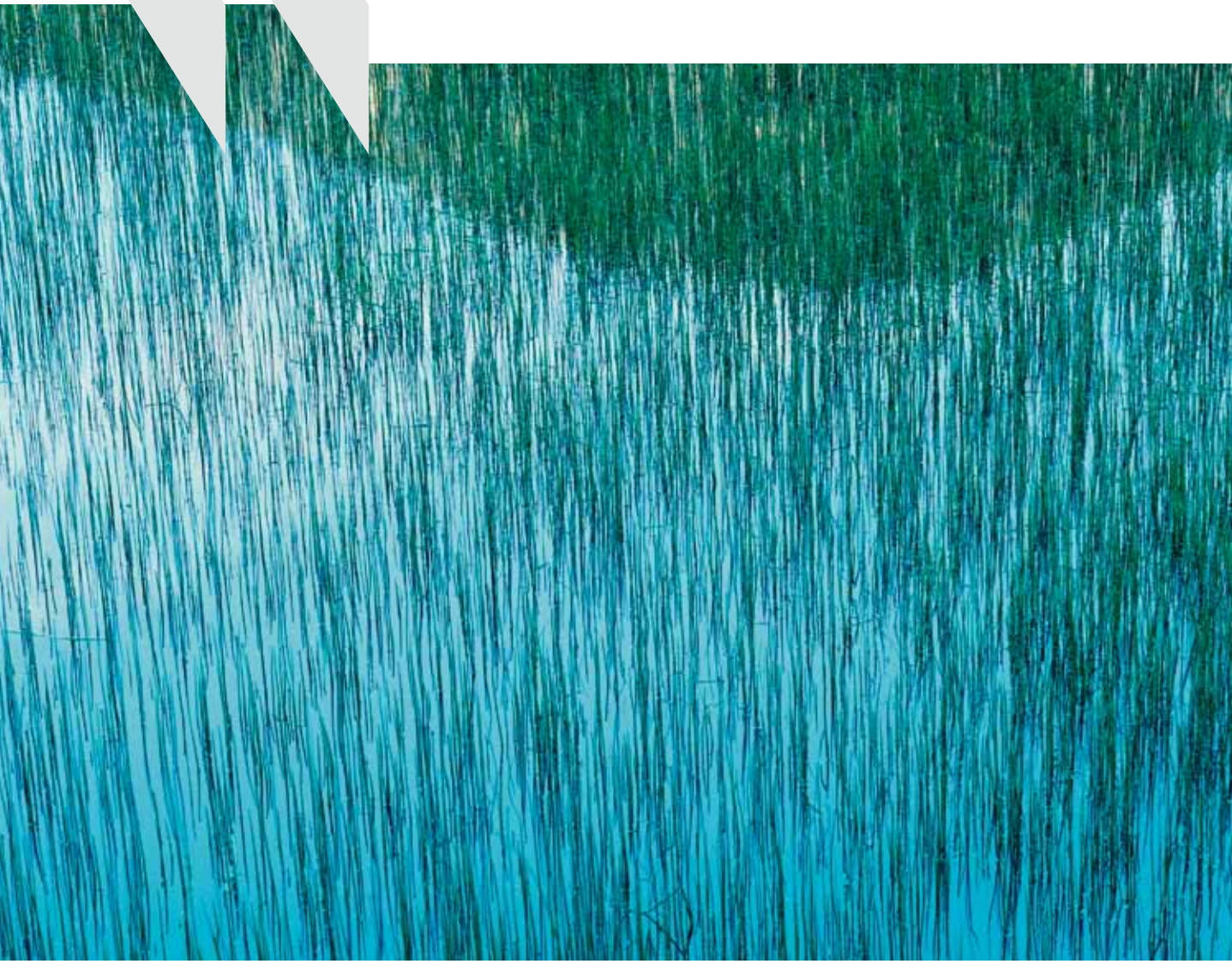

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Table of contents

Executive summary 8

Assessment and recommendations 9

Chapter 1. **Denmark: the crisis and beyond** 17

The Danish economy in international context 19
The financial crisis and the macroeconomic outlook 21
Potential medium-term implications of the recession. 35
Policies to overcome the crisis 37
A key challenge ahead: reinvigorating productivity 54

Notes 54
Bibliography 55

Annex 1.A1. Consolidation in the Danish banking sector during the financial crisis 57
Annex 1.A2. Progress in structural reform 59
Annex 1.A3. Topics covered in previous OECD Economic Surveys of Denmark 64

Chapter 2. **Why has productivity growth declined?** 65

Trends in labour productivity 66
Sectoral productivity performance 69
Recent developments in labour productivity. 72
The contribution of labour composition and capital to productivity. 73
Structural and policy factors affecting productivity. 77

Notes 90
Bibliography 91

Annex 2.A1. Background technical analysis 94

Chapter 3. **Human capital: key to higher productivity**. 97

Educational attainment and market outcomes. 98
Early childhood and compulsory education 106
Upper secondary education 112
Tertiary education 113
Conclusions. 118

Notes 119
Bibliography 120

Annex 3.A1. Micro-data evidence 122

Boxes

1.1. The Danish mortgage bond market 23
1.2. Financial stability measures 38
1.3. Approaches to dealing with "toxic" assets 41
1.4. The Spring Package 2.0 tax reforms 46
1.5. Green growth 47
1.6. Recommendations of the Labour Market Commission 52
2.1. Statistical issues in productivity measurement 67
2.2. Danish R&D policies 85
2.3. Main recommendations on productivity 90
3.1. The Danish education system in a nutshell 104
3.2. Life-long learning in the Danish labour market 105
3.3. Main recommendations on human capital 118

Tables

1.1. Key financial ratios for Danish banks 27
1.2. Danmarks Nationalbank's stress tests 27
1.3. Short-term economic outlook 34
1.4. Potential output growth and its components 37
1.5. Fiscal measures affecting 2009 and 2010 46
2.1. Labour productivity growth accounting 69
2.2. Value added shares and contributions to growth in labour productivity 70
2.3. Total economy and market-sector labour productivity growth 72
2.4. Value added share and capital intensity 76
2.A1.1. Scenarios on the possible impact of new workers having lower productivity than existing workers, 1993-2006 96
3.A1.1. Wages and length of education 122
3.A1.2. Average annual wage increases by level of education 123
3.A1.3. Unemployment and length of education 123
3.A1.4. Unemployment and level of education 124

Figures

1.1. Real house prices in selected OECD countries 18
1.2. GDP per capita and decomposition 20
1.3. Correlation between inequality and inter-generational wage persistence 21
1.4. Interest rate spreads, equity prices and nominal effective exchange rates 22
1.5. Developments in the fixed exchange rate regime 25
1.6. Expected default rates of listed companies 26
1.7. Growth in lending by financial institutions by use of funds 29
1.8. Interest rates paid by corporations and households 29
1.9. Key macroeconomic indicators 31
1.10. Developments in the housing market 32
1.11. Exports and contributions to growth in Denmark's export market 33
1.12. Households debt and net wealth 35
1.13. Actual and structural unemployment 36
1.14. Impact of Bank Rescue Package II on bank's solvency ratios 40
1.15. Assets of Danish financial institutions 42
1.16. Actual and structural budget balance and 2015 strategy targets 49

1.17. Proportion of the working-age population not in regular employment 51
2.1. Labour productivity growth in Denmark has slowed to well below that in other OECD countries 67
2.2. Productivity growth has been trending down in many sectors 70
2.3. Weaker capital deepening and TFP growth are the main factors behind slower productivity growth 71
2.4. Productivity growth has slowed mainly in non-ICT sectors 71
2.5. Labour utilisation has grown 73
2.6. The skill level of the workforce is rising more slowly 74
2.7. Growth in the capital stock in key infrastructure sectors has declined 78
2.8. Denmark has a relatively low share of growth enterprises 80
2.9. The Danish venture capital market is relatively small 81
2.10. R&D spending is relatively high and R&D activities are labour-intensive 83
2.11. Product market regulation is relatively liberal 87
2.12. Regulation could be lower still in a few areas 87
3.1. Educational attainment compared internationally 99
3.2. Completion of post-compulsory education compared over time 100
3.3. Earnings distribution across and within skill categories 101
3.4. Wage premia, internal rates of return and living costs 103
3.5. The Danish education system 105
3.6. Learning outcomes in compulsory education 107
3.7. School principal leadership behaviour indices 108
3.8. Teacher's perceptions of appraisal and feedback and its impact on the school 110
3.9. Learning outcomes for immigrant and native students compared 111
3.10. Share of youth in education, employment or inactivity by age 113
3.11. Median age of entry into tertiary education 114
3.12. Regulation of tertiary education providers 116
3.13. Foreign students enrolled in tertiary education 117

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BASIC STATISTICS OF DENMARK

THE LAND

Area (sq. km)	43 098
Agricultural area (sq. km)	25 890

Population of major urban areas, 2009, thousands	
Copenhagen	1 168
Århus	240
Odense	159
Ålborg	101

THE PEOPLE

Population, January 2009, thousands	5 511
Number of inhabitants per sq. km	128
Population, annual net natural increase (average 2000-2008, thousands)	8
Natural increase rate, 2008 (per 1 000 inhabitants)	1.8

Total employment, 2008, thousands	2 922
By sector :	
Agriculture	84
Manufacturing	403
Construction	190
Market services	1 245
Community, social and personal services	1 000

THE PRODUCTION

Gross domestic product, 2008	
Kr billion	1 733
Per capita (USD)	61 937

Gross fixed capital formation, 2008	
Kr billion	364
Per cent of GDP	21
Per capita (USD)	12 997

THE GOVERNMENT

Public consumption, 2008	
Per cent of GDP	26.7
General government current revenue	
Per cent of GDP	54.35
Public gross fixed capital investment	
Per cent of GDP	1.8

Composition of Parliament	Number of seats
Liberals	46
Social Democrats	45
Danish People's Party	25
Socialist People's Party	23
Conservatives	18
Social Liberals	9
New Alliance	5
Unity List – Red-Green Alliance	4
North Atlantic	4
Total	179

Last general elections: 13 November 2007

Next general elections : 13 November 2011 (at the latest)

THE FOREIGN TRADE

Exports, 2008	
Exports of goods and services	
Per cent of GDP	54.9
Decomposition of merchandise exports, 2008 (% of total)	
Agricultural products	9.0
Manufactured products	73.5
of which : Machinery and instruments	26.6
Other manufactured products	46.9
Fuels, etc.	17.5

Imports, 2008	
Imports of goods and services	
Per cent of GDP	52.6
Decomposition of merchandise imports, 2008 (% of total)	
Intermediate goods for agriculture	2.1
Intermediate goods for other sectors	39.1
Fuels and lubricants	6.6
Capital goods	14.1
Transport equipment	6.9
Consumer goods	28.4

THE CURRENCY

Monetary unit: Krone

September 2009, monthly average of spot rate	
DKK per $	5.11
DKK per €	7.44

Executive summary

The Danish economy has been suffering during the global crisis but beyond the projected cyclical recovery it will need to restore sustained robust growth. While the level of national income is high, the gap vis-à-vis the leading OECD countries has widened somewhat over the past decade. GDP gains have been driven primarily by rising labour utilisation, related to the evolution of the "flexicurity" model, with increases in both the share of the population in work and average hours worked. At the same time, however, productivity has been slowing down.

The Danish economy is currently enduring a rough ride, although less so than some of its neighbours. The effects of the global economic crisis, notably the collapse in world trade, and the impact of the downturn in the domestic property market have combined to produce the largest fall in GDP in over four decades. Monetary policy has eased and measures to relieve financial sector stress and loosen fiscal policy have been extensive:

- *In the* **financial sector**, *government guarantees, capital injections and liquidity measures have supported the functioning of financial markets and boosted bank capital. Going forward, stress tests may help establish whether banks are sufficiently capitalised to absorb the losses that are yet to surface.*
- *The* **fiscal** *response has been vigorous, reflecting large automatic stabilisers and substantial discretionary measures, and at this point there is no need for additional fiscal stimulus. While the relaxation of the fiscal stance is designed to be temporary, further measures will be required to bring fiscal policy back on track with the longer-term targets.*

The depth of the recession is set to have adverse medium-term economic consequences – the first hard test of the "flexicurity" model. Rising unemployment may lead to higher structural unemployment, and falling investment will limit the contribution to growth from capital deepening. While labour demand is currently weak, the efforts to raise **labour supply** *in the longer term will take on new significance. Such efforts now have to offset any medium-term impact of the crisis on labour supply, as well as meet the employment goals required to ensure sustainable public finances. The recent recommendations of Denmark's Labour Market Commission focus on measures to raise labour supply that are broadly consistent with previous OECD* Surveys. *This* Survey *focuses on how to boost productivity.*

- *The* **slowdown in labour productivity** *is at least partly related to the rise in labour utilisation. While the policy frameworks influencing productivity are generally growth-friendly, there are opportunities to raise productivity over the medium term through action in such areas as research and development, innovation, entrepreneurship, product market regulation and taxation. The government is addressing most of these issues and recently launched a Growth Forum to explore how to improve potential growth beyond the crisis.*
- *Education is generally a strongpoint of the Danish economy, but the* **contribution of human capital to productivity growth** *can and should be raised. Key areas requiring attention are improving education outcomes in compulsory school, reducing the high dropout rate from upper secondary education and encouraging students to make the most of their capacities by moving more rapidly into and through tertiary education.*

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Assessment and recommendations

Denmark is enduring a major recession

The Danish economy has not escaped the global financial and economic crisis. The deterioration in financial conditions and collapse of world trade, along with the ending of the property boom, have all hit Denmark hard, although GDP has not fallen as much as in some neighbouring countries. Unemployment is now on the rise, providing the first hard test of the "flexicurity" model, which to date has operated primarily in better times. With labour utilisation already high, though needing to improve further, the key here is boosting productivity, the Achilles heel of the Danish economy over the recent past. This will require maintaining the traditional strengths in the economy, described below, as well as pursuing an agenda focussed on productivity-enhancing reforms in education and the business sector.

Denmark has achieved high levels of income and low inequality

Growth in Danish living standards has been underpinned by flexible labour and product markets, a strong social safety net and active policies to help the unemployed back into work. These measures have promoted gains in labour utilisation that have driven economic growth. Following the deep downturn of the early 1990s, structural unemployment has fallen, and labour force participation and average hours worked have risen. The employment rate is now amongst the highest in the OECD, although average hours worked are still relatively low. However, while labour utilisation has been growing, productivity has slowed. As a result, national income per capita has lost ground *vis-à-vis* the leading OECD economies.

High living standards have been achieved alongside a very equitable distribution of income, both within and between generations. A high degree of social mobility, measured by the extent to which parents' educational attainment influences that of their children, is supported by a generally sound education system. Ongoing focus on improving educational attainment and outcomes can help maintain equity as well as boost the contribution of human capital to productivity growth, the current weak link in the economy.

The financial sector has been under pressure and the real economy is feeling the effects

In the short term, the Danish economy is in the midst of a challenging period. Danish financial markets have been under severe pressure, although they are returning to greater normality. The unique mortgage bond market has continued to function and while it has experienced some stress it has been much less affected by the sub-prime crisis than mortgage bond markets elsewhere. Banks' earnings have deteriorated and loan losses have surged. Some 18 smaller institutions have been taken over or wound up. Sharp falls in equity prices, along with the downturn in the housing market, have led to a substantial deterioration in household wealth, although the net wealth-to-income ratio remains fairly high in a longer-term perspective. Tightening lending standards coupled with weakening demand for credit have led to slower growth in lending by financial institutions. If the measures already implemented to improve solvency and confidence in the financial sector turn out to be insufficient, credit conditions might become even tighter and act as a brake on economic activity. Interest rates spiked late in 2008 but have retreated significantly since, in line with an easier monetary stance and improvement in financial markets.

Against this backdrop, the real economy is set to shrink in 2009 before recovering modestly in 2010. Private consumption will be restrained by diminished household wealth and rising unemployment, but supported by tax cuts, withdrawal of Special Pension scheme savings and lower interest rates. Business investment will be held back by the scale of economic slack. While the drop in interest rates since last autumn may help stem the fall in house prices, residential investment is on course to decline further, a process that could be compounded by rising forced sales due to higher unemployment. With Denmark's export markets undergoing a major contraction, exports will be very weak. The recovery might also be slowed by the sizeable loss in competitiveness accumulated over the past few years due to strong wage growth and effective exchange rate appreciation. With the output gap widening considerably, inflationary pressure will diminish but unit labour costs and consumer prices may continue to rise more than in the euro area, further hurting competitiveness. Another risk relates to the mortgage debt taken on in recent years by some households, the burden of which might hold back consumption growth in the future.

Potential output may be durably affected

The depth of the recession is likely to have adverse medium-term consequences for the Danish economy. Higher actual unemployment could lead to higher structural unemployment for quite some time, although less so than in many other OECD countries due to low long-term unemployment and strong active labour market programmes. Also, the depth of the downturn in investment means that the contribution to GDP growth from additions to the capital stock will be lower than normal for a few years. Furthermore, there could be effects from reduced investment in R&D. Since growth in potential employment is expected to be weak due to a reduction in the working-age population, this means that the growth potential of the economy will be subdued for a number of years. Taking into account these various effects, potential output growth is expected to decline from 1.7% on average over 2006-08 to 0.5% in 2009-10 and 1.1% in 2011-17.

Financial sector policy measures have been effective

Financial sector policy measures to deal with the crisis have been extensive. A key measure was the creation of a bailout fund by the government and the Danish banking sector that serves to guarantee all claims of unsecured creditors on participating banks. Only if the total loss were to exceed DKK 35 billion would this guarantee entail government payments. The government also established a new process for dealing with institutions whose capital falls below statutory minimum levels and offered capital injections to boost capital-adequacy ratios. In addition, the central bank has taken a number of initiatives to improve financial system liquidity. These measures are likely to significantly reduce the risk of widespread insolvency even under scenarios of great stress. However, if used to their fullest extent, they imply that the government could end up as a significant owner of equity in some banks. Furthermore, the measures will probably only stem the slowdown in lending to some extent since demand for financing will be curtailed by the drop in investment and lower house prices while lending policies in any case becomes more cautious when growth prospects are weak. Detailed "bottom-up" stress tests, involving the financial institutions themselves, would help establish whether financial institutions are sufficiently capitalised to absorb the losses arising from impaired loans.

In the medium term, significant changes are likely to stem from international efforts to bolster financial system regulation. A specific issue for Denmark will be how to reduce the pro-cyclical capital requirements for the new type of mortgage bonds, which require extra capital when house prices are falling. The regulatory resources to supervise medium- and smaller-sized institutions have been increased and it will be important to ensure that they are adequate.

Fiscal policy is boosting disposable incomes and demand

Denmark entered the recession with a strong fiscal position and a sound fiscal policy framework. Large budget surpluses in recent years have reduced debt – indeed, the government had a positive net asset position of about 5% of GDP in 2008. Fiscal targets are set according to a medium-term framework based on fiscal sustainability assessments. Therefore, discretionary policy measures are likely to be credible in the eyes of financial markets. Danish automatic stabilisers are the largest in the OECD, implying a smaller need for discretionary policy measures. Nevertheless, given the depth of the recession, significant discretionary measures have been taken. Tax cuts, which were decided well before the crisis, took effect in 2009. Public consumption will increase quite sharply. Government investment spending has been brought forward. A major tax reform package was legislated in early 2009, aimed at raising labour supply and reducing the government financing gap in the long run but providing demand stimulus in the short run. And release of funds from the compulsory private Special Pension scheme has significantly eased households' liquidity constraints. Signs of improvement in the economy and the substantial deterioration in the fiscal position already expected suggest that there is no need for additional fiscal stimulus, although with a highly uncertain environment it should not be completely ruled out. Looking ahead, discretionary measures will be required to bring the structural budget balance back in line with the government's 2015 fiscal targets.

Spelling out targets for the intervening years and identifying some specific consolidation measures would help.

Labour market policies must adapt to weak demand, but still focus on boosting labour supply in the long term

With unemployment on the rise, the short-term focus of employment policies will need to be on maintaining job search efforts and keeping people attached to the labour market to prevent a rise in structural unemployment. With weak labour demand, unemployment spells will lengthen, so a larger proportion of the unemployed will end up participating in activation programmes. It is important that public sector job centres have sufficient resources to deal with the rise in unemployment. The decentralisation of all functions of the public sector job centres to local governments should be carefully monitored to ensure that effective services are delivered to an increasing pool of clients. At the same time, there is less risk of unemployed people missing out on a job because they reduce search effort due to the time commitments of participating in activation programmes. This calls for careful targeting of training programmes and job placements to steer the unemployed to those programmes that are most likely to be effective.

For the longer term, the recommendations of the Labour Market Commission will be more important now than ever – if structural unemployment rises in response to the crisis, the government's long-term goals for fiscal sustainability will be even more difficult to achieve. As unemployment rises, it will be important to avoid policies that restrain labour supply, such as job-sharing measures that may be hard to reverse once labour demand picks up again.

Why has Danish productivity growth slowed?

Labour productivity, or GDP per hour worked, has decelerated markedly since the early 1990s. While this trend is also evident in a number of other OECD countries, productivity growth in Denmark is now lower than in many comparable countries. This has put a brake on the process of catching up to the GDP per capita levels of the leading economies. While some industries have bucked the trend, the slowdown is evident across much of the economy. Furthermore, the large size of the public sector, where measured productivity growth is nil for statistical reasons, cannot explain the slowdown.

Wider inclusion in the labour market is part of the explanation

The slowdown in labour productivity has coincided with a trend rise in employment and, to a lesser extent, hours worked. These developments may be related. It takes time for the stock of capital to adjust to higher labour supply. In addition, newly-employed workers might have lower human capital than existing employees. The overall skill level of the Danish workforce has been growing more slowly over the past decade. Even highly-skilled people who have recently moved into the workforce may take time to attain the productivity levels of their colleagues. The slowdown in the contribution to growth from

capital deepening seems consistent with a lagged adjustment to higher employment. However, these factors probably explain less than half of the observed slowdown in labour productivity growth.

The remaining portion of the productivity slowdown is harder to explain. This is particularly true since the policy factors that are thought to underpin strong productivity growth are generally sound in Denmark. Furthermore, policy changes have moved in the direction of higher productivity, rather than working against it. Still, the expected slowdown in potential output calls for renewed focus on policies to lift Denmark's productivity performance and ought to be a key focus of the government's recently launched Growth Forum.

While policies are supportive of productivity, more can and is being done

Measures can be and are being taken in a number of policy areas to boost productivity growth. The planned increases in infrastructure investment might add to potential growth in the medium term and, as they have been frontloaded, they will help pull the economy out of recession. The recent income tax reforms, which cut marginal tax rates for all income levels, should encourage greater efforts to develop human capital and might make it easier for Denmark to attract and retain talented foreign workers. It is important that these reforms are not reversed. More efficient processing of immigration applications could boost the pool of potential new entrepreneurs. In addition, targeting of entrepreneurship support should attempt to capture all high-growth-potential firms, regardless of their age. Entrepreneurship education needs continued attention, particularly in ensuring that students get experience in work as well as time to develop their own business ideas. Finally, while product market regulation is relatively liberal, further reforms could boost the economy's flexibility. OECD product market regulation indicators suggest the need for measures in licensing procedures, planning of retail outlets and access in the legal services industry.

Human capital is a key to productivity

Human capital is important to productivity performance for a number of reasons. In general, increasing skills can lead to restructuring of production towards activities with higher value added. The right training can boost the likelihood of success as an entrepreneur. Human capital is important for R&D, both in undertaking research but also in having the skills and knowledge to implement new technologies and methods in the workplace. Moreover, higher-skilled workers might be more flexible and able to adapt more easily to new environments.

Education outcomes are not as good as they could be

Human capital has traditionally been considered a strong point for the Danish economy, not least thanks to the quality of life-long learning. However, educational achievement studies have indicated that Danish education outcomes were not as good as generally

perceived, or as could be expected given the considerable resources available. Also notable in international comparison are the high rates of dropout from upper secondary education, particularly for immigrant children, and the high average age of completion of tertiary education. The latter reflects primarily long gaps between completion of secondary school and entry into tertiary studies. In light of the results on educational attainment, a number of measures have been taken in recent years. These have focused on strengthening the education content of the earliest years in the formal school system, increasing reporting of individual education progress, promoting an evaluation culture, and boosting Danish language training for immigrants. Recent survey results indicate that children at age 10 or 11 have better skills today than five to 10 years ago.

The distribution of hourly wage earnings has narrowed over the past quarter of a century, due to relatively strong wage increases for low-income earners. Over time, education has become more important in determining individual earnings, while age and experience are now less important. This suggests the need for a strong general level of education that can support a flexible and adaptive workforce. While the overall wage distribution narrowed in the 1980s and has not changed much since, relative wages have risen for the most highly educated.

There is a need for strengthened educational content and more accountability and flexibility in schools

The pre-school class offered for six-year olds before commencing formal primary school has now been made compulsory and the educational content of this year has been strengthened. In addition, language testing has been introduced at ages three and six to identify children who might require extra assistance with language development. However, there is still scope for improvement in early childhood learning. Recent reforms of the voluntary 10th form (for 16-year olds) have strengthened its educational content and provided opportunities for students to try out vocational education pathways to help them make better career and study choices. Targeting the 10th form more carefully towards the weakest students would release resources that could be better employed elsewhere in the education system and may speed up entry into further studies. Indeed, the share of students attending 10th form has started to decline somewhat.

Additional training is being introduced for both teachers and school administrators to bolster education quality. Continued efforts are needed to build a “culture of evaluation” and to strengthen school leadership. A long-term goal might be to use the outcomes of both educational quality reporting and compulsory national testing of students in carrying out the performance assessment of teaching and schools. The ensuing contestability might yield quality gains. There might also be scope for attracting and motivating high-performing teachers via more pay flexibility. This could be achieved through an accreditation scheme, where completion of professional education programmes could attract higher remuneration.

Reducing dropout rates from upper secondary school is a key challenge…

The number of youth dropping out from upper secondary education presents a major challenge to achieving the government's ambitious goals for secondary school completion rates. Reviewing the diverse array of paths available in secondary education is necessary, particularly to ensure that vocational programmes provide a solid basis of education to allow graduates to retrain later in life if necessary. At the same time, introducing practical components earlier in vocational programmes could reduce dropouts by people who are less academically and more practically inclined. More information about labour market outcomes for recent graduates could also help youth make better study choices.

There is also a case for extending the special welfare benefit arrangements applying to people under 25 to all those aged less than 30. The youth regime applying to under-25 year olds involves reduced unemployment insurance and social assistance benefits and stronger focus on education or activation. This approach has clearly reduced inactivity amongst young people.

… as is getting students through tertiary education earlier

In the tertiary system, average completion times have fallen slightly over the current decade, but students are taking a long time to move from secondary to tertiary education, primarily owing to periods of work rather than being out of the labour force. As a result, the median age of students when they start tertiary education, at over 22 years, is the second-highest in the OECD. This generates significant foregone tax revenue, to the extent that swifter entry into, and completion of, tertiary education would lead to higher lifetime earnings. Measures are being introduced to encourage more timely completion, including making it easier to enter tertiary education if students move quickly from the secondary level and providing universities with more incentives to promote on-time completion. The recent tax reforms, which reduce high marginal tax rates, should raise the returns to education in the long term. However, the recent measure allowing students to earn more from work before losing some public grants might not encourage timely completion. Reducing the generosity of study grants, particularly if studies are prolonged, would encourage shorter study time.

In the long term, particularly if the overall tax burden on higher incomes continues to fall, a system of tuition fees for Danish and EU students, combined with income-contingent loans, might encourage quicker completion and help students make better study choices. This would encourage competition, and therefore efficiency, among universities and give them more flexibility to design innovative courses and programmes to meet demand. Furthermore, moving towards general tuition charging would give universities better conditions to develop attractive offers for foreign students, at lower cost to public finances.

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Chapter 1

Denmark: the crisis and beyond

The Danish economy has been hit by the global economic crisis and is going through a deep and protracted recession. Fortunately, strong policy frameworks mean that Denmark is well placed to steer through the worst downturn in forty years. The fiscal position is comparatively strong and sizeable fiscal stimulus is already working its way through, supplementing strong automatic stabilisers. Labour market policies, including a strong focus on activation of the unemployed, should help employment recover quickly as the economy starts to grow again. However, the depth of the recession is likely to have medium-term consequences for the Danish economy via higher structural unemployment, reduced capital accumulation and possibly lower innovative activity. This chapter first briefly situates Denmark's longer-run economic performance. It then reviews developments in financial markets and their implications for the real economy. Next, it turns to the likely consequences of the recession on medium-term growth and points to the financial, fiscal and labour market policies required to overcome the recession and minimise its adverse long-term consequences.

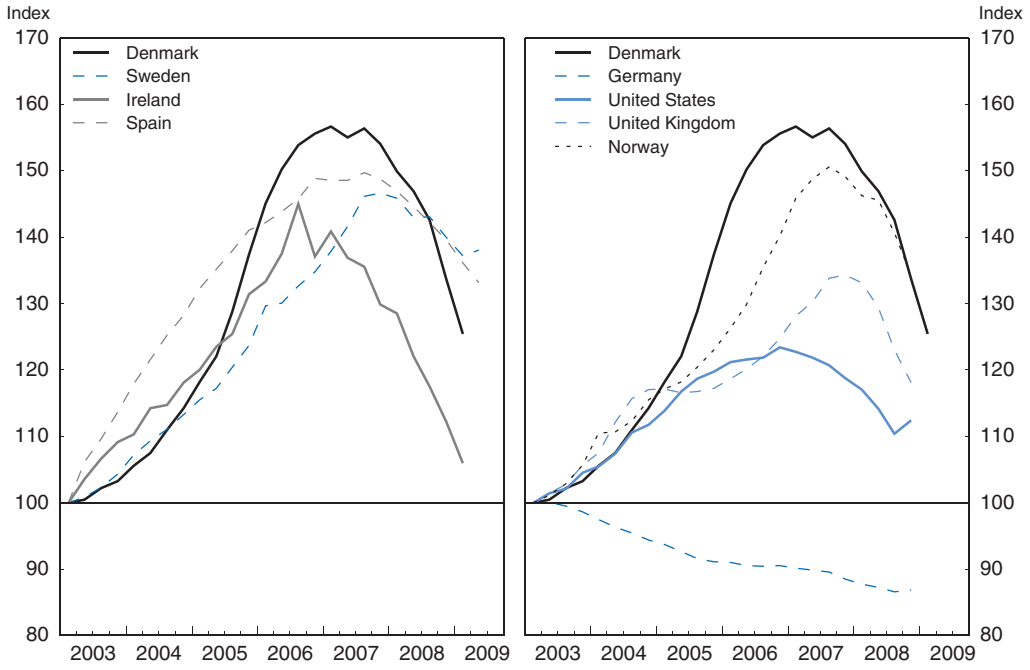
Denmark is currently going through its worst recession since the 1960s. The economy started to slow in 2007, in a context of labour shortages, tighter monetary conditions and rising energy prices, In 2008, it was hit hard by the global financial and economic crisis. At the same time, it has been witnessing the unwinding of a major housing price boom. Its strong policy frameworks, however, should help Denmark face these challenges.

From a long-term perspective, the Danish economy has been doing fairly well, with high income per capita, a relatively even income distribution, high labour market participation, a flexible workforce and a strong social safety net ("flexicurity"). A gradualist, consensus and stability-oriented approach to reform has contributed to Denmark's prosperity. A strong fiscal framework has been developed to help steer public finances as the population ages. Partly to ensure fiscal sustainability, much effort has been directed to raising labour supply and reducing structural unemployment. However, productivity growth, which is key for long-term living standards has trended down, despite favourable policy settings.

From a shorter-term perspective, Denmark faces difficulties, even if the global crisis is proving less painful than in many other OECD countries. GDP growth was strong between 2004 and 2007, partly driven by a major property boom (Figure 1.1). Unemployment

Figure 1.1. **Real house prices in selected OECD countries**

2003Q1=100



Source: OECD, *Economic Outlook 85 Database* and various national sources, see Table A.1 in Girouard, N., M. Kennedy, P. van den Noord and C. André (2006), "Recent house price developments: the role of fundamentals", OECD Economics Department Working Papers, No. 475.

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had fallen well below the structural level, resulting in significant labour shortages and policy efforts to raise labour supply in the short run. Capacity constraints, higher interest rates, eroding confidence along with a weakening stock market and the unwinding of the property boom led to a slowdown in the economy already during 2007 and GDP shrank in 2008, especially following the intensification of the financial crisis in the latter part of the year. GDP continued to contract in the first part of 2009 and the projected recovery next year is a gradual one.

The severity of the current recession may have adverse implications for growth over the coming years. It could push up structural unemployment for several years, making it more difficult to achieve the employment goals underpinning the Government's fiscal policy targets. Furthermore, higher risk premia and lower appetite for risk than before the crisis may imply less capital-deepening and hence hold back productivity growth. This calls for pushing ahead with labour market reforms and for a renewed focus on productivity, via structural policies and additional emphasis on education.

After situating the Danish economic performance in an international context, this chapter reviews developments in the Danish financial sector and their consequences for the macroeconomic outlook. It then considers the potential medium-term repercussions of the current recession. Finally, it assesses the financial, fiscal and labour market policies needed to overcome the recession and minimise its longer-term deleterious consequences.

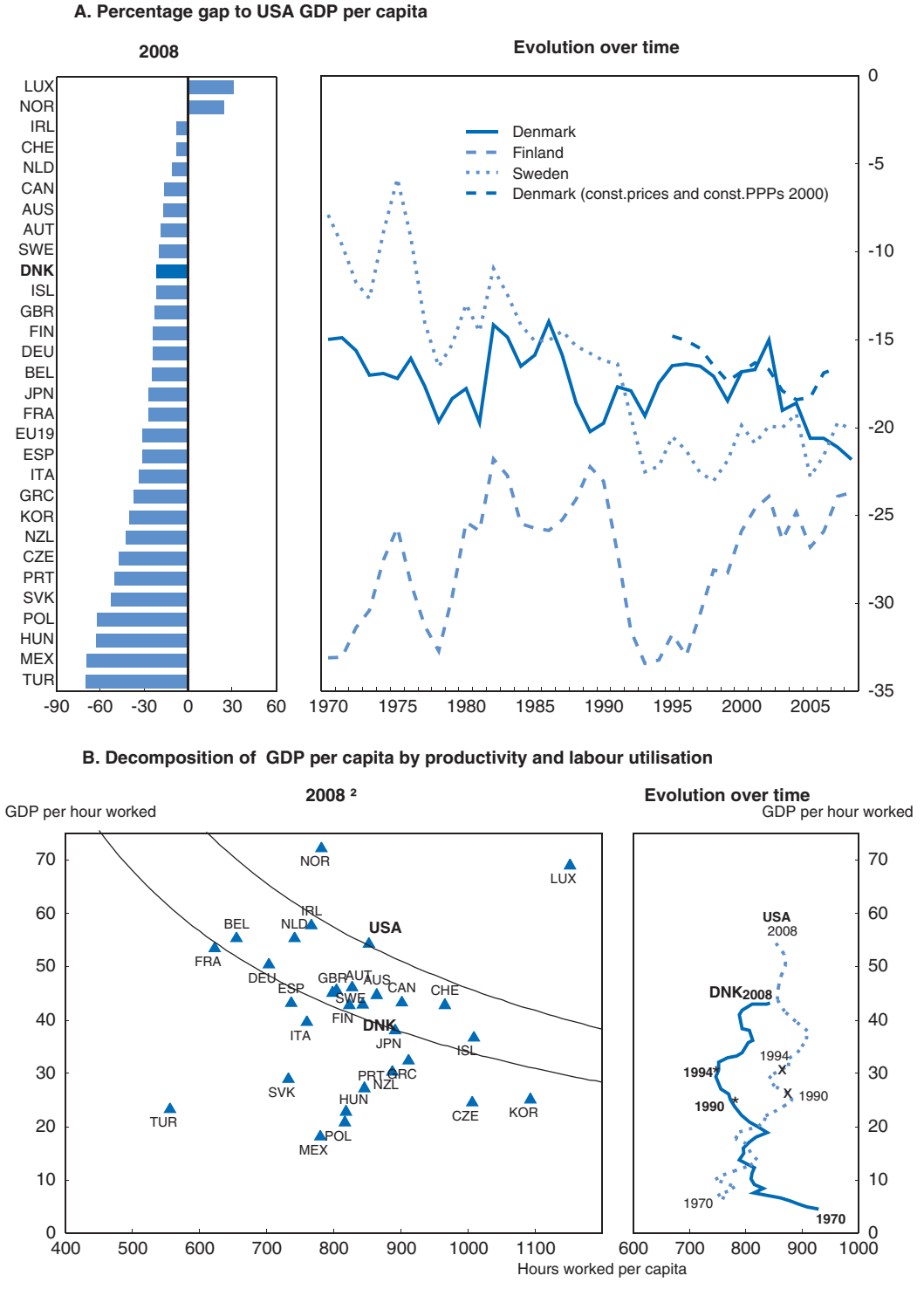
The Danish economy in international context

Denmark's position in the top third of OECD countries in terms of GDP per capita is based on a relatively long period of combining open markets, incentives for economic participation and a strong social safety net. However, the income gap to the leading countries has widened since the mid-1990s. Labour utilisation has increased substantially, through a higher employment rate and, to a lesser extent, higher average hours worked. However, this has been more than offset by a slowdown in labour productivity growth. GDP per hour worked grew on average by 2.4% per year between 1981 and 1992, but slowed to 1.6% per year between 1993 and 2005. Hence, the income gap is now mainly due to the gap in labour productivity (Figure 1.2). Chapter 2 examines in detail the possible reasons for the labour productivity slowdown.

At the same time, Denmark has recorded a modest trend increase in its terms of trade, which has boosted the international purchasing power of domestic income and so held up GDP per capita measured at current prices and purchasing power parities. This contrasts with some of Denmark's Nordic neighbours, particularly Sweden, where high ICT production intensity has led to declining terms of trade, muting the purchasing power gains stemming from strong productivity growth.

A key element of the Danish model is the focus on equity – both intra and inter-generationally. Income inequality measured by the Gini coefficient, after taking into account taxes and transfers, is the lowest in the OECD. The Gini coefficient before taxes and transfers is the fifth-lowest in the OECD, likely reflecting a relatively narrow earnings distribution and high labour force participation. The inter-generational earnings elasticity, which measures the degree to which people's income is influenced by the income of their parents, is also the lowest of OECD countries for which data is available. The extent to which the likelihood of a young person achieving a certain level of education is influenced by their parents' education level is also low. Putting these together, in Denmark there is a

Figure 1.2. **GDP per capita and decomposition**[1]



1. GDP is measured at current prices purchasing power parities. Productivity is GDP per hour worked. Labour utilisation is hours worked per capita.
2. The lines running through Denmark and the United States show the different combinations of GDP per hour worked and hours worked per capita that produce the same level of GDP per capita.

Source: OECD, *Productivity Database* and OECD Secretariat estimates.

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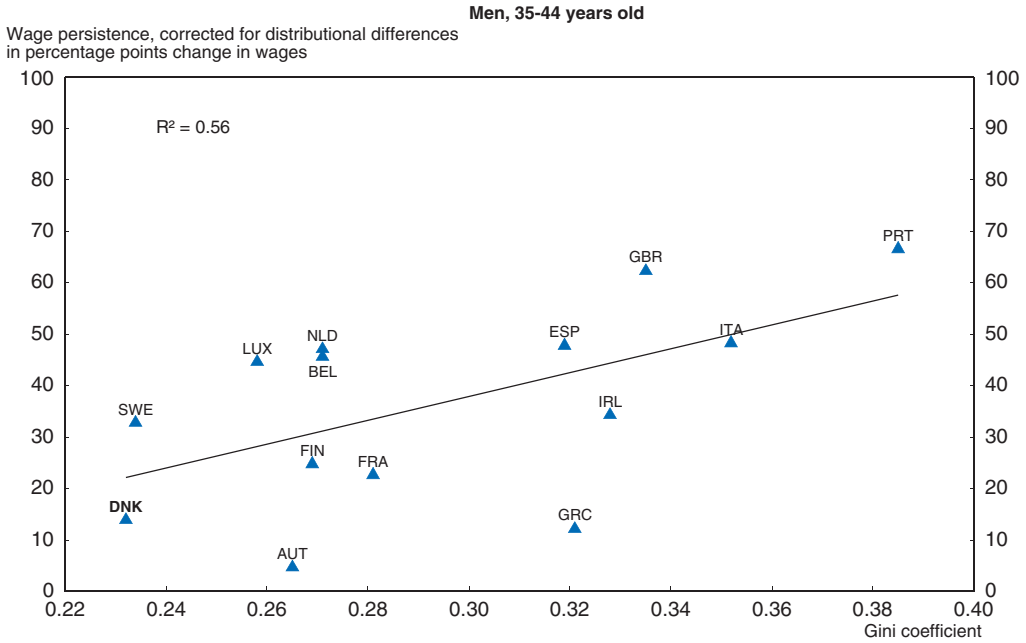
relatively low association between the wages children will earn as adults and their parents' education level, referred to as intergenerational wage persistence in Figure 1.3. Low intergenerational wage persistence is also correlated with low society-wide income inequality (Figure 1.3). Recent OECD research points to the important role of educational access and attainment in achieving a high degree of inter-generational social mobility (Causa and Johansson, 2009). Chapter 3 discusses in detail the role of the education system in developing the stock of human capital, which will be important for raising productivity growth in the years ahead.

Figure 1.3. **Correlation between inequality and inter-generational wage persistence**[1]



1. Persistence in wages measures the percentage increase in wages of an offspring having a father with tertiary education relative to an offspring having a father with below upper-secondary education. A larger number implies stronger persistence in wages or a higher degree of immobility across generations. Inequality is measured by the Gini coefficient of disposable. household income adjusted for household size.

Source: Causa and Johansson (2009).

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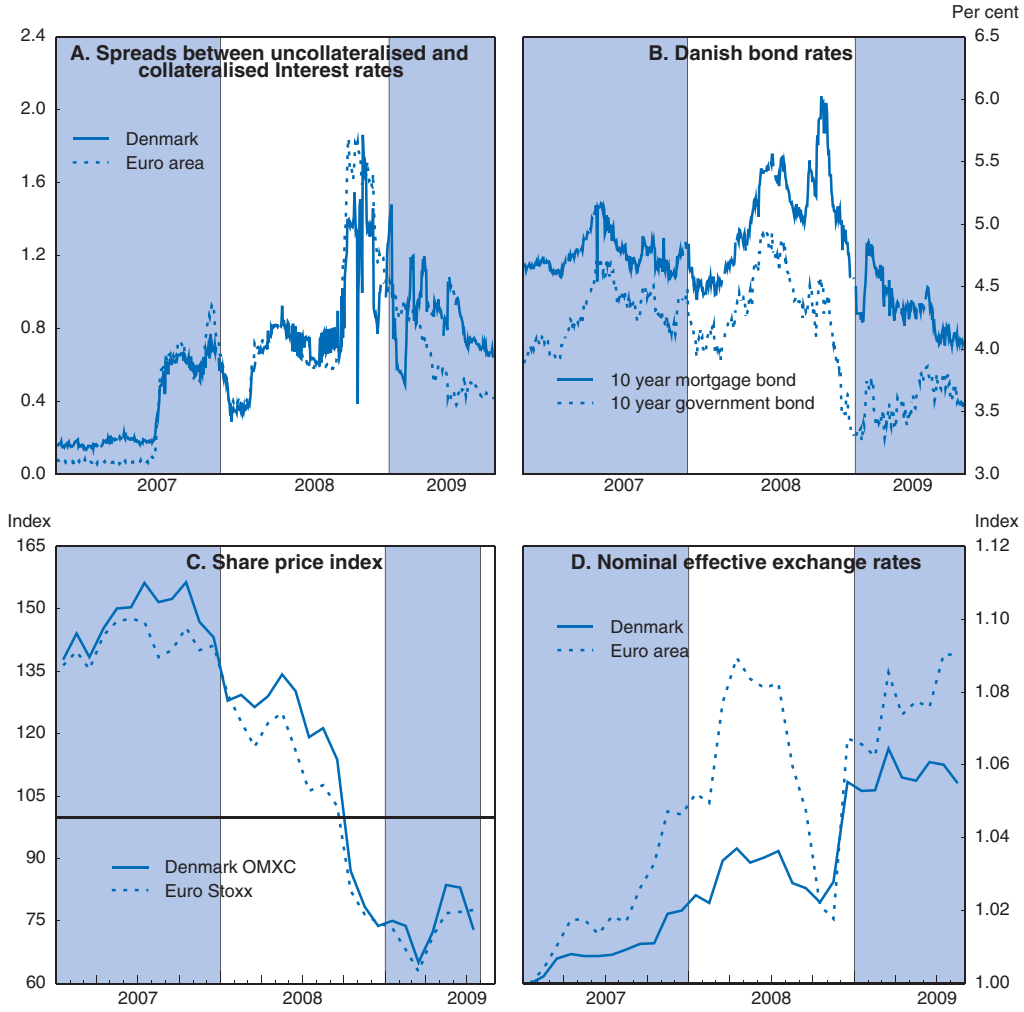
The financial crisis and the macroeconomic outlook

As late as the second half of 2008, concerns about overheating remained prominent in Denmark, given the extremely low rate of unemployment and the acceleration in wages. In fact, economic growth had already slowed down very significantly since early 2007 and the financial sector had been showing strains since early 2008. Financial conditions deteriorated progressively during 2008 and the intensification of the global financial crisis in September 2008 was echoed in Denmark. Moreover, to a greater degree than in a number of other OECD countries, the financial crisis coincided with the unwinding of a major property boom.

Financial stress

Danish financial markets have been as badly affected by the global financial crisis as those in the euro area. Spreads between collateralised and uncollateralised three-month money market rates rose as much as in the euro area, and have since come down less than might have been expected (Figure 1.4). Financial institutions that normally funded their activities by borrowing for two-to-three months have found it difficult to obtain financing for longer than a week. Cross-border money market transactions dropped, as Danish banks found it more difficult to fund themselves offshore (Ejerskov, 2009). As in many countries, the decline in money market transactions has largely been taken up by increased transactions with the central bank. Mortgage bond yields have not risen as much as in many other countries, mainly because the mortgage bond market is structurally very different from those in most other countries (Box 1.1). The spread between mortgage and government bond rates has only risen to about the same extent as it did in the early 1990s,

Figure 1.4. **Interest rate spreads, equity prices and nominal effective exchange rates**



Source: Danmarks Nationalbank, Datastream, and *OECD Analytical Database.*

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Box 1.1. **The Danish mortgage bond market**

The Danish mortgage bond market has received some international attention in the light of the US subprime crisis.* Not once in its over-200-year history has there been a default by a Danish mortgage bank. Traditionally, mortgage credit institutions (MCIs) were the only financial institutions allowed to grant loans against mortgage on real property by issuing mortgage bonds (RDOs). MCIs are allowed to originate and service mortgage loans, funded through the issuance of mortgage bonds. They are not allowed to fund their activities with deposits or issue guarantees, although they can develop banking and insurance activities through subsidiaries. New legislation in 2007 created a two-tiered bond market where RDOs would exist alongside the new covered mortgage-credit bonds – *særligt dækkede realkreditobligationer* or SDROs – which fulfil the old and new rules and new covered bonds – *særligt dækkede obligationer* or SDOs – which can be issued by both the mortgage banks and commercial banks. Almost 50% of the outstanding mortgage bonds are owned by Danish credit institutions, around 27% are held by insurance companies and pension funds, and around 13% are held abroad.

Fixed-rate callable annuity loans with a maturity of up to 30 years are the dominant mortgage loan type, but adjustable-rate loans are now very widespread. The latter also have a maturity of up to 30 years, with an interest rate that is reset periodically (often yearly). They are financed with bonds of maturities of one to 11 years, with the interest rate on the loan linked to the market rate on the refinancing. Interest-only loans (up to 10 years) were introduced in 2003 and loans with interest rate guarantees in 2004. The share of loans with an interest rate fixation period of less than one year has grown substantially in recent years. In order to comply with the "balance" principle, the vast majority of mortgage loans are funded by the issuance of mortgage bonds of equal size and identical cash flow and maturity characteristics. The proceeds from the sale of the bonds are passed on to the borrower and interest and principle payments are passed on directly to the investor holding the mortgage bonds. Hence, borrowers' financing conditions are directly linked to the capital markets. Mortgage institutions are paid for their services by the borrower.

Maximum loan-to-value (LTV) ratios apply at the time the loan is issued, varying with the type of property. For owner-occupied homes, rental properties, co-operative homes and housing projects, mortgage loans can represent up to 80% of the value of the property. Maximum LTV ratios are 70% for agricultural properties, 60% for commercial real estate (with a possibility to go up to 70 % if additional collateral is posted) and 40% for unbuilt sites (mortgage loans are frequently used by small and medium sized enterprises in the corporate sector). MCIs are required by law to base the mortgage on the market value of the property and take into account the risk of changes in market or structural conditions.

The prevailing market practice is that the borrower has the right to pre-pay or buy back his loan at any given time, at par or at the prevailing market price. Callable loans may be pre-paid at par before maturity. Adjustable-rate loans can only be redeemed at par at the time of adjustment. In a high-interest-rate environment, buying back the loan (below par) and refinancing into another loan closer to par allows for capital gains in return for accepting larger coupon payments. When interest rates are falling, mortgagees have an incentive to buy back the loan at face value (less than market value) and take on a lower interest rate.

Box 1.1. **The Danish mortgage bond market** *(cont.)*

MCIs are exposed to the risk that the borrower defaults and the risk that the value of the property will not match the outstanding amount of the loan (credit risk). That is, while they act as a conduit between the borrower and the lender, they effectively guarantee the lender's asset. There is usually considerable scope for the mortgage lender to adjust payment schedules to avoid default. However, when default occurs, a bank or MCI can request that a debtor's property be sold by order of the courts. The property is then sold at a public auction. In case the highest bid does not cover the value of the debt, the bank can assert a claim of the remaining debt against the debtor. This payment system discourages borrowers from defaulting on their loans, as they remain liable for the payment of their loan if they default. It typically takes no more than six months between a borrower's default on a loan and the forced sale.

The model offers a number of benefits. On top of strict LTV and market valuation requirements, the fact that the credit risk remains with the MCI creates incentives for the lenders to ensure that the quality of the underlying credit is good. The balance principle substantially limits funding mismatches, such as financing long-term mortgage loans with short-term debt instruments. Almost direct pass-through of market conditions keeps transaction costs low for consumers. Callability of the loans means that there is likely to be demand from mortgagees to buy mortgage bonds when prices fall, reducing the risk of negative equity by refinancing into a loan closer to the property value. This might also have added liquidity to the mortgage bond market when it sold off due to the international market reaction against mortgage bonds. Borrowers are discouraged from defaulting since they remain personally liable for any outstanding debt also after the property is sold.

However, a number of recent changes and trends may have increased the risks associated with the framework. The trend towards deferred-amortisation loans increases the credit risk faced by the MCIs, since mortgagees have less scope to adjust their repayment schedules if their financial position worsens. New loan types, and the associated changes in bond issuance, may lead to reduced liquidity in each bond line, affecting investors' appetites for mortgage bonds. The more different types of loans available the less liquid particular bonds could become, making managing prepayment risk more complex. Also, with the new SDOs and SDROs, if the value of the collateral underlying the mortgage falls and the LTV ratio rises above the statutory limit, additional collateral must be added to the cover pool. This raises demands on MCIs to find new funding at a time when the broader economy is weak and it might be more difficult to raise funds.

* For example, see George Soros' article in the *Wall Street Journal* of 10 October 2008.

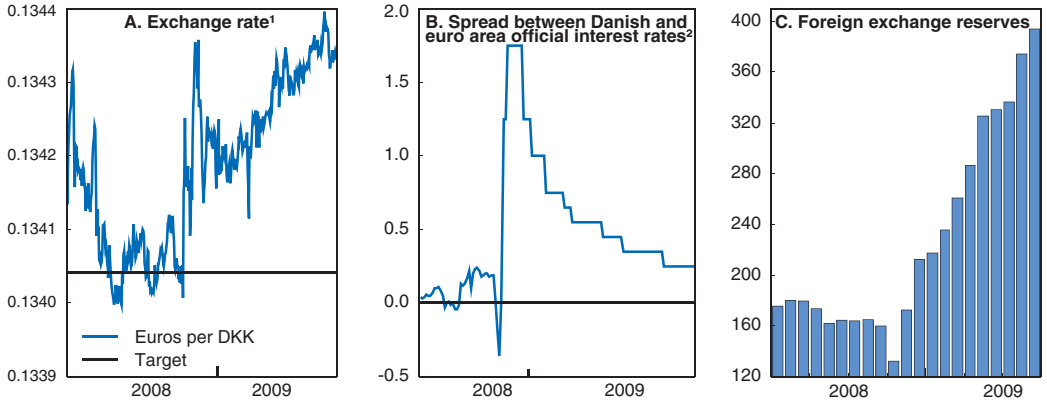
Source: IMF (2007a); Hay (2008).

when there was a sustained but less sharp fall in house prices. The bond auctions in late 2008 to refinance adjustable rate mortgage loans saw better-than-expected issuance, and while the yields were up they were not as high as had been feared. Equity prices have plummeted since the beginning of 2007, almost exactly mirroring euro area developments. Meanwhile, with the exchange rate fixed to the euro, the nominal effective exchange rate has appreciated by about 6% since early 2007.

Interest rates are now very low by historical standards but due to foreign exchange market tensions and the currency peg to the euro, the overall interest rate environment has not eased as much in Denmark as in many other countries. In recent years, the Danish

rates for weekly monetary policy transactions had been set 25 basis points above the minimum refinancing rate of the European Central Bank (ECB). However, in Spring 2008, the ECB's variable rate transactions were resulting in actual rates up to 30 basis points above the minimum, leading to a lower or sometimes negative spread between Danish and euro area weekly policy rates. Consequently, the Danish central bank unilaterally raised its weekly interest rates on 16 May 2008. In late September 2008, the actual rates on ECB weekly tenders rose far above the minimum bid rate, leading to a negative spread to Danish rates and outflow of capital from Denmark, putting pressure on the exchange rate. The Danish central bank intervened in the foreign exchange market and, on 7 October, announced that it would raise its weekly rates by 40 basis points to 4.5%. On 8 October, the ECB lowered its official interest rates and switched from fixed-quantity to fixed-interest-rate tenders for weekly refinancing operations. In this particular case, the interest rate cut was not shadowed by the Danish central bank. On 24 October, the central bank announced a further increase of 50 basis points in its weekly rates. Since then interest rate spreads between Danish official rates and ECB rates have been reduced gradually, back towards the early 2008 levels, and Danmarks Nationalbank's net foreign exchange reserves have soared (Figure 1.5).

Figure 1.5. **Developments in the fixed exchange rate regime**



1. An increase in the series in Panel A represents an appreciation of the Danish Kroner against the euro.
2. Panel B shows the spread between Danmarks Nationalbank's lending rate and the ECB's main refinancing operations rate.

Source: Danmarks Nationalbank and OECD *Main Economic Indicators database.*

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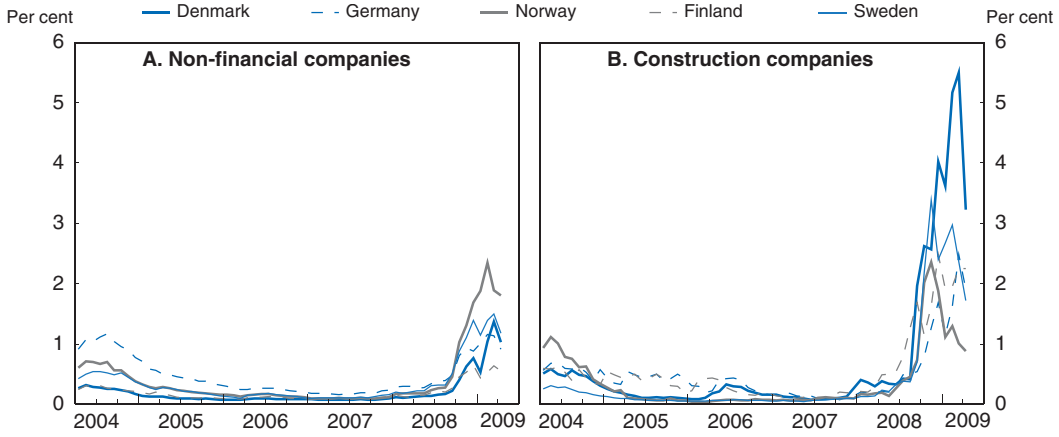
Creditworthiness of Danish financial institutions

The combination of the economic recession and financial turmoil has pushed up impaired loans and loan losses in financial institutions. Danish company failures have risen markedly, with IT, trades and building industries most at risk (Danmarks Nationalbank, 2009b). In August 2009, the number of businesses declared bankrupt was two and a half times the long-term average even though it was declining (this figure is not adjusted, however, for the significant rise in the number of firms in recent years). Expected default rates for listed companies soared in late 2008, particularly in construction, but have receded somewhat since (Figure 1.6). Forced sales of real property have risen, but remain well below their early 1990s levels. However, forced sales could increase further as unemployment increases. There is a strong tendency for mortgages with high LTV ratios to

Figure 1.6. **Expected default rates of listed companies**[1]



1. The series shown are expected default frequencies calculated by Moody's KMV by compiling information about firms' equity, leverage, industry, volatility, financial statement data and historical defaults.

Source: Moody's KMV and Sveriges Riksbank.

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be financed with adjustable-rate loans, often on a deferred amortisation basis, and these households may have less scope to adjust to changes in their financial circumstances than in the past, possibly increasing the risk of unemployment leading to mortgage default. However, for other less constrained households, access to adjustable rate loans on a deferred amortisation basis may improve the ability to overcome unemployment spells. A recently-launched survey covering bank and MCI lending to companies and households indicates that loan losses increased in the three quarters to mid-2009, with the exception of losses relating to MCI loans to households. Further increases in loan losses are expected in the third quarter (Danmarks Nationalbank, 2009d).

Bank earnings declined already in the second half of 2008, due primarily to capital losses and loan write-downs, and smaller financial institutions (groups 2 and 3 in Table 1.1) experienced sharper falls in profits and greater increases in impaired loans. Profits have actually deteriorated more than is evident in Table 1.1, since a new opportunity to reclassify financial assets to avoid an impact on profits from unrealised value adjustments may have inflated the 2008 profit results (Danmarks Nationalbank, 2009b).

Between the start of 2008 and mid-2009, 18 institutions have been wound up or taken over (Annex 1.A1). Many of them had higher-than-average lending growth, substantial exposures to property markets and large exposures more generally (Danmarks Nationalbank, 2009a). In addition, small-and-medium-sized banks have been particularly affected by stress in the money market: in the fourth quarter of 2008, they were paying up to 3-4% more for funds than the average large bank, way up from the premium of less than 1.5% in late 2006 (Ejerskov, 2009).

On average, banks had lent their equity capital almost nine times at the end of 2007, compared to a historical average of about seven times.[1] A return to the long-term average would require either a 24% fall in lending or a 30% increase in equity capital (Danmarks Nationalbank, 2009a).

Stress tests conducted in Spring 2009 by the central bank indicate that in the absence of government capital injections the banking system would be quite vulnerable (Danmarks Nationalbank, 2009b). They compare three scenarios (Table 1.2): the baseline involves a

Table 1.1. **Key financial ratios for Danish banks**

	2005	2006	2007	2008	First half of 2009
Group 1					
Solvency ratio	13.2	13.7	11.7	14.3	16.6
Tier 1 ratio	9.5	10.3	8.4	10.6	12.9
Return on equity after tax	17.4	17.8	15.2	1.9	0.9
Lending/equity ratio	919.2	926.0	1 064.0	1 167.0	10.5
Impairment ratio	–0.1	–0.1	0	0.6	0.8
Group 2					
Solvency ratio	11.5	11.5	11.6	11.3	12.1
Tier 1 ratio	9.9	9.4	8.9	9.2	9.7
Return on equity after tax	16.3	19.1	14	–8.8	–14.1
Lending/equity ratio	741.4	801.6	854.4	1 009.7	0.6
Impairment ratio	0.1	–0.1	–0.1	1.6	2.2
Group 3					
Solvency ratio	14.2	13.9	14.4	15.4	18.4
Tier 1 ratio	13.7	13.1	12.2	12.5	15.1
Return on equity after tax	13.3	14.9	11.3	–1.9	–10.0
Lending/equity ratio	423.3	472.7	509.3	558.1	4.4
Impairment ratio	0.1	–0.1	0.1	1.2	1.7

Notes: Group 1 includes the five largest banks, group 2 the next nine and group 3 includes 30 of the smallest financial institutions. The solvency ratio is core plus supplementary capital (total capital base less statutory deductions) as a percentage of risk-weighted assets. The statutory minimum is 8%. The tier 1 ratio is core capital (share capital plus hybrid core capital) as a percentage of risk-weighted assets. The impairment ratio is total impairment losses as a percentage of loans, guarantees and impairment losses. The increase in solvency and tier 1 ratios in 2008 primarily reflects a reduction in risk-weighted assets due to changed calculation methods under the Basel II framework.
Source: Danmarks Nationalbank (2009b).

shallower recession than the one projected in the June 2009 *OECD Economic Outlook* (see Table 1.3 further down); a "Danish shock" scenario assumes a slightly deeper recession than projected by the OECD; and a "long, deep recession scenario" features a much deeper one. The calculations do not take into account the impact of the government's capital injection programme, discussed in detail below. In the "Danish shock" scenario, the loan-loss ratio is similar to that during the Nordic banking crisis of the early 1990s while it is

Table 1.2. **Danmarks Nationalbank's stress tests**

	2009	2010	2011
Baseline scenario			
GDP	–2.4	0.5	1.5
Unemployment rate	4.5	6.5	6.3
Average bond yield	4.1	4.6	5.3
Loan-loss ratio	1.4	1.5	1.2
Danish shock			
GDP	–4.0	–1.9	0.0
Unemployment rate	5.6	8.9	9.6
Average bond yield	4.1	4.6	5.3
Loan-loss ratio	1.9	2.5	2.3
Long, deep recession			
GDP	–4.5	–2.9	–0.6
Unemployment rate	6.1	10.2	11.8
Average bond yield	3.9	3.2	2.8
Loan-loss ratio	2.6	3.1	2.8

Source: Danmarks Nationalbank (2009b).

about 0.5 percentage points higher in the "long, deep recession" scenario. In the baseline scenario, all the banks maintain capital in excess of the statutory solvency requirements. In the Danish shock scenario, a few fail to meet these in 2010 and more than half of the banks don't meet them in 2011. In the long, deep recession scenario only a few banks meet the statutory requirements in 2010 and virtually none in 2011. When publishing these results, the central bank underlined that they highlighted the need for a number of banks to accept public capital injections (see below).

Effects of financial stress on the real economy

Deteriorating financial conditions adversely affect the economic outlook through a number of channels. Losses due to falling financial asset prices reduce consumers' ability to finance consumption from household wealth. Lower share and bond prices make it more expensive for firms to issue new capital or take out loans. The cost of finance (interest rates) can rise and/or there may be outright restrictions on access to finance even for profitable business opportunities. This limits the ability of firms to finance short-term operations (such as inventory management), which hurts sales, and new business opportunities, which curtails investment. Similarly, a number of households may be unable to find funding for consumption (consumer credit) or investment (including buying or building a new house).

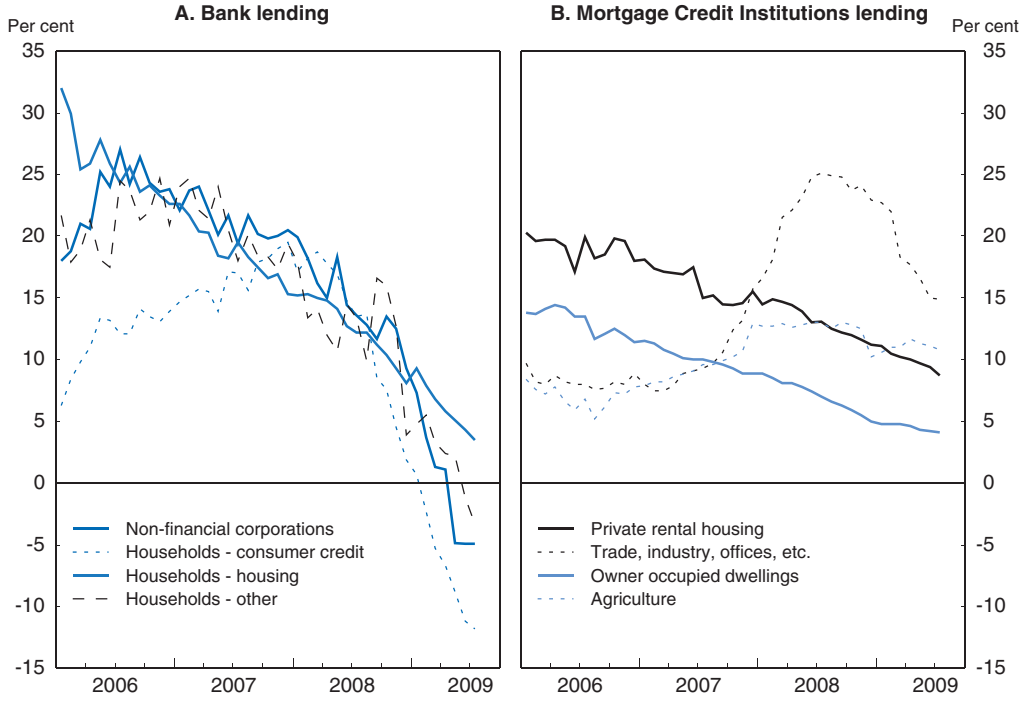
Households have suffered a major reduction in wealth over the past two years. Up to 2007-08, gains in household wealth had been driven by strong growth in asset prices and, to a lesser extent, household saving. Housing wealth accounts for more than half of household assets in Denmark. Direct and indirect holdings of shares and other equity account for about 15-20% of household assets while bonds and bank deposits account for 25-30% (Olesen, 2009). Total household wealth (including pension and housing assets) was about 4.6 times a year's household net disposable income in 2007 – a high level by historical standards. However, sharp falls in house and equity prices brought this ratio down to 3.6 in the course of 2008 – still fairly high in historical perspective. In the first half of 2009, equity prices recovered somewhat but house prices continued to fall.

Bank lending to non-financial corporations has contracted since early 2009 while growth in MCI lending to business (other than agriculture) has slowed but from high rates. Mortgage lending to households has been slowing gradually from the very high rates of a few years ago. Consumer credit is now falling (Figure 1.7). Lending growth has slowed more sharply in smaller banks. These may be more exposed to the small enterprise sector, which is likely to be more sensitive to the economic cycle (Danmarks Nationalbank, 2008). The slowdown in lending growth reflects the usual pattern in a cyclical downturn, including tighter credit conditions on the part of financial institutions and also a reduction in demand on the part of borrowers (Danmarks Nationalbank, 2009d).

From 2006 to 2008, interest rates on existing and new loans had trended up, in line with ECB policy tightening, and short-term rates spiked in late 2008 as the Danish central bank unilaterally raised interest rates in the face of foreign exchange market pressures (see above). Since the peak in October 2008, official interest rates have fallen by more than 4 percentage points. Meanwhile, interest rates on loans to businesses and households have fallen by less – between 0.8 and 3.2 percentage points (Figure 1.8). This probably reflects the unsettled nature of funding markets but also, to some extent, an attempt by financial institutions to rebuild their margins as loan losses erode profitability. Medium-size banks have raised deposit and lending rates more than large banks in order to try to

Figure 1.7. **Growth in lending by financial institutions by use of funds**

Year-on-year per cent change



Source: Danmarks Nationalbank.

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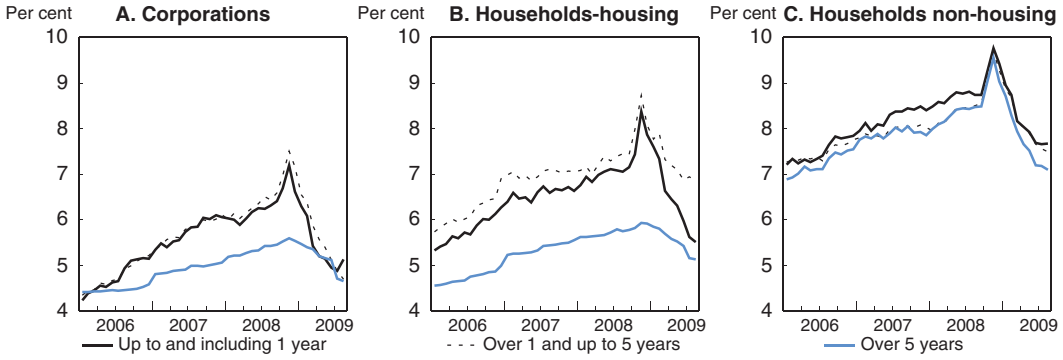
attract more deposits and reduce lending (Danmarks Nationalbank, 2008). The trend towards adjustable-rate mortgages has accelerated in response to the sharp fall in interest rates. This reduces the current strain on household budgets, which is helpful at this juncture, but also makes them more vulnerable to future interest rate hikes.

Figure 1.8. **Interest rates paid by corporations and households**[1]



1. The data are interest rates on the stock of outstanding loans. For banks, the rate of interest is calculated as the month's income from interest as a per cent of the month's average loans, including overdraft facilities. For MCIs the rate covers the interest rate on the cash value of the loan (coupon interest and the capital loss or gain on issue of the underlying bonds, on the assumption that the loan is held to maturity) and administration fees.

Source: Danmarks Nationalbank, Table DNRUM.

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Financial market stress has clearly contributed to the recession. Overall financial conditions tightened considerably late in 2008, with the effect of falling share and house prices compounded by higher policy and market interest rates. Real exchange rate appreciation, reflecting more rapid inflation in Denmark than in its trading partners, worked in the same direction. Since the beginning of 2009, financial conditions have eased somewhat, with significantly lower policy and market interest rates in the money and bond markets, and a rebound in share prices. However, house prices and the exchange rate continue to exert a negative influence on the economy.

Macroeconomic outlook

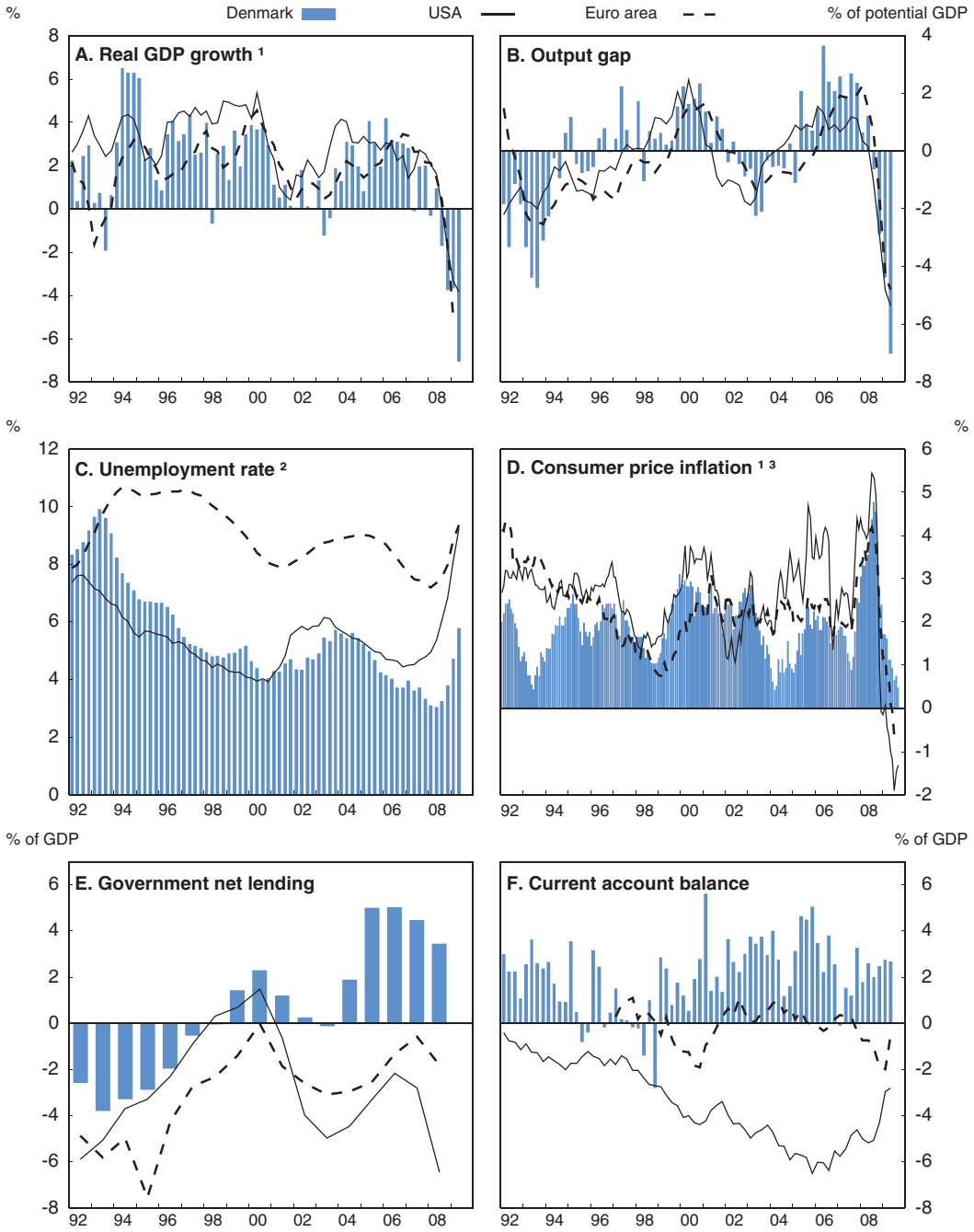
Globally, downturns following banking crises tend to be associated with output losses two to three times greater than other types of downturns and the recovery takes twice as long. Business and housing investment are disproportionately reduced. Fiscal balances tend to deteriorate more than in non-banking crisis downturns (Haugh *et al.*, 2009). The Danish economy is facing not only the impact of the global financial crisis and the collapse in global trade, but also the unwinding of the domestic 2004-06 property boom.

After growing by an average of 2.7% per year over 2004-06, the economy slowed sharply in 2007 and contracted by 1.2% in 2008. The property boom, which had been fuelling residential investment and consumption, turned around already in 2007, partly triggered by higher interest rates. Also contributing to slowing demand were the rise in oil prices in the first part of 2008, the weakening of export markets and sliding confidence. On top of that, the economy was experiencing severe labour shortages – manifested in mounting wage inflation – and falling productivity levels. Activity had therefore slowed sharply before the financial turmoil burst forth into full-blown crisis. The labour market, which had been extremely tight with unemployment reaching record lows, began to turn in the third quarter of 2008. Inflation rose sharply in the course of 2008, and over the past year core inflation has been somewhat higher than in the euro area. The budget surplus remained strong, buoyed by growth in North-Sea oil and gas revenues and the tax on unrealised capital gains in the pension system. The current account has remained in positive territory during the entire upswing but has been trending down until early 2008, as imports have grown more rapidly than exports (Figure 1.9). More recently, net exports have improved as household saving rose sharply.

GDP has now contracted for four consecutive quarters and by spring 2009, it was 7% lower than a year earlier. GDP fell more than expected in the second quarter of 2009. The contraction was driven mainly by plunging business and housing investment while private consumption decreased only slightly. Forward-looking indicators point to some improvement. Sentiment is up in manufacturing. Industrial production and new orders seem to have stabilised at a low level while the number of new bankruptcies is coming down. The outlook is more uncertain, however, for the construction sector. Early retail trade data suggest that household consumption is unlikely to deteriorate further and consumer confidence has improved substantially since the low-point in October last year, to around its long-run average.

The feed-through of the significant fiscal and monetary stimulus is key to the outlook, in particular whether the sharp drop in interest rates since last autumn and higher disposable incomes will be sufficient to stabilise house prices. National average prices for one-family houses were down 15% year-on-year in the first quarter of 2009 (Figure 1.10)

Figure 1.9. **Key macroeconomic indicators**



1. From same period of previous year.
2. For the United States, the unemployment rate is from the monthly Current Population Survey of persons aged 16 and over. For the euro area, it is derived from aggregating labour force data for individual countries. For Denmark, it is calculated using the Eurostat harmonised labour force survey level of unemployment and the level of employment from the national accounts.
3. Harmonised index of consumer prices for the euro area.

Source: OECD *Analytical Database.*

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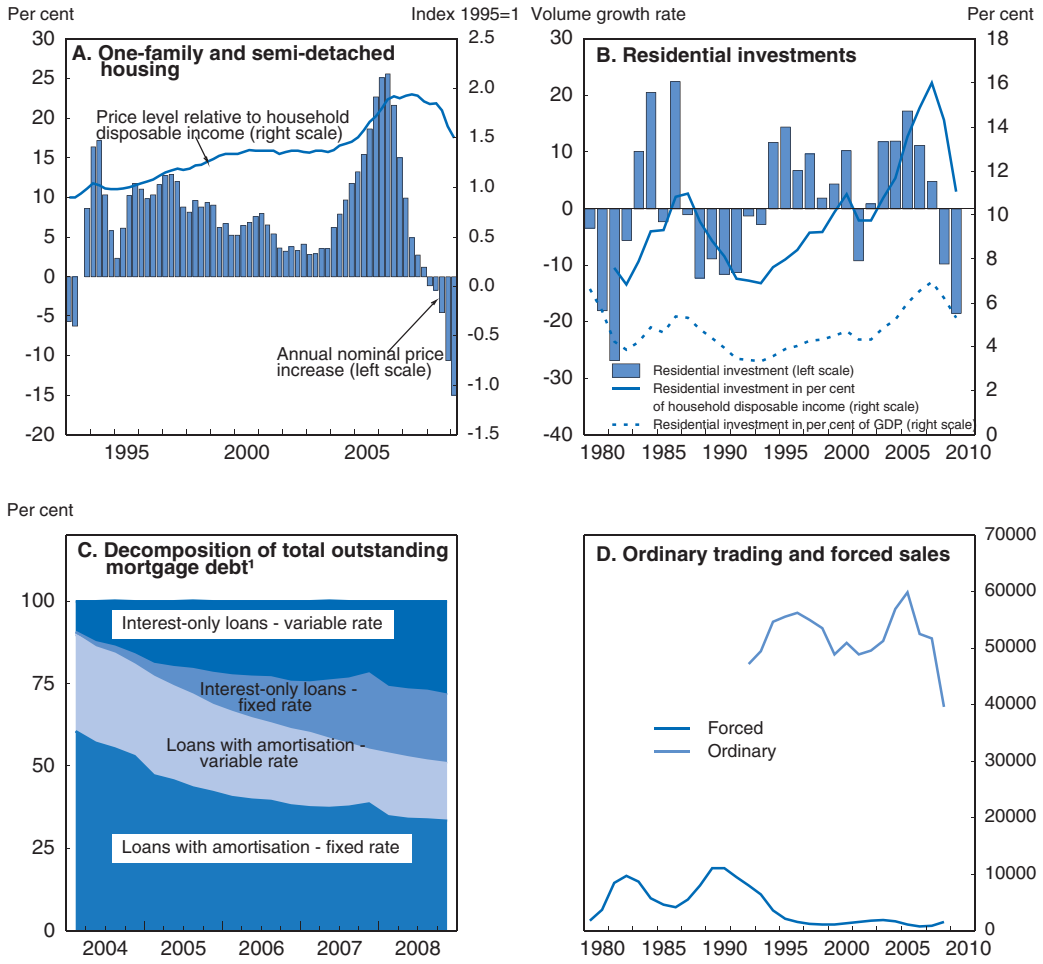
Figure 1.10. **Developments in the housing market**



1. Interest-only loans were first introduced in 2003.

Source: Statistics Denmark, Realkreditradet and *OECD Economic Outlook No. 85 Database*.

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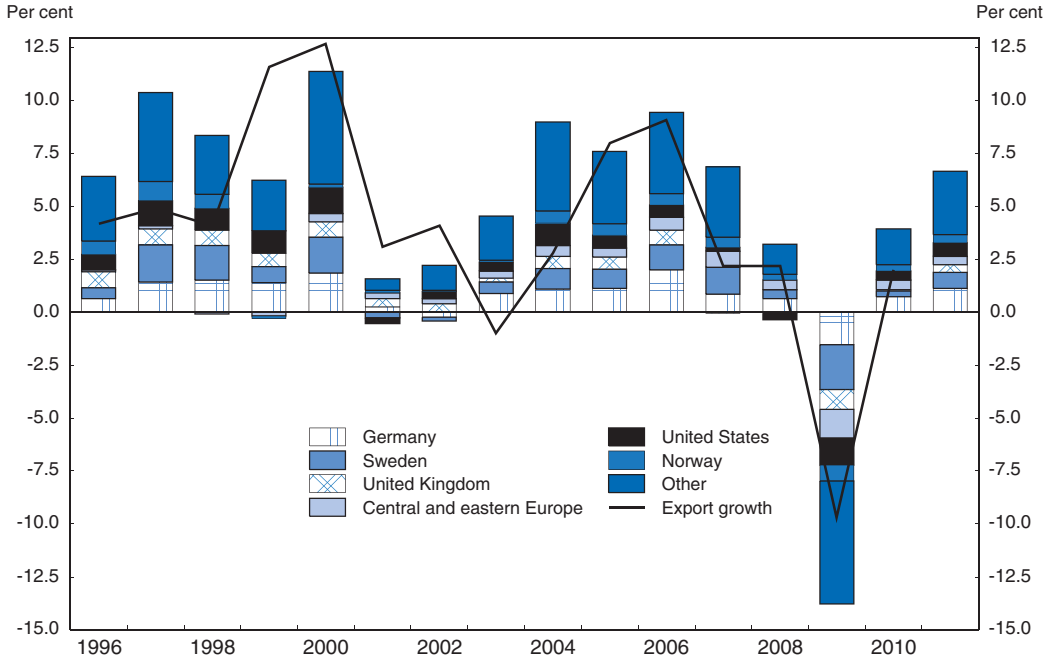
and according to the association of Danish Mortgage Banks, prices were still falling in the second quarter of 2009. The number of homes sold has been well below the long-term average in recent quarters. After a number of years of being well above the estimated equilibrium level, house prices have by now probably come down close to their equilibrium values, but often they undershoot after having overshot, depending *inter alia* on interest rate developments (Bødker and Skaarup, 2009). Young owner-occupiers in particular have increased their debt levels along with the rise in house prices, increasing their vulnerability to house price falls (Lunde, 2009). Combined with rising unemployment, lower house prices will also likely feed back into increased mortgage defaults and forced home sales, possibly putting further downward pressure on property prices. Lower house prices should dampen residential investment as prospective purchasers focus on existing homes. Alterations to existing buildings will be boosted by a government initiative providing grants to subsidise renovations with a focus on energy-saving modifications. Business property

prices are now falling as well, compounding the effect of excess capacity on non-residential investment.

Exports are another key driver of GDP. Danish export volumes have fallen for four consecutive quarters and in the second quarter of 2009 were 13.5% below the level of a year ago. Denmark's export market is expected to contract by 14% in 2009, with about two-fifths of this contraction accounted for by Denmark's four top export destinations – Germany, Sweden, the United States and the United Kingdom (Figure 1.11). To some extent, the composition of Danish exports might cushion the impact of the fall in export market demand. Demand for food and pharmaceutical goods, which make up a high proportion of Danish goods exports (16% and 7% respectively), might not be very income-elastic. However, the real exchange rate has appreciated in recent years due to relatively strong wage growth, which will weigh on Denmark's market share going forward.

Figure 1.11. **Exports and contributions to growth in Denmark's export market**[1]



1. The country bars represent growth in imports of the country in question multiplied by the share of that country's imports that are sourced from Denmark. Figures for 2009 and 2010 are based on OECD Economic Outlook No. 86 projections for imports.

Source: OECD Economic Outlook No. 86 Database and OECD, Secretariat calculations.

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Following a sharp contraction in 2009, the economy is projected to recover gradually over the course of 2010 and more substantially in 2011 (Table 1.3). Exports are set to be one of the main drivers of the recovery, against the backdrop of an acceleration in world trade and a further deceleration in wages coupled with a pick-up in productivity. Business investment is also projected to gain momentum in the latter part of 2010 as financial conditions normalise and the uncertainty surrounding the recovery

Table 1.3. **Short-term economic outlook**

	2007	2007	2008	2009	2010	2011
	Current prices DKK billion	Percentage changes, volume (2000 prices)				
Private consumption	826.7	2.4	–0.2	–4.8	1.6	2.2
Government consumption	438.8	1.3	1.5	2.2	1.8	1.5
Gross fixed capital formation	374.3	3.1	–5.1	–12.4	–5.1	2.5
Final domestic demand	1 639.8	2.2	–0.9	–4.5	–0.4	2.0
Stockbuilding[1]	11.8	–0.3	0.2	–1.3	0.8	0.0
Total domestic demand	1 651.7	1.9	–0.7	–6.2	1.2	2.0
Exports of goods and services	882.8	2.2	2.2	–9.7	2.0	4.5
Imports of goods and services	846.6	2.8	3.4	–13.0	2.0	5.3
Net exports[1]	36.2	–0.2	–0.5	1.6	0.1	–0.3
GDP at market prices	1 687.9	1.6	–1.2	–4.5	1.2	1.7
GDP deflator		2.0	4.0	–0.5	1.2	2.1
Memorandum items						
Consumer price index		1.7	3.4	1.4	1.6	1.8
Private consumption deflator		1.8	3.1	1.4	1.2	1.4
Employment		2.6	0.9	–2.9	–1.8	0.9
Labour force participation rate[2]		83.5	83.5	83.0	82.2	82.1
Unemployment rate[2]		3.6	3.3	5.9	6.9	6.2
Household saving ratio[3]		–1.0	–0.3	7.9	6.8	5.2
General government financial balance[4]		4.5	3.4	–2.5	–5.4	–4.0
Current account balance[4]		0.7	2.0	1.0	1.3	1.5

Note: National accounts are based on official chain-link 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), actual amount in the first column.
2. Based on the Labour Force Survey, being ½-1 percentage point above the registered unemployment rate.
3. As a percentage of disposable income, net of household consumption of fixed capital.
4. As a percentage of GDP.

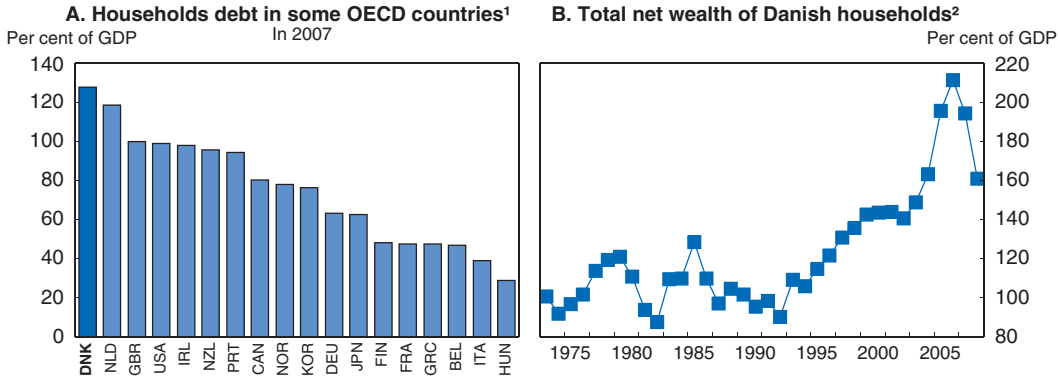
Source: October 2009 OECD projections.

fades. The unemployment rate had been exceptionally low (the lowest since the 1970s) but has risen to pass the structural rate during 2009 and will continue to rise until mid-2010, despite some reduction in labour supply due to withdrawals from the labour market. Rising unemployment and falling house prices in 2010 will restrain consumption, but on the other hand, it will get support from the boost to disposable income resulting from fiscal policy measures and lower interest rates. In 2011, consumption would benefit from a fall in unemployment and a turnaround in house prices. Inflation is expected to ease gradually due to the scale of slack in the economy, although it will be boosted in 2010 due to the indirect tax changes announced in the Spring Package 2.0 tax reforms (Box 1.4).

While overall economic prospects seem to have improved in recent months, some risks hang over the projected recovery. One is that the stabilisation of the housing market might be more drawn out than currently foreseen. Another is that, even though overall, households' net wealth position remains fairly strong, the burden of the high levels of mortgage debt built up in recent years by some households (Figure 1.12) might hold back consumption more than expected.

Figure 1.12. **Households debt and net wealth**

In per cent of GDP



1. Gross debt of households as share of GDP. The debt measure consists of short-term and long-term debt of the households.
2. The depicted measure shows the aggregate of households' housing assets and net financial assets after tax.

Source: OECD, Households' assets and Nationalbanken.

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Potential medium-term implications of the recession

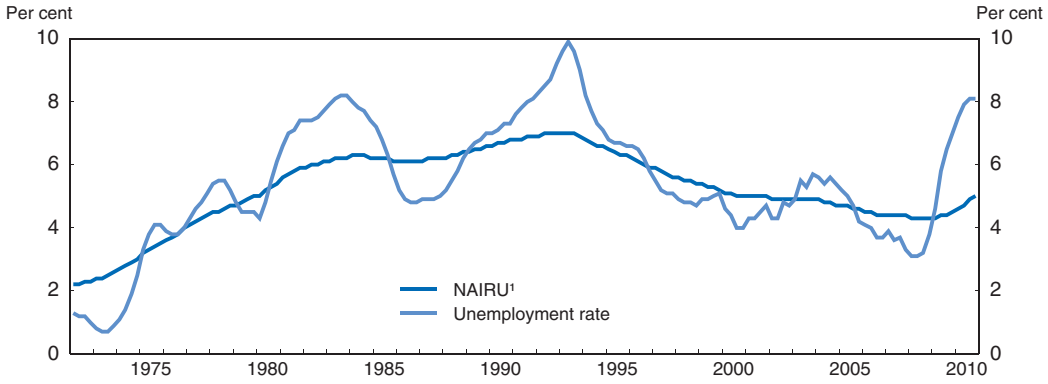
As in many other OECD countries, potential growth had long been expected to weaken in the coming years as a consequence of population ageing, but it will be adversely affected by the financial crisis as well. The two main channels through which the crisis is likely to drag down potential growth over the medium term are higher structural unemployment and reduced capital deepening due to heightened risk aversion. Studies suggest that full recovery of output to the earlier trend level following a banking crisis is rare. On the other hand, the pace of structural reform is often stepped up in the context of deep downturns (Haugh *et al.*, 2009).

Labour utilisation

While unemployment has fallen to very low levels in recent years, there is now a risk that the high cyclical unemployment rates projected for 2010 will turn structural to some extent in subsequent years (Figure 1.13). Hysteresis effects include ratcheting-up of structural unemployment due to insider-outsider dynamics, a loss of morale and skills by the unemployed, stigmatisation of the jobless reducing their employment prospects and lower regional labour mobility, especially where house prices are falling. Such effects were at work in Finland, Norway and Sweden in the aftermath of their past financial crises (Haugh *et al.*, 2009). Recent OECD analysis estimated the impact of higher unemployment on long-term unemployment, a key channel through which higher actual unemployment can lead to higher structural unemployment. This analysis suggested that a one unit increase in actual unemployment increases long-term unemployment by around 0.4 unit in Denmark. This figure is amongst the lowest in the OECD and is similar to Norway, Sweden and Finland. It is well below the Slovak Republic, Germany, Italy and Belgium, where a one unit rise in unemployment is estimated to increase long term unemployment by almost 0.9 unit (OECD, 2009f).

Figure 1.13. **Actual and structural unemployment**

Per cent of the labour force



1. The structural unemployment rate is the non-accelerating rate of unemployment (NAIRU), estimated according to the methodology outlined in Gianella *et al.* (2008).

Source: OECD Economic Outlook No. 85 Database.

StatLink http://dx.doi.org/10.1787/734547041222

Productivity

Productivity will be affected over the medium term by a slowdown in capital deepening related to the recession. This comes on top of the trend deceleration in labour productivity since the mid-1990s. The financial crisis triggered an adjustment in attitudes to risk, which may last. It is now generally believed that the price of risk has been too low, along with the price of money, and that speculative bubbles in a number of different assets have contributed to the crisis. As a result, risk aversion has increased, translating into higher financing costs and more subdued investment growth. This may hold back capital deepening and so lower productivity growth in the medium term. Such effects have been noted in the United States and Sweden following previous financial crises (Haugh *et al.*, 2009).

At the same time, product market hysteresis effects could also have a persistent impact on potential growth by affecting the drivers of innovation and productivity growth. Globally, there are signs that the recession has begun to undercut innovation in the private sector. A downturn is already evident in R&D and venture capital spending, due to the procyclical nature of investment in innovation (OECD, 2009c). In the short term, firms may divert resources away from R&D in order to cut costs or to finance the short-run costs of layoffs. This cyclicality may not present problems for long-term growth if R&D spending bounces back quickly once the recovery takes hold. However, if risk aversion remains higher, firms will find it durably harder to obtain external finance for R&D.

On the other hand, the restructuring brought about by the current crisis will accelerate changes: new sectors will appear, old ones will fade away; new work organisations will be introduced with new rules and regulations; new skills will be needed while the demand for others will abate. Research-intensive firms might seek to gain market share by increasing spending on innovation and R&D. The rise in unemployment may prompt an increase in entrepreneurship, out of necessity. Entrepreneurial skills and attitudes, risk-taking behaviour and creativity will be crucial competencies in the economy that need to be nurtured by more adaptive and innovative education and training systems. These issues are discussed in more detail in Chapters 2 and 3.

Potential output growth

Potential output growth is expected to be particularly weak in Denmark over the next few years, due mainly to reduced capital deepening but also to an increase in structural unemployment (Table 1.4). Coming on top of weak growth in potential employment via a reduction in the working-age population, potential output growth is expected to decline from 1.7% on average over 2006-08 to 0.5% in 2009-10 and 1.1% in 2011-17.

Table 1.4. **Potential output growth and its components**

Annual average % growth

	Potential real GDP growth	Potential labour productivity growth	Potential employment growth	Components of potential employment[1]		
				Trend participation rate	Working-age population	Structural unemployment
2006-08	1.7	0.8	0.8	0.4	0.3	0.1
2009-10	0.5	0.7	–0.3	0.0	0.0	–0.3
2011-17	1.1	1.3	–0.2	0.0	–0.1	–0.1

Note: Potential real GDP is calculated using a production function approach with capital and labour inputs, as outlined in Beffy *et al.* (2006). In this table, growth in trend average hours worked is captured in potential labour productivity growth along with capital deepening and total factor productivity. Potential labour productivity growth is potential GDP per employee, so is not directly comparable to the productivity measures used in Chapter 2.

1. Percentage point contributions to potential employment growth.

Source: OECD (2009b).

Policies to overcome the crisis

Bringing the economy quickly out of recession requires a range of measures on a broad front. The government has already implemented many measures to ease pressures in the financial sector, along with significant fiscal stimulus. Further labour market reforms have been suggested to improve the efficiency of the labour market and boost labour supply in the long term.

Financial sector measures

The Danish government and central bank have taken a range of measures to help steer the financial system through the crisis. These are in line with the approach agreed by European leaders in late 2008. The most important elements of the government's response are a blanket guarantee on claims against banks by all depositors and senior debtors, a process for taking over and winding up insolvent banks, and state-funded capital injections to boost capital in solvent financial institutions (Box 1.2).

The measures taken by the government and the central bank have had a strong positive effect on the financial system. The government guarantee has been crucial to help maintain liquidity in some institutions. Interest rates on bonds maturing before the end of the guarantee have been lower than those maturing afterwards (Danmarks Nationalbank, 2009b). The measures to prevent widespread divestiture of mortgage bonds by pension funds significantly lowered mortgage bond interest rates. With the applications received by financial institutions for capital injections, virtually all institutions will have a tier-1 capital ratio of at least 12% (Danish Ministry of Economic and Business Affairs, 2009).

Danmarks Nationalbank recently assessed that the capital injections provided under Bank Rescue Package II would significantly reduce the solvency problems in the banking sector if the loans provided by the government are converted into share capital (Figure 1.14). This is because share capital is regarded as higher quality than hybrid core

Box 1.2. **Financial stability measures**

Agreement on Financial Stability – Bank Rescue Package I

In October 2008, the government announced a voluntary scheme whereby participating banks would receive a government guarantee over all domestic and foreign claims by depositors, debt holders (senior debt) and other simple creditors. The guarantee was initially intended to apply until 30 September 2010 but has partly been extended until 2013 by allowing individual credit institutions to apply for an individual guarantee on senior debt. The agreement covers all licensed banks in Denmark which are members of the deposit insurance scheme (*Det Private Beredskab*) and Danish branches of foreign banks where they are not covered by a similar arrangement in their home country. 133 banks, comprising the majority of the banking industry, decided to join the guarantee scheme. Banks that participate in the scheme will not be permitted to pay out dividends, initiate any new stock buy-back arrangements, initiate any stock-option arrangements, or undertake a significant expansion of their activities which would not have taken place in the absence of the new scheme. With effect from 1 October 2010, ordinary deposits will be covered by an increased deposit guarantee of DKK 750 000.

The government also established a "winding-up company", referred to as the Financial Stability Company, to facilitate the take-over and winding up of banks that do not fulfill the statutory solvency requirements, and for which no viable private solution is evident. This company will establish and provide capital to a new company to take over and wind up each failed bank, so that claims by depositors and senior debtors do not suffer any losses. The financial sector, via Det Private Beredskab, will provide up to DKK 35 billion to cover losses in the Financial Stability Company. Det Private Beredskab has decided how this contribution will be financed amongst its member institutions, based on their capital base and insured activities. Banks are allowed to pay their contribution to the financing of the guarantee scheme in their own shares.

The government also implemented a ban on short-selling of shares in Danish listed banks.

Mortgage market and pension funds

On 31 October 2008, the Ministry of Economic and Business Affairs and the Danish Insurance Association agreed to let pension funds, which hold about 27% of outstanding mortgage debt, raise the discount rates for calculating future obligations to partially incorporate the development in mortgage bond rates. This reduced the gap between developments in assets and liabilities and thereby the need to divest mortgage bonds, alleviating pressure on the mortgage bond market.

Credit Package Agreement – Bank Rescue Package II

The Danish parliament passed a law on 3 February 2009 under which all credit institutions in Denmark that comply with the statutory solvency requirements could apply for state-funded capital injections. The injection is in the form of hybrid core capital and will attract a rate of interest, calculated on the individual bank's rating, capital adequacy and liquidity risk, varying between 9% and 11¼ per cent. Applications for the capital injections closed on 30 June 2009. A total of 50 institutions applied for DKK 63 billion in total. Banks and MCIs may redeem the loans after three years, and there will be financial incentives to do so. In addition, institutions have the option to convert the injection from hybrid core capital to share capital under certain circumstances.

Box 1.2. **Financial stability measures** *(cont.)*

Danmarks Nationalbank's measures

Danmarks Nationalbank has taken a number of measures to ease liquidity restrictions, mainly focused on the types of securities that can be used as collateral in daily and weekly monetary policy operations. First, Danmarks Nationalbank established a temporary facility enabling banks and mortgage-credit institutes to borrow against a new type of loan bills issued in Denmark. Financial institutions can borrow by issuing these loan bills and the institutions that purchase them can use them as collateral for borrowing from Danmarks Nationalbank. Second, banks and mortgage-credit institutes may borrow at Danmarks Nationalbank on the basis of their excess capital adequacy (the difference between the base capital and the capital need), less a margin of 1 percentage point. Third, Danmarks Nationalbank further expanded the collateral base for borrowing by banks and mortgage-credit institutes to include quoted shares, investment fund shares, junior covered bonds and bank and junior covered bonds issued under the government guarantee scheme. The temporary credit facilities will run until 30 September 2010, but the arrangement for securities issued under the government guarantee scheme will last until 31 December 2013.

In addition to these measures, the central bank has taken a number of steps to improve liquidity in foreign exchange markets. Danmarks Nationalbank and the US Federal Reserve agreed on a swap facility of $15 billion, which expires on 1 February 2010. Danmarks Nationalbank has concluded a similar agreement with the ECB in order to improve the liquidity conditions in the euro short-term funding markets. This agreement totals € 12 billion and will be in force for as long as necessary.

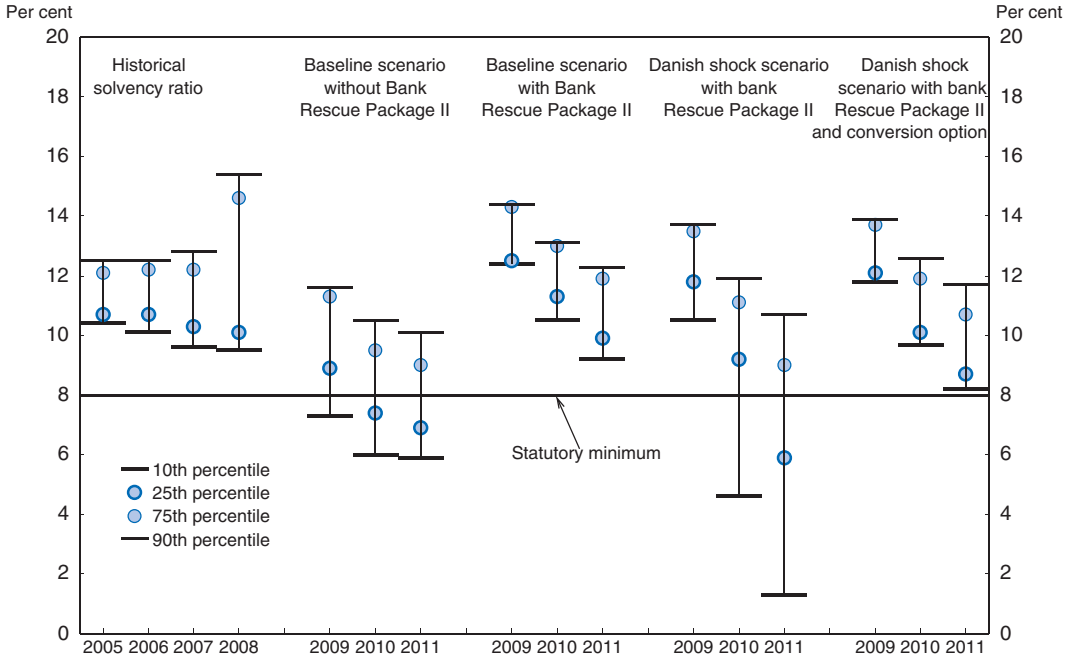
Other measures

In February 2009, it was decided that private firms can postpone payment of VAT and income taxes, in order to improve non-financial corporations' access to liquidity. Moreover, the possibility was granted to households in March 2009 to withdraw money from the compulsory private Special Pension savings scheme (see below) helps alleviate their liquidity constraints. In September 2009, a new initiative (*Erhvervspakken*) aimed at small and medium-sized enterprises was launched, setting aside DKK 4.2 billion to improve export credit facilities, the existing loan guarantee schemes and access to venture capital, and to promote public-private partnerships to develop new market-based solutions for the welfare sector.

Source: European Commission (2008a), Ministry of Economic and Business Affairs and Ministry of Finance (2008); Danmarks Nationalbank (2009b) and various press releases.

capital in the calculation of bank solvency. Also, banks earnings improve if the injections are converted to share capital, since they then no longer have to pay interest on the injection (Danmarks Nationalbank, 2009b). The FSA can forcibly convert the hybrid core capital injection from the government in the case of a financial institution in distress. Banks choosing an option to convert their capital injection will pay a fee to the government, which may then effectively become a common shareholder in the bank. If the full amount of hybrid core capital injections made by the government is converted to share capital, the Danish government would become a major shareholder in some banks. This comes on top of the ownership interest in financial institutions the government has acquired through the fact that some institutions may have paid for their contribution to the government guarantee fee with their own shares. There will be a need to clearly

Figure 1.14. **Impact of Bank Rescue Package II on bank's solvency ratios**[1]



1. Solvency ratio is core capital plus supplementary capital (total capital base less statutory deductions) as a percentage of risk-weighted assets. The statutory minimum is 8%. Figures for 2009 to 2011 are based on the scenarios described in Table 1.2. The analysis was undertaken prior to the closure of applications for capital injections, so is based on estimates of the amount offered. The analysis covers the 14 largest banks.

Source: Danmarks Nationalbank (2009b).

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articulate how these ownership interests will be managed. A timetable for their eventual divestiture will be important to send a clear message that the government does not intent to retain ongoing ownership after the crisis has passed.

In the meantime, the key question is to what extent the arrangements put in place by the government and central bank can alleviate credit constraints. The first bank package envisages a bank rescue arrangement whereby the state effectively takes over a bank that does not fulfil the statutory solvency requirements and has no possibility of reaching a viable private solution. It provides an incentive for distressed banks to seek pre-emptive private-sector solutions since shareholders of a wound-up bank lose control of it. Eligibility requirements are designed to reduce domestic and cross-country "beggar-thy-neighbour" effects (IMF, 2008). Since the industry bears the first tranche of losses, this should encourage banks to prudently manage their risks and provides for a type of moral suasion between banks. At the same time, the systematic blanket government guarantee increases market certainty but reduces incentives for institutions to manage recovery efficiently. It is also not focused on those assets which are distressed, but covers all creditors except in covered bonds and subordinated debt. Bank Rescue Package II reduces the likelihood of a bank's capital falling below statutory capital requirements, so reduces the likelihood of having to make further use of the first package's winding-up arrangements.

However, there is no guarantee that the existing arrangements are sufficient to deal with a situation where – in addition to the issues addressed in the two banking sector initiatives – impairment of asset values on banks' balance sheets significantly hampers a

return to normal credit provision. In such a situation, separating good and bad assets is a possible solution, which has been adopted in some countries, To some extent, Denmark's Financial Stability Company, which is dealing with toxic assets in non-performing banks and the capital injections in performing banks, can be seen as a substitute for a specific toxic asset programme, especially in a context where asset prices have tended to stabilise or recover (as has been the case since Spring). Even so, it could be argued that the response put in place explicitly covers only two of the three steps required to deal with a bank solvency crisis (Blundell-Wignall *et al.*, 2008). The missing step is a process of separating good assets from bad assets and removing the latter from financial institutions' balance sheets (Box 1.3).[2] Government purchases of toxic assets raise some design issues and practical difficulties, with respect to the identification of eligible assets, their pricing and how to manage them efficiently up to and following the purchase. However, government purchases also have some merits, not least in that they can generate important externalities and reduce risk spreads in a number of different markets and could encourage private injection of capital by reducing uncertainty (Furceri and Mourougane, 2009).

Box 1.3. **Approaches to dealing with "toxic" assets**

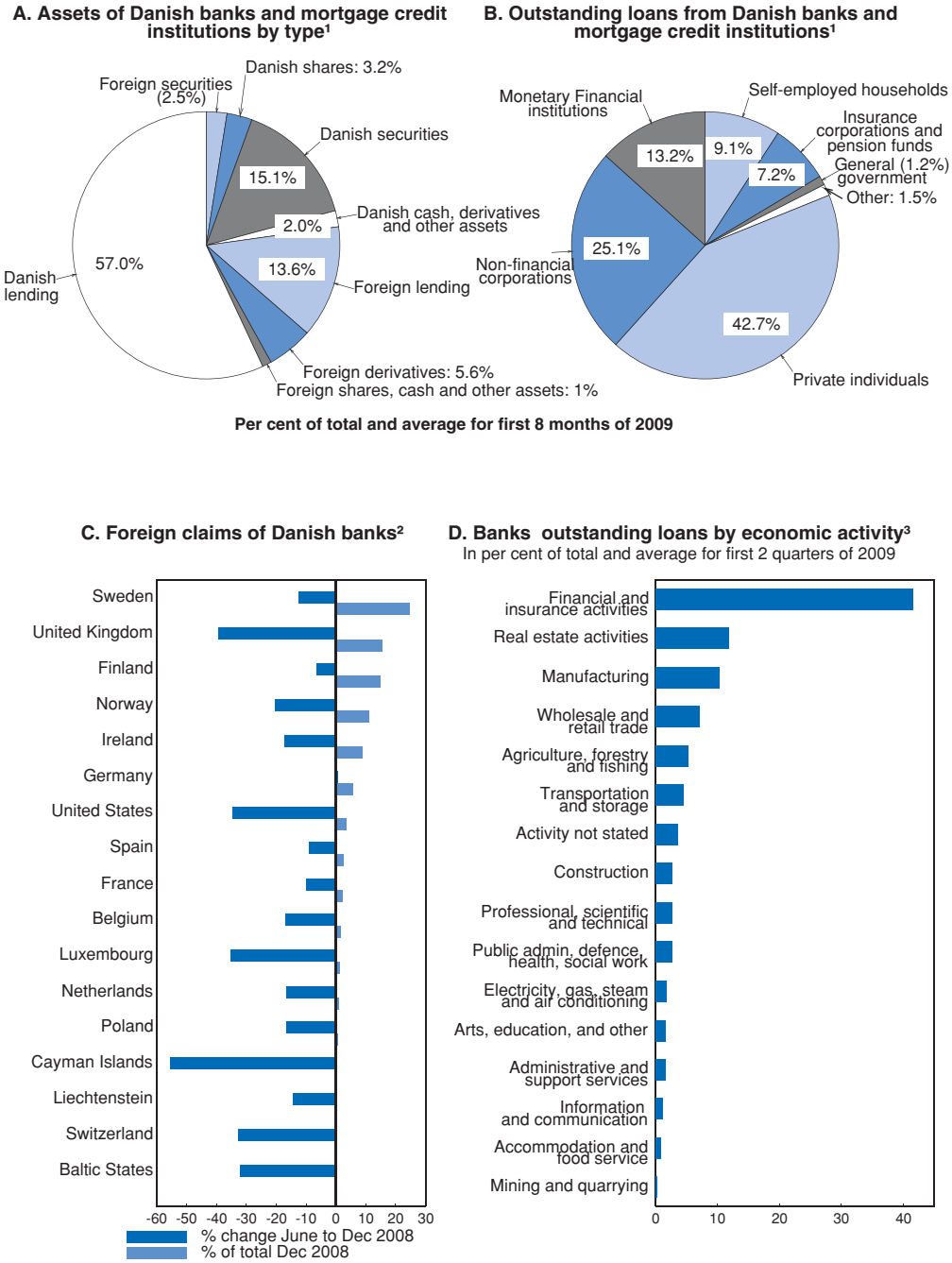
There are at least two broad approaches to dealing with toxic assets. One approach, followed in the United States and the United Kingdom, is to ring-fence troubled assets and provide a government guarantee for those assets. Separating bad assets allows the bank to continue to lend to creditworthy businesses and households. It has the advantage of not requiring upfront disbursement of public money. An argument for leaving assets on the bank balance sheet is that the bank has better knowledge of the borrower and might be in a better position to re-establish the credit relationship if the loan is eventually repaid. However, keeping government-guaranteed troubled assets on the balance sheet or in individual special purpose vehicles reduces the incentive for the parent company to maximise recovery rates and may undermine market confidence in the parent bank. If forced to manage the bad assets, the bank might become overly risk averse and refrain from lending in an attempt to rebuild capital.

The second approach is to create a bad bank with a centralised asset management company which would buy troubled assets from banks. The bad bank approach increases incentives to maximise recovery rates and can create economies of scale in the recovery process. However, this approach requires ample upfront capitalisation and pricing of hard-to-value toxic assets. The bad bank approach requires the restructuring entity to have the legal backing to exercise claims on assets and to recover the proceeds of asset sales. This can be achieved by purchasing the assets with government-guaranteed bonds, under the assumption that the entity will dispose of the assets before the bonds mature, at which point the proceeds of the sale can be used to retire the bonds. Another arrangement has been for the asset management company to be funded separately upfront, as in Sweden in the early 1990s, which then uses its capital to purchase non-performing loans.

Sources: OECD (2009d), Lumpkin (2008).

In order to determine whether there is a need for a specific strategy for dealing with impaired assets, a thorough assessment of financial institutions' balance sheets is required to gauge the scope of these assets and the extent to which asset quality is impaired (Figure 1.15). In both the United States and the European Union, bottom-up stress

Figure 1.15. **Assets of Danish financial institutions**



1. The figures for Danish banks and MCIs are simple additions of the two sectors and do not net the positions between the two sectors. Values shown are the averages for the first eight months of 2009.
2. The foreign claims data measures Danish banks' claims in the mentioned countries on an intermediate claims basis – that is, excluding the value of any collateral or guarantees.
3. Banks' outstanding loans by economic activity covers a sample of large institutions and not the whole sector. Arts, education and other includes Education, "Arts, entertainment and recreation", "water supply, sewerage and waste", "other service activities", "activities of households as employers", and "activities of extraterritorial organisations and bodies".

Source: Danmarks Nationalbank and Bank for International Settlements.

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tests have been conducted on individual financial institutions in order to assess their need for capital injections. In the United States, these results were published but those institutions that were assessed as needing additional capital received it immediately in order to avoid negative market reactions. In the European Union, the results of the stress tests will not be published. The stress tests carried out by Danmarks Nationalbank are based on a top-down approach, where the analysis considers aggregate exposures and other factors and the results are allocated to individual institutions (Danmarks Nationalbank, 2009b). Consideration should be given to whether a bottom-up stress test exercise, which was carried out in the context of the Financial Sector Assessment Programme in 2006 (IMF, 2007b), should be conducted to evaluate whether individual financial institutions are sufficiently capitalised to absorb losses arising from impaired loans.

While it may help as a temporary measure, a ban on short selling could reduce the efficiency of financial markets in the longer term. There are some signs that such bans imposed in the United States and United Kingdom have affected the efficiency of the stock market, although recent evidence for Germany suggests that there has been minimal negative impact there (ECB, 2009). The breadth of coverage may be important – in Germany the ban covered naked short selling (that is, where the seller did not own or had not borrowed the shares) of a limited number of institutions, while in the United States and United Kingdom, it applied to both naked and covered (where the seller has borrowed the shares) short sales. In Denmark, the ban applies to all banks and both naked and covered short sales. The Danish government has indicated that the ban will be lifted when market conditions have normalised.

Medium-term issues resulting from the crisis

The global financial crisis has led to considerable efforts to reshape financial sector regulation frameworks. Most important for Denmark, as a member of the European Union, is the work around and following from the "Larosière report" on EU financial supervision, but also of the Financial Stability Board, the Basel Committee on Banking Supervision and the G20. Key areas of focus are reducing the cyclicality of the financial system, increasing transparency and strengthening financial market regulation.

Avoiding procyclical regulation. Under the Basel I accord, minimum capital requirements on a given portfolio were fixed and became binding with a fall in a bank's capital following credit losses. Under the new Basel II system, they become binding through an increase in minimum requirements as loans become more risky. At the point in the cycle when banks are most likely to record losses, the minimum capital requirements can increase, which would accentuate any slowdown in credit growth brought about by capital losses and perceived declines in the creditworthiness of potential borrowers (Lawson *et al.*, 2009). Cushions should be built up in upswings to be relied on in rough times. This would enhance institutions' ability to weather deteriorating economic conditions when access to external financing becomes more costly and constrained. Moreover, it would reduce the amplitude of the financial cycle, limiting the risk of financial distress in the first place. Such an approach would help make it clearer that risk rises in booms, paving the way for the subsequent busts (Borio, 2008).

A specifically Danish issue that needs to be considered in the context of the cyclicality of capital requirements is the role of the new SDO mortgage bonds. As explained in Box 1.1,

a key difference between SDOs and the previous mortgage bonds is the requirement that additional capital be posted to the cover pool when the value of the collateral falls relative to the value of the loan. Hence, financial institutions have to raise additional capital during downturns, adding to the cyclicality of capital requirements. As of the end of February 2009, MCIs had sufficient capital to provide additional top-up collateral to SDO cover pools equivalent to 6% of total outstanding SDO without issuing new debt. However, the requirement for top-up collateral is larger the more uneven the distribution of house price changes. The legislation for SDOs is currently under review. Danmarks Nationalbank has recommended lowering the LTV limit from 80% to 70% as a way to reduce the cyclicality in the SDO legislation (Danmarks Nationalbank, 2009b).

In Denmark, as in some other countries (Sweden, Finland, Netherlands), regulations designed to protect participants in pension plans may force asset sales on falling markets. The October 2008 agreement between the Ministry of Economic and Business Affairs and the Danish Insurance Association to adjust the discount rate used in liability calculations helped reduce the impact of falls in mortgage bond prices on pension funds' investment strategy by allowing the value of the liabilities to move more closely with the assets. However, as with capital-adequacy requirements for banks, more systematic ways should be sought to introduce more countercyclical capital requirement regulations and reduce the need for ad-hoc adjustments.

Enhancing transparency. In general, transparency of financial reporting of financial sector activities could be enhanced, with a focus on three types of information: estimates of current value, income, and cash flows; their statistical dispersion; and the uncertainty associated with the imperfect measurement of the first two types of information. This could remedy some of the shortcomings of reliance on rating scales (Borio, 2008). As part of the Credit Package, new regulation has been introduced, requiring all credit institutions to publish their internal capital adequacy assessment process (ICAAP). Furthermore, the crisis has put the spotlight on transparency of liquidity risks. In June 2008, the Basel Committee and the Committee for European Banking Supervisors published new principles and recommendations on liquidity risk management. The government is currently in the process of implementing the EC directive drawn up along those lines.

Efficient supervision. The significant number of smaller institutions that have been merged or taken over suggests that additional efforts are required on the part of financial supervisors to monitor medium- and small-sized institutions. This is important from the perspective of financial stability but also to ensure ongoing effective competition in the financial sector. Denmark already had high degree of banking and mortgage sector concentration before the crisis began. Higher concentration may increase the risk to financial stability via contagion and could potentially result in a reduction in competition, and a loss to welfare, via higher interest margins between bank borrowing and lending. Bank interest rate margins have been declining since 2003 and reached historically very low levels in 2008 (Danmarks Nationalbank, 2009c). In the short term, higher margins are to be expected, as banks seek to offset the fall in profits, but in the long term, margins should appropriately reflect the risks and costs borne by the institutions rather than higher mark-ups due to weaker competition. Cross-country studies on prudential regulation in banking shows a positive and statistically significant negative correlation with net interest margins, suggesting that stronger prudential regulatory supervision, particularly the ability

to execute on-site visits, is consistent with more competition (OECD, 2009e). Currently, large institutions are subject to a comprehensive examination over a four-year cycle, medium-sized institutions are examined at least every fourth year and smaller low-risk institutions are examined every seventh year (IMF, 2007c).[3] A recent National Audit Office report called for the Danish FSA to supplement technical ratings of financial institutions based on annual reports with quarterly data to ensure that more up-to-date assessments can be prepared. The report also argued that the FSA generally has sufficient resources, but has had difficulty attracting and retaining qualified staff, which may be affecting its ability to carry out on-site visits (Rigsrevisionen, 2009). The resources of the FSA were increased both as part of Bank Rescue Package I and in the context of the Credit Package. Furthermore, the tools of the Danish FSA have been strengthened as part of the Credit Package.[4]

Fiscal policy

The fiscal position has been very strong in recent years, thanks to a forward-looking fiscal framework and to the buoyancy of the economy, increases in oil and gas tax revenue driven by high commodity prices, company tax and the pension yield tax on unrealised capital gains on pension fund earnings. The underlying balance corrected for temporary factors has also been strong. The government's *2015 Strategy*, announced in 2007, set targets for general government net lending of surpluses of ¾ to 1¾ per cent of GDP between 2008 and 2010 and at least balance between 2011 and 2015. Annual targets for real growth in public consumption have also been set, and the objective is for public consumption spending come down to 26½ per cent of cyclically-adjusted GDP in 2015. The targets were determined on the basis on an analysis of fiscal sustainability, using an indicator similar to the one used by the European Commission in monitoring of fiscal policy under the Stability and Growth Pact (European Commission, 2008b). With fiscal surpluses in recent years having been applied to reducing government debt, general government net financial assets were over 5% of GDP in 2008. However, the budget balance is now set to deteriorate sharply and the financial and economic crisis has led the Government to redefine the 2015 Strategy targets, with the most recent budget update indicating that the government intends for the structural fiscal balance to be zero by 2015 (Danish Ministry of Finance, 2009c). Spelling out targets for the intervening years and identifying some specific consolidation measures would help.

Stimulus

The fiscal policy response to the recession has been substantial, even though Danish automatic stabilisers are the largest in the OECD (Girouard and André, 2005), reducing the need for discretionary policy relative to countries with smaller automatic stabilisers. At the same time, discretionary fiscal policy measures are likely to be more effective than in some other countries because of the strong, credible and forward-looking fiscal policy framework. Measures taken so far in response to the crisis have focused on tax cuts and a sizeable frontloading of investment spending, while public consumption also rose substantially (Table 1.5). The increase in consumption spending may be problematic, since previous experience suggests that it has been very difficult to wind back increases in public consumption outlays (OECD, 2008a). Deliberate under-financing of a long-term-oriented tax reform package is an astute strategy. The tax cuts will be implemented in 2010 but financing measures to completely offset the budget impact of the tax cuts will be phased in so that the package is budget-neutral by 2013 (Box 1.4). If implemented efficiently,

Table 1.5. **Fiscal measures affecting 2009 and 2010**

% of GDP	2009	2010
Revenue measures	0.6	1.2
Spring Package 2.0 (including green cheque)		0.7
2007 Tax Package	0.3	0.4
Other revenue measures	0.3	0.1
Expenditure measures	1.3	1.9
Public consumption	0.7	1.0
Public investment, including transport and local governments	0.3	0.5
Public subsidies, including home repair incentives	0.2	0.1
Other expenditure measures	0.1	0.2
Net effect	1.9	3.1
Memorandum item		
Withdrawal from Special Pension scheme[1]	1.5	

Note: The items "2007 Tax Package" and "Other revenue measures" were not included in the tables indicating the size and timing of fiscal packages in either OECD *Economic Outlook* No. 85 nor the March 2009 *Interim Economic Outlook* since they were decided prior to mid-2008 and were not implemented specifically in response to the crisis. However, they do impact on net lending so need to be taken into account in assessing the overall stance of fiscal policy and the need for further discretionary measures.

1. Indicates the estimated post-tax value of the addition to disposable income from withdrawals of assets in the Special Pension scheme based on applications to mid-August 2009.

Source: Danish Ministry of Finance and *OECD Economic Outlook No. 85 Database*.

Box 1.4. **The Spring Package 2.0 tax reforms**

The Danish government reached an agreement with parliamentary partners in March 2009 on a major tax reform package. Its main elements were:

- A reduction in the bottom state income tax rate of 1.5 percentage points (the bottom tax bracket and the health care contribution have been merged, eliminating a difference in the tax bases applying to these two elements of the tax system).
- The abolition of the middle state (central government) income tax bracket (which currently contributes 6 percentage points to the overall marginal income tax rate).
- An increase in the income threshold for the top marginal tax rate. The combination of reduced bottom state tax rate and the abolition of the middle tax bracket results in a reduction of the top marginal tax rate of 7.5 percentage points. Positive net capital income less than DKK 40 000 per year will no longer be subject to the top tax rate.
- The tax rate on income from shares is reduced from 28 to 27% for people in the bottom tax bracket and from 45 to 42% for those in the top bracket.

Financing will come from a reduction in tax deductibility of interest (from about 33.5% to 25.5% above a certain threshold), a reduction in the tax value of employment-related deductions, the elimination of the tax deduction for employees whose home multimedia services are paid for by their employer, higher environmental taxes paid by businesses and health-promoting taxes (excise on ice-cream, chocolate, carbonated drinks, tobacco, etc.). In order to partly offset the impact on consumers of these higher taxes, a "green cheque" will be issued to everyone over 18 years old worth DKK 1 300 (about € 175) plus DKK 300 per child, with a 7.5% reduction applicable to people earning over DKK 360 000. Consumers who economise on consumption of the now more highly taxed items will gain as the compensation they receive will be greater than the additional tax they end up paying on environmentally harmful products.

The package also includes a measure to allow businesses to defer VAT and labour tax remittances within the current year to help ease credit constraints on business, as well as a repair and renovation scheme for private homes and an increase in municipal investments for 2009.

Source: Danish Ministry of Finance (2009a).

increased investment spending can also be beneficial, since the multipliers associated with infrastructure investments tend to be higher than for other fiscal measures (OECD, 2009a) and there is some evidence of an infrastructure backlog (Danish Infrastructure Commission, 2008). Chapter 2 discusses the slowdown in capital deepening as an explanation for weaker productivity growth over the last decade. The current recession will be associated with a significant fall in business investment, so it would take some time for private sector-led capital deepening alone to pick up the slack in productivity growth. Large-scale investment in infrastructure is also an opportunity to foster green growth, as recognised by the government (Box 1.5).

Box 1.5. **Green growth**

The OECD Strategic Response to the Financial and Economic Crisis highlighted the opportunity presented by the recession to implement structural reforms with long-lasting benefits, notably to improve energy efficiency and develop new green industries and businesses. This issue was recognized at the 2009 OECD Ministerial Meeting, with a declaration on Green Growth signed by all 30 OECD countries plus Chile, Estonia, Israel and Slovenia.

The Danish government has recently announced several new measures to promote a "green" recovery. In late January 2009, the government announced a "green transport" initiative to follow up on a transport policy framework announced in December 2008. It involves spending of DKK 94 billion (5.4% of 2008 GDP) on infrastructure over 2009-20, the near-term elements of which form part of the government's fiscal policy response to the financial crisis. The investment will be focused on upgrading rail transport infrastructure in an attempt to reduce car use; eliminating road congestion hot-spots; further investment in cycle ways; and investment in port infrastructure.

The government also reached agreement with its parliamentary partners in June 2009 on a "green growth" initiative with new measures focused on improving the environmental performance of the agriculture sector. Measures include introducing a new transferable quota system for nitrogen; creating more nature reserves, wetlands and buffer zones around farmland; additional investments in R&D in the agriculture sector; and measures to improve water quality and reduce the harmful effects of pesticides. In total, the initiative will involve spending of DKK 13.5 billion (0.8% of 2008 GDP) over 2010-15.

Furthermore, financing measures from the Spring Package 2.0 tax reforms are also designed to reduce consumption that is harmful to the environment. Key measures include increased taxes on electricity and energy for heating and cooling, increased pollution taxes on waste water and greenhouse gases, the introduction of green transport charges in road haulage, changes in vehicle ownership and registration taxes, and auctioning of CO2 quotas rather than giving them away for free.*

A home repair and renovation incentive was also introduced as part of the Spring Package 2.0. It provided up to DKK 1.5 billion to finance individual household investments in home renovation, with a focus on energy-saving modifications. For energy-saving investments, a subsidy of 20% of the cost of materials is added to the general 40% subsidy on labour expenses available under the programme.

* The tax increases in electricity consumption have been criticised. Production of electricity is included in the EU Emission Trading Scheme (ETS), thus the electricity tax might reduce Danish electricity consumption, but it will encourage households and corporations to substitute towards heating by other fuels, which are not included in the EU ETS. This will lead to more emissions at the European level and make it harder for Denmark to reach the greenhouse gas reduction goals for the part of the economy not included in the EU ETS (Danish Economic Council, 2009).

The Danish government has allowed firms to delay remittance of the VAT collected from customers and income tax paid by employees. With sales and business income falling and credit markets unsettled, even sound businesses can lack liquidity. In this context, deferring tax payments can help avoid the need for businesses to lay off staff. However, as with many temporary measures, there is a risk that the elimination of the measure may have negative impacts – hence it has already been deferred from mid to end-2009 and there have recently been calls for a further extension.

The measure allowing individuals to withdraw savings from the compulsory private Special Pension (SP) scheme could provide a significant boost to demand, if the withdrawn funds are spent.[5] They are most likely to be spent by credit-constrained households and survey evidence suggests that around half of these funds is indeed being used for consumption purposes.[6] The remainder is being shifted to other forms of savings. Tax is payable on withdrawals from the SP scheme, but deposits into another pension scheme are tax-deductible. Furthermore, the tax value of the deductibility of interest on debt will be reduced in the tax reforms coming into effect in 2010, so some households might use the SP funds to reduce debt levels. As a result, the magnitude of the net positive impact on the economy is uncertain. The impact on the government's fiscal balance will be positive and substantial in the short term but will weaken sustainability slightly.[7]

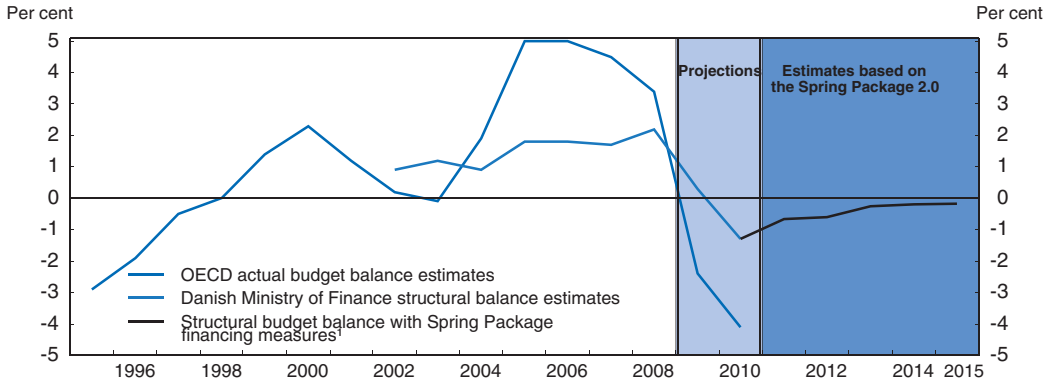
With unemployment on the rise, there is a risk that active labour market measures may not function as well as normal due to resource constraints in the public employment services (Danish Economic Council, 2009). While resources in local job centres were not cut back when labour market demand was strong, so that existing resources might be sufficient in the short term, there is a risk that they may not be sufficient to cope with the expected substantial rise in unemployment, or could be diverted to other uses by local governments facing budget pressures. Careful monitoring of performance of local job centres will be required.

Despite the uncertainty associated with some announced measures, further fiscal stimulus is probably not warranted at this stage. Substantial stimulus is already in the pipeline – whose impact should increase throughout the rest of this year and next – and the budget balance is expected to weaken considerably, although less than in some other OECD countries. A modest recovery is anticipated and some short-run indicators are already suggesting that the worst of the downturn has past. However, with a high degree of uncertainty persisting, further measures should not be categorically ruled out, although their limitations should be recognised. If the credible reputation of fiscal policy in Denmark were to be jeopardised, the cost in terms of rising borrowing costs could be significant and counter the stimulative effects of fiscal and monetary easing. In addition, it is important to bear in mind the impact of any further fiscal measures on wage inflation in view of the ongoing loss in wage competitiveness and on the necessary subsequent consolidation

Fiscal sustainability

The discretionary measures taken in recent years and other factors have reduced the structural budget balance so that in 2010 it is expected to be well below the bottom end of the target range enshrined in the *2015 Strategy*. The financing measures introduced in the tax reform package outlined in Box 1.4 mean that net lending improves already in 2011 and continues to do so up to 2015. However, reversal of the temporary increase in investment as part of the fiscal stimulus and implementation of the Spring Package 2.0 measures alone will not be sufficient to restore net lending zero by 2015 (Figure 1.16). In coming years, the

Figure 1.16. **Actual and structural budget balance and 2015 strategy targets**



1. The series "Structural budget balance with Spring Package 2.0 financing measures" projects forward the Danish Government's structural balance estimate assuming that the additional investment spending as part of the fiscal stimulus is reversed already in 2011 and that the financing initiatives included in the Spring Package 2.0 are fully implemented. No other policy or structural changes are accounted for.

Source: OECD Economic Outlook No. 85 Database and Danish Ministry of Finance (2009b).

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structural balance may deteriorate even further as a consequence of demographic changes and declining North Sea oil and gas production, although dynamic effects from the recent tax policy changes might work in the opposite direction. Therefore, even with all of the consolidation measures built into the tax reform package, further fiscal consolidation will still be required.

Measures to cut public spending will have to be a key part of the consolidation effort. The share of public consumption in GDP is projected to reach 28.7% of GDP in 2010 (Danish Ministry of Finance, 2009b), above the target of 26½ per cent, which applies in 2015. There are no mechanisms built into the *2015 Strategy* to bring it back to target. As discussed in the previous *Survey*, public consumption grew twice as fast as had been planned in the *2010 Strategy*, which preceded the *2015 Strategy*. This growth in consumption was accommodated by relatively strong tax revenues, sustained by increasing working hours and high consumer spending, but also by the extremely large gains in revenue stemming from rising commodity and asset prices as well as changes to the North Sea tax regime (OECD, 2008a). Gains from rising commodity and asset prices cannot be relied upon in coming years.

A further option for improving the budget position in the long term, as well as improving the neutrality of the capital tax system, would be to raise property taxes. Currently, the effective central government real estate tax rate is merely around ½ per cent (OECD, 2006). Around 3.8% of total Danish tax revenue is collected from property taxes (including land, real property, estate and financial transaction taxes), compared to an OECD average of 5.7% (OECD, 2008b). Recurrent taxation of immovable property is thought to be the least harmful tax for economic growth. In fact, well-designed taxes on immovable property can even increase long-run growth by reallocating capital away from tax-subsidised housing towards more productive business activities (Johansson *et al.*, 2008). However, any such measures would need to wait until the property market is clearly recovering.

Labour market policies

In recent years, labour market policies have focused on boosting labour supply in order to contribute to long-run fiscal sustainability. With the very tight labour market in 2007-08, emphasis was also put on adding to the labour supply in the short term, such as through the 2008 Job Agreement, which included changes to supplementary unemployment benefits, tax relief for 64-year olds who stay in work and greater efforts towards international recruitment (Danish Government, 2008).

Despite the current recession and rising unemployment, continued focus on boosting labour supply in the medium term is crucial. The fiscal targets in the government's *2015 Strategy*, designed to ensure fiscal sustainability, are based on an increase in un-subsidised employment of 20 000 by 2015 and maintenance of the existing average hours worked. The tax reform package described in Box 1.4 is estimated to raise full-time employment by enough to add 0.3% of GDP to the budget balance – about two-fifths of the overall requirement of the *2015 Strategy*. However, the likely impact of the recession on structural unemployment will make achieving the *2015 Strategy* goals more difficult – further measures to enhance labour supply will be necessary once the economy begins to recover. Hence, the recommendations of the Labour Market Commission, established to provide recommendations for meeting the *2015 Strategy* employment goals, will be even more important now than when the Commission was first established.

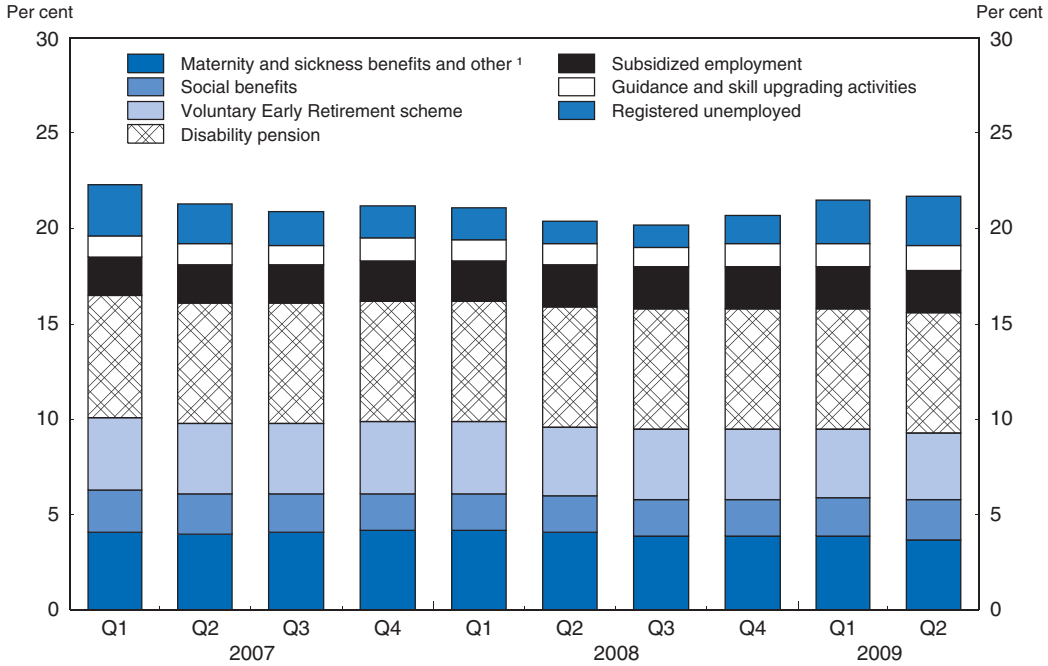
Policies to cushion the rise in structural unemployment should focus both on limiting the rise in actual unemployment and on reducing the risk that actual unemployment turns structural. The combination of active labour market programmes (ALMPs) and benefit reforms has played a key role in the fall in structural unemployment observed over the past decade (OECD, 2008a). ALMPs have four distinct effects on the probability of unemployed people finding work: the threat effect, the locking-in effect, the post-programme effect and the wage effect.[8] Normally, the largest gains from ALMPs are thought to come from the threat effect and, to a lesser extent, the post-programme effect from participation in private-sector subsidised employment. With weak demand for labour, the threat effect is likely to be unusually feeble. This means that unemployment duration may be longer than normal and so more of the unemployed may end up participating in ALMPs. At the same time, the lock-in effect is not likely to be as much of a problem since there is less risk of participation in an ALMP resulting in missed employment opportunities. These factors raise the demands on job centres and heighten the need for careful consideration of the most effective programmes for each individual. While private sector job placements are normally thought to be effective, there is a risk that publicly-subsidised employment may hinder structural adjustment by reducing the employment costs of firms that are likely to be unprofitable even when the economy recovers. This calls for careful targeting of subsidised job placements.

Concerns have been raised about the likely impact of the decentralisation of job centres at the current juncture. From August 2009, employment policies will be implemented through local government employment services. This reduces the previous distinction between national offices, administering benefits for insured unemployed people, and local offices, administering benefits for social welfare recipients – all unemployed will now be dealt with by the same agency within a local government area. However, it raises the risk of increased diversity in the services offered between different municipalities, although arrangements have been put in place to monitor consistency with

national employment policies. Municipalities will be funded according to how many unemployed people participate in ALMPs, raising the risk that some unemployed might be forced to participate in ALMPs too early or too often (Danish Economic Council, 2009). It may also lead to local employment offices focusing too narrowly on their own area to the detriment of labour mobility (OECD, 2008a).

Despite the tight labour market of recent years, there remain some 800 000 people, about 22% of the working-age population, who are not in ordinary employment – they are either unemployed, participating in an activation programme, on disability pension, on sickness benefits or in early retirement. So far, the downturn in the labour market has primarily resulted in higher registered unemployment. Since these people have not been unemployed very long, many of them would not yet have been referred to activation programmes (Figure 1.17).

Figure 1.17. **Proportion of the working-age population not in regular employment**



1. The category "Maternity and sickness benefit and other" includes people receiving holiday benefits (unemployment insurance fund members and people receiving municipal cash benefits for sickness or maternity leave earn entitlement to paid holidays while unemployed) and participating in integration (language training). The data on people not in regular employment covers the population aged 16-66 while the data on working age population covers people aged 15-66.

Source: Statistics Denmark Table AUK04 and AKU01.

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There is a risk that the rise in actual unemployment could permanently reduce labour supply due to newly-unemployed people moving into voluntary early retirement or disability pension. People over 60 who become unemployed face a relatively small income reduction if they move into the voluntary early retirement pension (VERP, *Efterløn*) scheme and so could effectively permanently withdraw from the labour market. People in their late 50s who become unemployed might have less incentive to search for a new job and may rather simply move into the VERP once they reach 60. Over the current decade, on

average, Danish unemployment rates have been below the OECD total for each 5-year age cohort from 15 to 64, except for 55-59 year olds. The share of the population aged 55 to 66 has risen from 17% in the late 1990s to almost 23% in 2008, so greater incidence of withdrawal from the labour market by older people would now have a larger effect on the overall labour supply. While the connection between the state of the labour market and disability benefit recipient numbers might be looser, the proportion of the working-age population receiving disability benefits has declined over the past decade, whilst the labour market was strong. It would be unfortunate if the downturn in the labour market increases the incentive for people with minor disabilities who are laid-off to seek permanent disability pension entitlement rather than staying attached to the labour market, or increases the incentives for firms to seek flexjob subsidies for people who have some disability but are currently coping with a regular job.

The Labour Market Commission, in its final report in August 2009, proposed a range of measures to boost labour supply (Box 1.6). Proposals include completely phasing out the VERP, reducing the period of unemployment benefit eligibility and introducing earlier compulsory activation. The Commission also recommended that local government funding be reformed to remove incentives to move the unemployed into the most expensive activation programmes and that resources for ALMPs be separated from local government administrative budgets to ensure that activation resources are not diverted to other uses in downturns. The Commission's recommendations, if adopted in full, are estimated to improve the budget balance by around DKK 27 billion per year, almost twice the amount required by the 2015 Strategy. The largest gains would come from encouraging older people to work longer and speeding up return to the labour market after unemployment (Labour Market Commission, 2009).

Box 1.6. **Recommendations of the Labour Market Commission**

The Labour Market Commission was established in 2007 to provide recommendations on how to achieve the employment goals required by the government's 2015 Plan for fiscal policy. The Commission's final report was released in August 2009 and included, amongst others, the following recommendations:

- The Voluntary Early Retirement Pension (VERP) scheme should be completely abolished *via* a gradual rise in the entry age until it is equal to the normal retirement age. A range of alternatives were proposed, including bringing forward, from 2019 to 2011, the start date of the existing agreement to raise the entry age to the VERP from 60 to 62.
- In order to raise working hours, new agreements between labour market participants should not include shorter working hours and should allow for the possibility to increase worked hours at unchanged hourly wages.
- To move the unemployed into employment faster, the unemployment benefit entitlement period should be cut from four to two years. However, the entitlement period could be extended during a recession to a maximum of three years. The arrangement whereby unemployed people under 25 receive reduced unemployment benefit rates should be extended to unemployed people between 25 and 29 without children. To ensure greater coverage of unemployment insurance, annual contributions to insurance funds should be reduced.

Box 1.6. **Recommendations of the Labour Market Commission** *(cont.)*

- To improve the effectiveness of active labour market policies, all unemployed people should be required to take a one-week job search training course within three months of becoming unemployed. There should be at least monthly contact between public employment offices and the unemployed during the first six months of unemployment.
- To help manage the inflow into disability pension entitlement, a new development path should be established for people who have negligible working capacity but whose working capacity can potentially be improved.
- The flex-job system, which subsidised firms who take people with reduced work capacity, should become more targeted and dynamic. Municipalities should receive reimbursement for the same proportion of the cost of a flexjob as for disability pension. People on disability pension should be given greater opportunities to participate in active labour market programmes.
- 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.
- To encourage earlier completion of education, students who complete their first year of tertiary vocational study within three years after completing upper secondary school should be paid a tax-free bonus of DKK 10 000. The current practice of allowing students to receive study grants for one year longer than the specified duration of their course should be terminated for students starting tertiary studies two years after finishing upper secondary school. The voluntary 10th form in the secondary school system should be targeted more carefully at students who are not capable of completing further study without extra help.
- To encourage more foreign workers, the income threshold of the Pay Limit scheme, where immigrants who have been offered a job above a certain income threshold face easier entry requirements, should be reduced from DKK 375 000 to DKK 300 000. The Positive List scheme, which identifies professions with labour shortages to target immigrant workers, should be expanded to people with shorter education periods and apprenticeships.

Source: Labour Market Commission (2009).

Many of these measures are consistent with recommendations in previous OECD *Surveys*. Reducing the unemployment benefit rate over the period of unemployment and/or reducing the period of eligibility for unemployment benefits would encourage unemployed back to work as quickly as possible. Earlier activation could be considered but should be combined with statistical profiling techniques to ensure that the unemployed are matched with the most appropriate course of action. At the same time, activation training programmes should be structured to allow continued job search and reduce the risk that job seekers miss employment opportunities due to activation commitments. If the VERP is not abolished, the income paid under this scheme could be reduced to encourage older workers to stay in the labour market past 60 years. The maximum flexjob wage subsidy should be equal to or less than the disability pension. The salary under a flexjob should be less than for an unsubsidised job – for example, flexjobs could pay a wage for the hours worked and an unemployment benefit for the hours not worked. Such measures would help prevent overuse of the flexjob scheme and encourage employees and employers to

seek viable solutions that are less costly to the public purse (OECD, 2008a). Some policy measures to improve active labour market policies and the administration of disability and sickness benefits have been introduced already 2009 (Annex 1.A2).

Measures such as these and the ones recommended by the Labour Market Commission will need to be introduced in the course of the projected economic recovery. However, planning and policy design need not wait until then and measures that will take time to produce noticeable results could be implemented already in the near term.

A key challenge ahead: reinvigorating productivity

The recession in Denmark is likely to be deep and have potentially long-lasting impacts on potential output. Significant efforts have been made since the mid-1990s to lower structural unemployment and the labour market policy framework should help minimise the long-term impact of the crisis on unemployment. Indeed, the expected transmission from unemployment into long-term unemployment, a key channel towards higher structural unemployment, is lower than in many other countries. However, further measures will be needed to offset the impact of the crisis on potential employment and help boost the fiscal position in the long term. The Labour Market Commission's final report provides numerous sound ideas, many of which are consistent with recommendations made in previous *Surveys* (Annex 1.A2 provides an update on progress of recommendations in previous *Surveys* and Annex 1.A3 lists the topics of focus in previous *Surveys*). The remainder of this *Survey* therefore focuses on productivity and how it can be raised:

- Chapter 2 analyses the possible reasons for the slowdown in labour productivity since the early 1990s. It also reviews the policy settings that are normally associated with strong productivity performance. These policy settings are generally sound, but some improvements can be made which should contribute to higher productivity growth in the medium term.
- Chapter 3 assesses developments in Denmark's human capital, focusing on educational attainment and developments in the demand for and supply of skills. The chapter then reviews the key stages of the education system and highlights areas for further progress. Key challenges remain in boosting educational attainment, reducing dropout rates in upper secondary and vocational education, and encouraging students to move into and through the tertiary education system faster.

Notes

1. This increase in leverage (defined as the ratio of total lending on equity in the sector) is similar to the one experienced in 1992.
2. The same can also be achieved by encouraging a larger institution to absorb a smaller one – this process has occurred extensively in Denmark.
3. In the large banking groups, at least one risk area is inspected each year and the FSA meets at least annually with their management.
4. Specifically, the Danish FSA can now publicize their supervisory actions against a particular institution, which should serve a disciplining purpose, and now undertakes a yearly investigation of each institution's ICAAP.
5. The measure is not likely to have a significant impact on retirement income policies, since it is a relatively small scheme and the pension system is generally well developed, with relatively high replacement rates expected in the future (OECD, 2008a).

6. See Alm. Brand (2009), ATP (2009) and Nykredit Markets (2009).
7. Considering the interest in withdrawing funds from the SP, there may be very little left in this scheme, which might lead to higher administrative costs for the remaining members. Hence, consideration could be given to rolling the remaining SP assets into the compulsory private Labour Market Supplementary Pension (*Arbejdsmarkedets Tillægspension,* ATP) scheme.
8. The threat effect is the increase in search effort brought about by the threat of having to participate in ALMPs. The locking-in effect comes about due to a reduction in the amount of time spent searching for a job due to participation in an ALMP. The post-programme effect is the expected positive implications for the chances of an unemployed person finding a job due to the training or experience they have received while participating in an ALMP. The wage effect is related to the threat effect – unemployed people may moderate their wage demands and take a lower paid job rather than participate in an ALMP. If this reduces economy-wide wages, it could lead to higher employment in general equilibrium.

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ANNEX 1.A1

Consolidation in the Danish banking sector during the financial crisis

The following is a list of the financial institutions that have been taken over, merged or wound-up since the start of 2008 (Danmarks Nationalbank, 2009a and 2009b):

January 2008: Sydbank acquires bank Trelleborg.

February 2008: Sparekassen Himmerland merges with St. Brøndum Sparekasse. Folkesparekassen acquires JAK Andelskasse Rødding.

March 2008: Sparekassen Sjælland acquires Haarslev Sparekasse.

July 2008: Danmarks Nationalbank provides a liquidity guarantee to Roskilde Bank, and Roskilde Bank is put up for sale.

August 2008: Danmarks Nationalbank and the Danish Contingency Association takeover the assets and liabilities of Roskilde Bank except subordinated loan capital and hybrid core capital.

September 2008: Danmarks Nationalbank and a number of private banks provide liquidity support to EBH Bank to enable it to continue its operations. Roskilde Bank's branch network is sold to Nordea (nine branches), Spar Nord Bank (seven branches) and Arbejdernes Landsbank (five branches). Nykredit Realkredit announces that it will acquire Forstædernes Bank but the latter continues to trade as an independent entity. Handelsbanken i Danmark (a subsidiary of the Swedish bank Svenska Handelsbanken) announces that it will acquire Lokalbanken i Nordsjælland. Vestjysk Bank acquires Bonusbanken. Vestjysk Bank merges with Ringkjøbing Bank on the same day. Sparekassen Vendsyssel acquires Ulsted Sparekasse. Frøslev-Mollerup Sparekasse acquires Sparekassen Nordmors.

October 2008: The Danish government announces "Bank Rescue Package I", creating the Financial Stability Company (Box 1.3).

November 2008: Morsø Bank takes over the activities, excluding the guarantee capital, of Sparekassen Spar Mors. EBH bank announces that its solvency is below the statutory requirement and its assets and liabilities (except share capital and other subordinated debt) are transferred to the government-established Financial Stability Company.

December 2008: Sparekassen Hobro announces that it will acquire Den Lille Sparekasse.

January 2009: the Danish government announces "Bank Rescue Package II" (Box 1.3).

February 2009: Den Jyske Sparekasse acquires Sparekassen Løgumkloster. Fionia Bank cedes control to the Danish state in return for a DKK 1bn capital injection that will keep the

bank solvent. The agreement means that banking activities in the current Fionia Bank are transferred to a new company founded and owned by Fionia Bank but controlled by the State. The only assets of Fionia Bank (which is to be renamed Fionia Holding A/S) will be the shares in the new company which Fionia Bank will pledge (together with associated voting rights) to the State as collateral for the capital injection.

March 2009: Løkken Sparekasse's capital falls below statutory solvency requirements and it enters an agreement with the Financial Stability Company to transfer all assets and liabilities except guarantee capital to the Financial Stability Company. The Financial Stability Company subsequently sells Løkken's core activities to Nordyske Bank.

April 2009: Gudme Raashcou Bank enters an agreement with the Financial Stability Company and transfers all assets and liabilities to the latter. Handelsbanken i Danmark acquires Lokalbanken i Nordsjælland.

June 2009: Lån og Spar Bank acquires Gudme Raaschou Bank's assets and portfolio management activities as well as a small lending and deposit portfolio. The bank's mortgage activities are transferred to a newly established subsidiary of the Financial Stability Company.

July 2009: Andelskassen J.A.K. Slagelse merges with J.A.K. Andelskassen Brenderup and Thisted Andelskasse.

August 2009: Nordea announces the purchase of most of Fionia Bank, including 29 branches.

September 2009: The former mortgage activities of Gudme Raaschou Bank are acquired by Kiwi Deposit Holding A/S.

ANNEX 1.A2

Progress in structural reform

This table reviews action taken on recommendations made in previous *Surveys*. Recommendations made in this *Survey* are listed in the conclusion section of each chapter.

Past recommendations	Actions taken since the previous *Survey* (February 2008)
HEALTH (in-depth topic of the 2008 *Survey*)	
Promoting moderate and sensible use of alcohol, notably among youth, should also have higher priority in public health policy.	Municipalities received DKK 35 million to finance advisors for children and families with alcohol problems.
While tax-financed healthcare is relatively well-functioning, public funding must be prioritised for where it is most needed.	The government established a "quality fund" of DKK 50 billion to be spent until 2018 on improving services in the welfare sector. DKK 25 billion has been earmarked for modernising hospitals. The first DKK 15 billion was allocated based on advice from an expert panel.
Introduce co-payments for visits to general practitioners and specialists as in other Nordic countries.	No action.
Change regulations in dental care so that the current fixed-price setting is replaced by maximum prices.	A system of maximum prices has been introduced for dental hygienists.
Restrict public funding for long-term care to those elderly who have more substantial care needs, for example by making those people that currently received free practical home help for less than two hours a week pay for it themselves.	No action.
Increase average working hours of nurses.	No action.
Develop public health sector pay schemes with elements of team and individual pay flexibility.	No action.
Refine the activity-based funding model for hospitals by applying funding rates clearly motivated by marginal costs.	Hospitals using the full amount of the activity fund in 2010 are required to increase productivity by 2%.
Expand the role of private-sector healthcare providers to ensure contestability and spur innovation.	No action.
Ensure that municipalities fulfil their obligation to publish their hourly costs for long-term home care via *Fritvalgsdatabasen*.	Municipalities are by law obliged to publish their price and quality standards via *Fritvalgsdatabasen* at least once a year.
Expand the use of medical technology assessment to ensure that cost-saving innovations are implemented.	No action.
Implement the planned investments in new medical facilities gradually, to adjust to changing medical technologies. Avoid overly prestigious investment plans that risk cementing current organisational structures and treatment practices.	The government has allocated DKK 15 billion to prioritised hospital plans, with allocation taking into account effective use of the hospitals and on the uncertainty regarding future needs. This calls for more modest dimensions and more flexible buildings.
Encourage people to take more responsibility for managing their health condition. Involve the increased number of retirees in informal care provided in the community to supplement municipal long-term care provision.	The April 2009 *Forebyggelsekommissionen* recommended improving information about the symptoms of certain diseases (*e.g.* diabetes), raising awareness and facilitating early management. The government will present a national plan for health and prevention in the fall 2009.

Past recommendations	Actions taken since the previous *Survey* (February 2008)
Replace the fixed-price system with a set of maximum prices and allow free entry into the retail market for pharmaceuticals.	The government and the Association of the Pharmaceutical Industry (Lif) agreed to introduce maximum prices for medicines used in hospitals. The agreement, valid until end-2012, requires a 5% reduction in maximum prices from 1 January 2010. Prices of newly introduced medicines cannot exceed the average price charged in a group of nine European countries. A second agreement was reached covering maximum prices for other medicines, prolonging a 2006 agreement: maximum prices will be unchanged in 2009 but will increase by 2% in 2010. Pharmaceutical firms can apply for higher increases.
Establish a national strategy to identify and prioritise preventive and curative measures to help maintain labour market attachment. Give the new coordination committees, involving all municipalities, responsibility for co-operation between healthcare providers and municipal job centres administering benefits and activation for persons with sickness or disability. Develop the use of models – like the round table for dialogue between the employer, job-centre caseworkers, physicians and the employee – to ensure early action when sickness absence is prolonged and risks loss of labour market attachment.	In May 2009, the parliament passed a law aimed at keeping people who are on sick leave in contact with their workplace and helping them return to work as soon as possible. Employers can receive a medical assessment report to help tailor work for employees on sick leave and speed up the return to work. They are also obliged to offer talks with employees after four weeks of sickness absence. Job centres will promote part-time sick leave and reduced working hours for employed sickness benefit recipients to reduce the risk of labour market detachment. Job centres can also offer activation for sickness benefit recipients.
Let municipalities carry more of the costs for benefits and flexjob subsidies, and give municipalities clearer instruments to guide the availability of vocational health services.	Municipalities now receive reimbursement of 65% of sick pay if they actively help people return to work after eight weeks, otherwise the cover is 35%. Sick pay will be prolonged by 26 weeks for people who have applied for a flexjob or early retirement compensation but have not yet been notified of the outcome of their application.
Consider differentiated employer co-financing of sickness benefits depending on participation in roundtables or similar dialogue.	No action.
Reduce the maximum flexjob subsidy to be equal to the disability pension or lower. The salary under a flexjob should be a lower than for an unsubsidised job, for example, by paying a wage for hours worked and unemployment benefits for hours not worked.	No action.
Reduce the benefit received during rehabilitation to ensure that it pays for participants to accept jobs they might be offered.	No action.
Make a doctor's certificate compulsory for receipt of sickness benefits, *i.e.* after two weeks. Introduce a waiting period of a few days for the sickness benefit. Enforce the 12 months time limit.	Medical assessments now focus on work ability but are no longer required after eight weeks – it is up to the municipality when to require an assessment.
FISCAL AND TAX POLICY	
Action should be taken to redress excess spending upfront if actual and projected spending indicates that the 26½ per cent limit in 2015 may be breached.	There has been no change to the fiscal framework to require such measures.
Compliance of municipal and regional authorities with spending growth limits must be ensured. Transparency should be improved *via* more accurate and up-to-date statistics on budget execution coupled with clearer consequences for overspending.	In June 2008 two laws were passed aiming at ensuring the compliance of municipalities with the spending growth limits and tax restrictions. The municipal budgets for 2009 were in line with the agreed spending growth and tax limits.
The new Labour Market Commission should present specific measures going well beyond the labour supply requirements of the *2015 Strategy*.	The August 2009 recommendations of the Labour Market Commission would, if implemented in full, produce a significantly larger rise in employment that required by the *2015 Strategy.*
If government balance sheet analysis uncovers liabilities that are more costly than government debt, budget surpluses should serve to reducing these liabilities. Otherwise, debt reduction should continue unless there are reasons to maintain a government bond market. If such a decision is taken and financial asset accumulation becomes necessary, a clear legislative framework should be established to govern asset management. This would prevent the assets from creating pressure for lower fiscal surpluses and ensure that they are invested to maximise returns subject to risk rather than being used for other policy objectives.	In February 2008, Danmarks Nationalbank indicated that government debt would continue to be issued even in the absence of funding requirement, so as to maintain a liquid government bond market. Given the deterioration in the fiscal position associated with the current recession, there is no expectation of significant asset accumulation in the near term, other than as a result of measures to facilitate the smooth operation of the financial markets and raise capital adequacy of financial institutions.
Any further expansion of the in-work tax credit should be accompanied by reductions in benefits.	The 2009 Spring Package 2.0 tax reforms increased the in-work tax credit but only to ensure that its value is retained following decreases in the tax value of general deductions.

Past recommendations	Actions taken since the previous *Survey* (February 2008)
Reduce the high marginal tax rates which apply from incomes just above average full time earnings or, as a second best, move the thresholds from where the middle and top tax brackets apply.	The 2009 Spring Package 2.0 raised the threshold for the top state income tax bracket, abolished the middle state income tax bracket, and reduced the bottom tax rate. These changes have the effect of lowering the top tax rate by 7.5 percentage points.
Increase or improve the structure of user charges, and give municipalities more discretion in setting charges.	No action.
LABOUR SUPPLY AND EMPLOYMENT	
Phase out the five-year voluntary early retirement scheme (*efterløn*). Make it easier to retire gradually by working part-time before and after the official pension age, supported by increased actuarially neutral flexibility in the public age pension. Abolish mandatory retirement age clauses from collective agreements.	The 2006 Welfare Agreement raised the entry age to the voluntary early retirement scheme and the pension age, and indexed both to life expectancy from 2019. In 2008, a tax credit was introduced to encourage people to work continuously between 60 and 64 and the amount of income that can be earned before pension benefits are withdrawn was increased.
Consider whether the parental leave system is so generous that it hurts the employment prospects of women. Rebalance by putting more emphasis on child care relative to leave.	No action on maternity/parental leave, but child care charges have been reduced by increasing public subsidies.
Consider earlier assessment of unemployment benefit recipients' job readiness and immediate referral to job vacancies upon application for unemployment benefits. Further develop job search counselling. Introduce statistical profiling to better tailor active labour market programmes (ALMPs) to individuals' circumstances, but continue to use the judgment of job centre professionals to ensure programmes are well targeted. Make sure that training courses offered in ALMPs are structured to ensure continued job search and that job search requirements during participation in training courses are enforced. Introduce more intensive face-to-face contact and activation requirements (like those for unemployed youth) for older workers such as people in their late 50s, who have lower employment rates.	From the summer of 2009, implementation of (ALMPs) will be solely the responsibility of municipal governments. This could potentially increase the variation in practices across municipalities. However, a unified municipal employment system will strengthen state-regional monitoring and management. This will help to ensure that local efforts are working to meet the overall national employment policy objectives.
Where it is cost-effective, compulsory activation could be brought forward to speed up the transition back to employment.	From the summer of 2009, all unemployed below the age of 30 will be required to take their first job interview within one month of unemployment instead of after three months, and compulsory activation starts after 3 months. Formerly, compulsory activation set in after 6 months for those below 30 and who received unemployment benefits.
Consider gradually reducing the unemployment benefit replacement rate over the benefit entitlement period.	No action.
Reduce the length of time for which a person can receive part-time unemployment benefits while working in a part-time job.	The 2008 Job Plan Agreement reduces the length of time for which a person can receive part-time unemployment benefits to 30 weeks within a period of 2 years. Previously, part-time employees with terms of notice were eligible for part-time unemployment benefits for 50 weeks within a period of 70 weeks and those without terms of notice were eligible for part-time unemployment benefits for 4 years within a period of 6 years.
Ensure that all social assistance recipients without severe problems aside from unemployment are registered with the employment service. Extend the benefit rules applying for those below 25 to all below 30 years, supplementing the stronger activation approach already implemented for all below 30.	From the summer of 2009, rules regarding compulsory activation and first job interview are the same for all unemployed below 30 (see above).
Introduce competition to the public employment service for placement services and for educational activation programmes.	External providers are increasingly involved in placement activities and the regular contacts with the unemployed.
Speed up the administrative procedures to issue residence and working permits for persons seeking work in companies without a collective wage agreement. Public employment offices could be active helping firms connect to unemployed workers abroad.	In October 2008, three new international recruitment centres opened to help companies and job seekers. In May 2009, transitional rules for workers from new EU member states ended.

Past recommendations	Actions taken since the previous *Survey* (February 2008)
PENSIONS	
Consider, in the long run, phasing out special benefits that are provided to pensioners in addition to the public pension.	No action.
Continue to enhance flexibility and individual choice in the occupational pension system, particularly in terms of the time profile of pension contributions and the level and type of insurance coverage included in the pension contract.	From 2009, ATP pension benefits can be deferred to start at age 75, compared to the current 70 years maximum, and pension benefits rise by 8-10% for each year of deferral. This gives pensioners more flexibility in planning retirement income flows.
Consider allowing employees to choose the fund in which their collectively-agreed pension contributions are placed.	No action.
Continue public education campaigns on financial literacy and consumer information on pension products.	The Danish Insurance Association and providers have continued to improve information available to consumers, for example, via PensionInfo and Pension Statement websites.
Consider reducing the tax rates on capital income outside the pension system, including the tax value of negative capital income.	Due to the 2009 Spring Package 2.0, the tax value of negative capital income above DKK 50 000 (DKK 100 000 for married couples) will be reduced by 8 percentage points, the taxation of positive capital income will be reduced by the abolition of the middle tax bracket and the reduction of the bottom tax rate, and only positive capital income above DKK 40 000 (DKK 80 000 for married couples) will be included in the base for the top tax.
HUMAN CAPITAL	
Continue the efforts to improve compulsory education, including by strengthening the educational content of the introductory year for six-year olds and targeting or abolishing the voluntary 10th form. Have more frequent monitoring of students' and schools' outcomes in compulsory education. Allow teachers to become more specialised.	The introductory year for six-year olds has been made compulsory. The 10th form is now targeted at students who need additional academic qualifications and clarification of their further educational opportunities before embarking on upper secondary education. Three compulsory tests in Danish/reading, mathematics, and physics/chemistry were conducted for the first time in 2007. These tests were developed over 2008 and, in 2009, the ten compulsory tests were piloted on 100 schools. The ten national tests are expected to be made compulsory from the spring of 2010. Teacher training has been improved.
Make more apprenticeships available, possibly helped by increasing refunding for firms taking apprentices, based on higher contributions from all employers.	From 2003 to 2008, the number of apprenticeships increased 39%, but fell between mid 2008 and mid 2009 due to the financial crisis. Subsequently, enrolment in school-based practical training programmes has increased substantially. A number of measures have been taken to support apprenticeships, including improving financial incentives for employers and training colleges' capacity to find training places.
Adjust the study grant so that someone who completes secondary education and wishes to study has a clear incentive to do it without taking several sabbatical years. Adjustments should also encourage on-schedule completion of studies while continuing to make loans available for those being delayed. For the longer term, consider a combined tax and tuition charging reform with loans for tuition and living costs which would be repaid after graduation. This repayment would replace some of today's income tax, thereby reducing the incentives to work short hours and encouraging highly qualified people to work in Denmark. Continue giving more autonomy to universities.	Starting from the 2009 enrolment, students entering tertiary education within two years of completing secondary school will have their grade average scaled up 1.08 and thereby have easier access to studies with *numerus clausus*. From 2009, the bonus that universities receive when students complete a bachelor programme is conditional upon the duration of the study. The universities will receive a bachelor bonus when student complete a bachelor programme within the prescribed study period plus one year and master's bonus when students complete a master´s programme within the prescribed study period. The globalisation strategy gives universities more flexibility to attract top academics.
Strengthen quality and cost effectiveness in adult education. Introduce sizeable user charges on adult education and training for the employed and cut back on public funding for courses with firm-specific content.	Contributions to education funds for life-long learning were introduced in collective wage agreements in early 2007. User fees apply for some adult education courses and are usually paid by the employer.

Past recommendations	Actions taken since the previous *Survey* (February 2008)
HOUSING (in-depth topic of the 2006 *Survey*)	
Increase the real estate tax for owner-occupied housing to make it neutral *vis-à-vis* the tax value of interest deductibility. Ensure that regulation allows mortgage institutions to offer products whereby the real estate tax and the land tax are paid automatically *via* mortgage equity withdrawal. Make co-operative housing liable for the real estate tax (at least for the part of the flat's value that is not matched by borrowing in the co-operative) and remove other subsidies to bring co-operative housing at par with owner-occupied housing.	The real estate tax has not changed, but the tax value of interest deductibility was reduced in the 2009 Spring Package 2.0. No change to the taxation of co-operative housing.
Replace the general subsidies for housing associations with targeted support for those most in need of housing support. Reconsider the size and targeting of personal housing allowances. Link the allowance to appropriate rents in each region instead of actually paid rents. Funding of construction, ghetto alleviation and similar measures should be subject to normal public budgeting scrutiny. The cap on associations' construction costs should reflect best practice.	No action.
End the subsidies for pension funds' investments in newly constructed private rental housing, as well as the tax exemption for pension funds' return on property bought previously.	To comply with the EU ruling on taxation of pension savings, the current tax exemption for pension funds' investment in rental housing was ended in 2009.
Let rents in private rental housing be set on market terms by scaling back current rent regulation. As first step, lower the threshold for how much landlords must spend on renovating apartments to be covered by less strict rent regulation. Let tenants in social housing pay rents that better reflect differences in quality, location and demand.	No action.
Remove price regulation for shares in housing co-operatives. The part that reflects public construction or urban renewal subsidies might be returned to the state and municipality.	No action.
Give municipalities more room to borrow to finance infrastructure when new land plots are issued. Consider mechanisms like road pricing to ensure that infrastructure investment is closely linked to demand. Consider mergers in the municipal structure around Copenhagen to balance local and wider zoning perspectives.	The Government is currently preparing a legislative proposal regarding road pricing
Improve statistics on housing finance by linking household-level data from mortgage credit institutions with income and other individual data from Statistics Denmark.	No action.

ANNEX 1.A3

Topics covered in previous OECD Economic Surveys *of Denmark*

2008

Fiscal strategy: keeping with the targets

Promoting employment and inclusiveness

Tax reform, hours worked and growth

Health: a major fiscal challenge

Pension savings and capital taxation

2006

Raising labour supply to safeguard welfare

Human capital: Getting more and using it better

Housing: Less subsidy and more flexibility

2005

Ensuring fiscal sustainability

Boosting labour supply

Boosting growth through greater competition

Raising productivity growth

2003

Raising labour supply for the longer term

Migration and integration of immigrants

Refining the medium term fiscal framework

Some environmental aspects of sustainable development

2002

Renewing the momentum for structural reforms

Enhancing expenditure control with a decentralised public sector

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Chapter 2

Why has productivity growth declined?

Labour productivity decelerated markedly over the 1990s and into the current decade. One reason is the slowdown in capital deepening related to the trend increase in employment. Greater inclusion in the labour market of workers with lower-than-average productivity may also have contributed. However, these factors do not account for the observed reduction in total factor productivity (TFP) growth. The TFP slowdown is puzzling in light of Denmark's comparatively productivity-friendly policies and institutions. The financial crisis is likely to hold back productivity growth over the medium run, through the pace of capital deepening and, possibly, through lower investment in R&D and innovation. This chapter analyses the slowdown in productivity growth and reviews the policies that could help boost it in the future.

Labour productivity growth in Denmark has been on a declining trend for almost a decade and a half. Over this period, labour utilisation has trended up, reflecting rising employment and, to a lesser extent, longer working hours by those employed. A common view is that the slowdown in labour productivity is due to the inclusion of workers from the fringes of the labour market. Additional labour supply may have weighed on productivity growth for two reasons. First, it takes time for the capital stock to adjust to the higher level of labour supply. While capital deepening has been a major contributor to labour productivity growth, additional capital may be required to complement the extra labour in use. Second, the additional workers brought into employment may have lower-than-average productivity.

Even taking these factors into account, it is difficult to explain the extent of the slowdown in labour productivity, especially since the basic framework conditions that are considered to be conducive to productivity growth are generally sound in Denmark. Indeed, R&D investment amounts to 2½ per cent of GDP – in the top third of OECD countries. Product market regulation is relatively liberal. Corporate taxes are relatively low. There is a high rate of firm turnover, suggesting strong "creative destruction", and foreign direct investment is high.

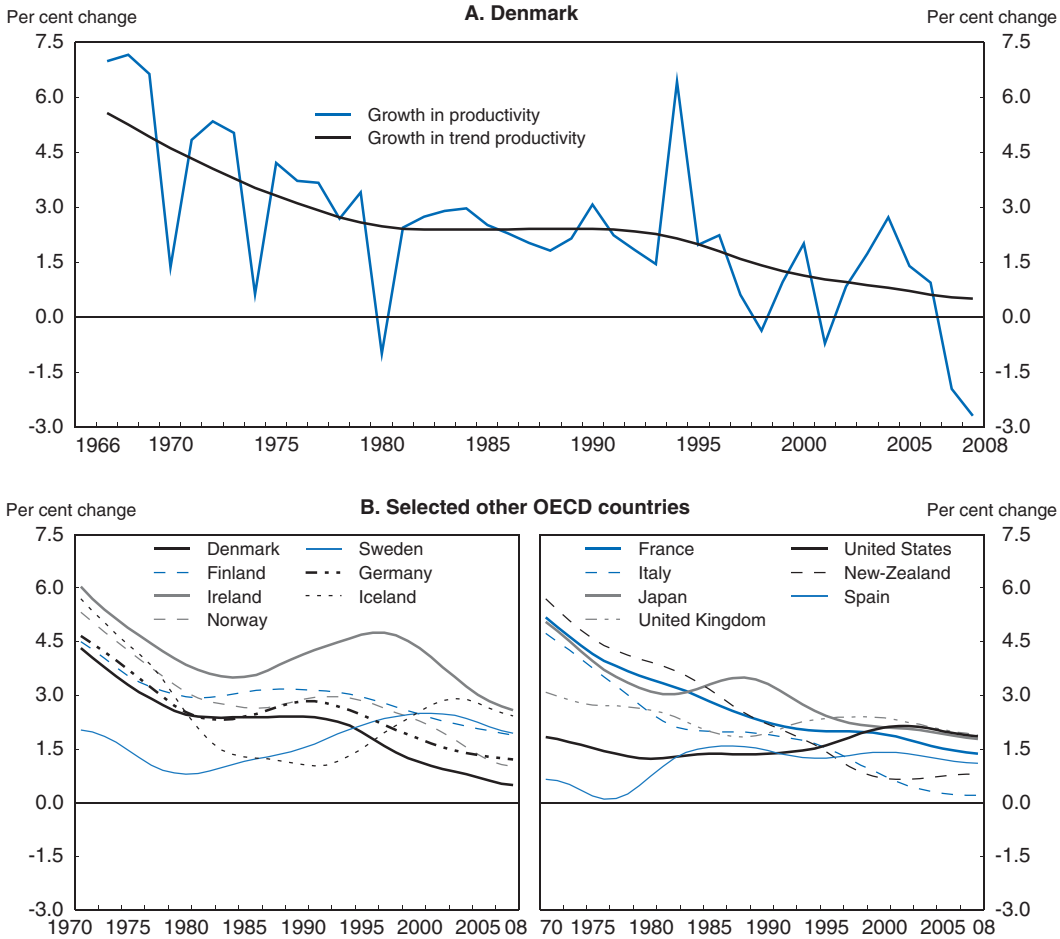
The financial crisis is likely to have medium-term implications for Danish productivity growth. An increase in risk aversion might dampen capital deepening, compounding the slowdown of the past decade. Furthermore, the recession might also reduce the resources devoted to R&D investment and innovation. While general framework conditions for productivity growth are good, there is a need to consider what further measures would boost productivity growth and thereby national income gains in the medium term.

Trends in labour productivity

Growth in labour productivity (gross domestic product – GDP or gross value added – GVA per hour worked) has trended down since the early 1990s, after strong performance in the 1970s and 1980s.[1] Aggregate labour productivity growth averaged about three-quarters of a percentage point less over 1993-2006 than over 1981-92. Several OECD countries have had a similar experience (*e.g.* Japan, New Zealand and Spain), but Denmark's labour productivity growth has fallen well below that in many other OECD countries (Figure 2.1). Accordingly, the level of labour productivity, converted into US dollars using purchasing power parities, has begun to fall below the leading countries. Improving terms of trade have worked in the opposite direction to productivity growth, providing a boost to national income. This contrasts with countries like Sweden and Finland, which have experienced declining terms of trade due to the large share of ICT products in their exports. Statistical issues may also affect cross-country comparisons of productivity performance, although it is difficult to say how much (Box 2.1).

Growth accounting suggests that the slowdown in labour productivity between 1981-92 and 1993-2005 is driven by a reduction in the contribution to growth in both TFP and capital deepening (Table 2.1, Annex 2.A1). Total economy labour productivity growth

Figure 2.1. **Labour productivity growth in Denmark has slowed to well below that in other OECD countries**[1]



1. The growth of GDP per hour worked has been smoothed using a HP filter (lambda=100) and the series shown are the annual growth rates of the smoothed series.

Source: Statistics Denmark National Accounts, Tables NAT02 and NAT18 and *OECD Productivity Database*.

StatLink http://dx.doi.org/10.1787/734672214271

Box 2.1. **Statistical issues in productivity measurement**

Cross-country comparisons of labour productivity performance are made difficult by measurement issues. In general, while most countries' national accounts data conform to the System of National Accounts, differences arise between countries due to interpretation or structural factors. Data on hours worked are sourced from national accounts and sometimes labour force surveys. Labour force surveys generally over-report hours worked compared to time-use surveys while employer-survey-based measures do not account for unpaid overtime and so may under-report hours worked (OECD, 2008d). This box discusses several issues related to Danish data that may affect international comparisons of productivity performance.

Box 2.1. **Statistical issues in productivity measurement** *(cont.)*

The dwellings sector, which captures rent paid for rental dwellings as well as imputed rent from owner-occupied dwellings, has been stable in real terms and fallen as a share of GVA over the past decade. Owner-occupied rent is calculated by using the rents paid in the private rental market. This market is heavily regulated and rents do not necessarily change much with changes in demand. Prices of owner-occupied housing have increased sharply in recent years. To the extent that this reflects a rise in the quality of the housing stock, it should be captured in the stratification methods used for national accounts. Price increases which don't reflect quality improvement should not affect the volume measure of value added in the national accounts. However, since the rental rate used in the national accounts is linked to rents that do not necessarily mirror house prices, the implied rental yield may be unrealistically low, which may bias recorded GVA (and productivity) downwards.

Difficulties in measuring service-sector productivity growth could affect international comparisons. Labour productivity growth in the public sector has historically often been set at zero with output assumed to equal inputs. For countries with large public sectors, this could mechanically reduce aggregate productivity growth relative to a country with similar growth in productivity in the market sector but a smaller public sector. In some other services sectors, where direct price measurement is difficult, value added is deflated using wages. This effectively removes labour productivity growth from volume measures and so could lead to some understatement of productivity growth.

National accounts volume measures are constructed using deflators which should control for the rapid rise in quality of computer products. Price indices for ICT products, based on hedonic methods, have fallen considerably faster than traditional price deflators (Pilat *et al.*, 2002). If the output produced using computer inputs is not deflated with hedonic indices, or deflated with different hedonic indices showing smaller price falls, importing computer equipment and using it as an input to produce non-ICT goods could lead to a rise in the volume of intermediate inputs, making volume value added appear weaker (Schreyer, 2002). In Danish national accounts statistics, hedonic price deflators are used for imports, gross fixed capital formation and private consumption of computers. Denmark has a small ICT-producing sector and there is no significant production of computers. Imports of office machines and automatic-data-processing equipment are equal to about 1% of total GVA. Input-output tables show that imports from the sector "manufacture of office machinery or computers" are used predominantly for consumption or investment. Given the small amount of imported computer equipment and its predominant use in consumption and investment, it is unlikely that hedonic deflation of these goods could significantly reduce reported GVA and labour productivity growth.

Finally, the measurement of investment in intangible assets may affect cross-country comparisons of productivity. Some intangible assets, such as computer software, are currently captured in gross value added and capital services measures. However, other intangibles, such as computerized information, firm-specific human capital, and organisational capital, are not currently captured in output or capital measures. To the extent that investment in these "other intangibles" is growing faster than in other types of capital, capital services growth may be under-estimated. Similarly, treating expenditure on these items as investment rather than intermediate inputs would increase value added and existing measures of value added growth may be under-reported if growth in other intangibles is higher than growth in other outputs. Thus, incorporating other intangibles may affect overall labour productivity growth, as well as the breakdown between capital deepening and TFP. Calculations for a number of countries indicate that including other intangibles tends to raise overall labour productivity growth and capital deepening and reduces TFP growth (Barnes and McClure, 2009). Given the data requirements and time limitations, no attempt has been made to assess whether these factors have played a part in the Danish labour productivity slowdown since the early 1990s.

Table 2.1. **Labour productivity growth accounting**

Average annual % change

.		1981-92	1993-2005	Change
Panel A. OECD Secretariat calculations				
Total economy	GDP per hour worked	2.4	1.6	–0.8
Contribution to total economy GDP per hour worked from				
	Capital deepening	1.1	1.0	–0.1
	Labour quality	0.4	0.3	–0.1
	Total factor productivity	0.9	0.3	–0.6
Panel B. Statistics Denmark calculations				
Total market activity	Value added per hour worked	2.9	1.5	–1.5
Contribution to market activity value added per hour worked from				
	IT-capital deepening	0.7	0.5	–0.2
	Non IT-capital deepening	0.9	0.2	–0.7
	Labour quality	0.2	0.1	–0.1
	Total factor productivity	1.2	0.7	–0.5

Note: The total economy growth accounting has been calculated using OECD capital services data and EU-KLEMs data on educational attainment of the labour force. Labour quality captures the effect on labour productivity of a shift towards higher educational attainment in the workforce. See Annex 2.A1 for a description of the methodology.
Source: *OECD Analytical Database*; EU-KLEMS labour input files; Statistics Denmark, Tables NAT02, NAT18 and NAT25; OECD calculations.

(Panel A of Table 2.1) has slowed by around three-quarters of a percentage point. In the market sector (Panel B of Table 2.1), the slowdown has been even more pronounced – almost 1½ percentage points. There has also been a trend shift in the share of hours worked away from low-skilled and towards higher-skilled workers, which contributes to productivity growth via a so-called "labour quality" effect. This positive contribution has declined but this accounts only marginally for the overall productivity deceleration.

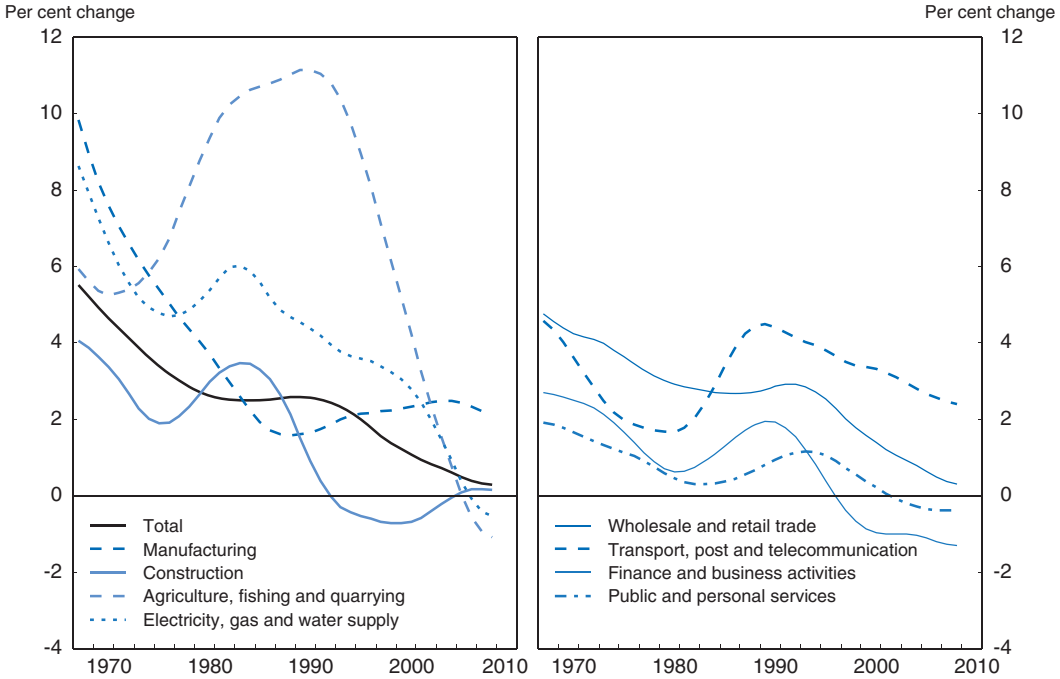
Sectoral productivity performance

The slowdown in economy-wide labour productivity has not been uniform across sectors. In agriculture, fishing and quarrying, productivity has trended down since the late 1980s.[2] It has declined in finance and business activities since about the mid-1990s. Two sectors stand out as bucking the overall trend: productivity in manufacturing has tended to accelerate since the mid-1990s; and productivity in the construction sector fell in the early 1990s but has picked up since (Figure 2.2).

Taking into account both the size and the growth rate of each sector, the sectors contributing most to the slowdown in aggregate productivity since the early 1980s were construction, agriculture, mining and quarrying, and business activities (see Annex 2.A1 for the underlying methodology). Manufacturing has recorded accelerating productivity but has declined as a share of the total economy. The opposite is true of wholesale and retail trade (Table 2.2). In construction and business activities, the productivity deceleration was mainly driven by slower TFP growth, but weaker capital deepening also played a role. In mining, weaker TFP and capital deepening were almost equally important. In agriculture, the slowdown in capital deepening was the main contributor (Figure 2.3).

A key focus of the analysis of productivity growth in recent decades has been the role of ICT (Pilat *et al.*, 2002). In Denmark, the share of the ICT-producing sectors is fairly small and their contribution to productivity growth has been modest but stable since the 1980s. The productivity slowdown is most evident in the non-ICT sectors, although it was also marked in ICT-using services (Figure 2.4).

Figure 2.2. **Productivity growth has been trending down in many sectors**[1]



1. GVA per hour worked has been smoothed using a HP filter (lambda = 100) and the series shown are the annual growth rates of the smoothed series. The sector "business activities" includes computer and related activities, research and development , and consultancy and cleaning activities.

Source: Statistics Denmark National Accounts, Tables NAT07 and NAT18.

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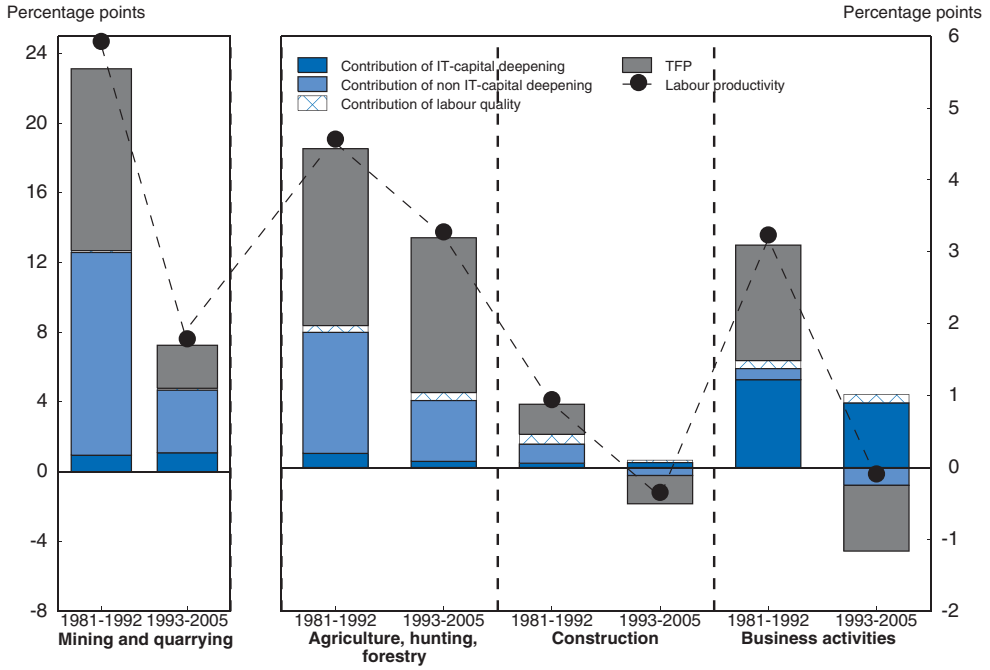
Table 2.2. **Value added shares and contributions to growth in labour productivity**

	Nominal value added share %			Contributions to growth in labour productivity (percentage point)		
	1981	1992	2006	1981-92	1993-2006	Change
Manufacturing	18.1	17.2	14.6	0.31	0.46	0.15
Letting and sale of real estate	10.1	10.6	10.4	–0.02	0.06	0.08
Post and telecommunications	1.5	2.3	2.0	0.09	0.14	0.05
Public administration	8.5	7.3	6.2	0.03	0.06	0.02
Fishing	0.7	0.3	0.2	0.00	0.01	0.00
Health care activities	4.9	4.5	4.5	0.01	0.01	0.00
Social institutions, etc.	5.3	5.5	6.0	0.00	0.00	0.00
Transport	5.1	5.4	5.8	0.16	0.13	–0.03
Education	6.1	5.5	5.5	0.06	0.02	–0.04
Hotel and restaurants	1.5	1.5	1.5	0.00	–0.08	–0.07
Finance and insurance	4.6	4.9	5.3	0.32	0.24	–0.08
Associations, culture and refuse disposal	3.8	4.4	4.3	0.04	–0.06	–0.10
Wholesale and retail trade	13.5	13.1	11.9	0.45	0.33	–0.12
Electricity, gas and water supply	1.6	2.3	2.0	0.14	0.02	–0.12
Construction	5.5	4.8	5.9	0.14	–0.02	–0.16
Agriculture, horticulture and forestry	4.6	3.1	1.3	0.36	0.20	–0.16
Mining and quarrying	0.5	1.0	4.1	0.21	0.05	–0.17
Business activities	4.3	6.2	8.5	0.21	–0.10	–0.31
Memorandum item: Total economy growth in GVA per hour worked				2.5	1.5	–1.1

Note: Industry-level contributions to productivity growth are calculated as outlined in Annex 2.A1. Industries are sorted by largest increase in the contribution to growth in labour productivity between 1981-92 and 1993-2006. The sector "business activities" includes computer and related activities, research and development, and consultancy and cleaning activities. "Associations, culture and refuse disposal" includes sewerage and refuse disposal services; activities of membership organisations; recreational, cultural and sporting activities; and other service activities.
Source: Statistics Denmark National Accounts, Tables NAT07 and NAT18, OECD calculations.

Figure 2.3. **Weaker capital deepening and TFP growth are the main factors behind slower productivity growth**

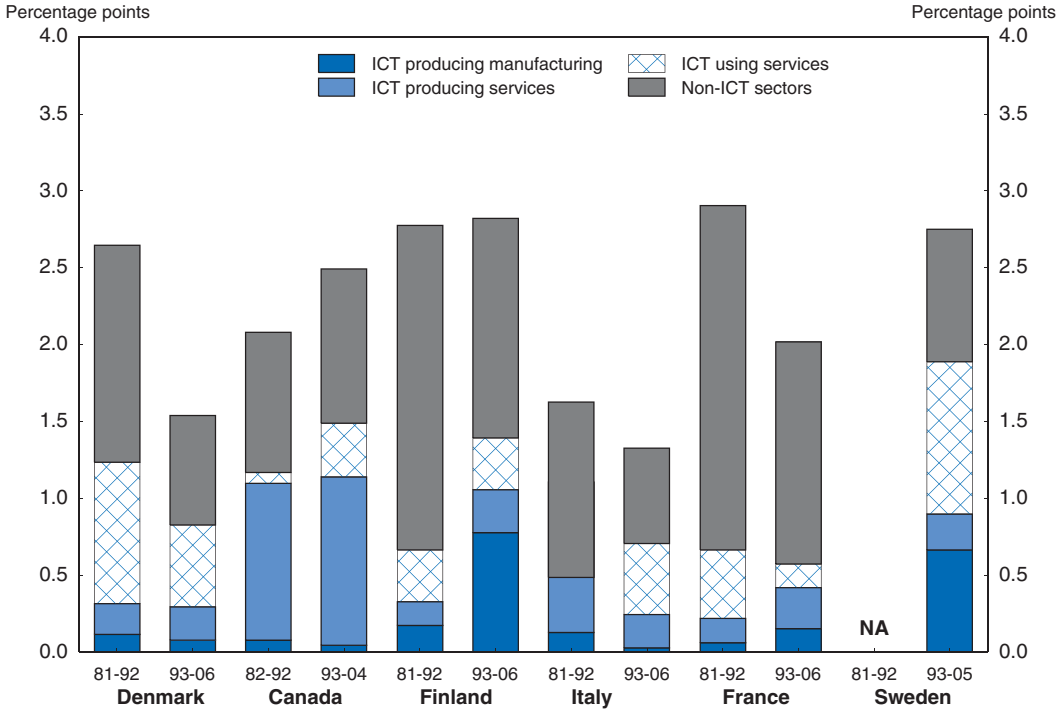
Contributions to growth in labour productivity



Source: Statistics Denmark Table NAT25.

StatLink http://dx.doi.org/10.1787/734773418053

Figure 2.4. **Productivity growth has slowed mainly in non-ICT sectors**



Source: *OECD STAN08 Database* and OECD Secretariat calculations.

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The large Danish public sector may lead to understating productivity growth relative to other countries, since in the Danish national accounts labour productivity growth in this sector is effectively zero (Box 2.1).[3] It has been estimated that moving from an input to an output-based approach to calculating value added in the public sector would add 0.1 percentage point to the average growth in total economy labour productivity over 2000-05 (Deveci *et al.*, 2008).[4] Looking at the market sector in isolation, however, the slowdown in Danish labour productivity is even starker (Table 2.3). Table 2.3 also shows that some countries record a contribution from the market sector well below total productivity growth, hence have recorded positive public sector productivity growth.

Table 2.3. **Total economy and market-sector labour productivity growth**

Period average of annual growth rates, %

		Total economy	Market sector	Contribution to total economy growth from market sector
Denmark	**1981-1992**	**2.2**	**3.1**	**2.1**
	1993-2005	**1.4**	**1.9**	**1.3**
Finland	1981-1992	2.7	3.2	2.5
	1993-2005	2.6	3.8	2.7
France	1981-1992	2.7	3.0	2.2
	1993-2005	1.8	2.2	1.4
Germany	1981-1992	2.5	2.6	1.9
	1993-2005	1.8	1.6	1.2
Ireland	1981-1992	2.8	3.2	2.5
	1993-2005	3.7	4.4	3.5
Italy	1981-1992	1.6	1.6	1.2
	1993-2005	1.0	1.1	0.7
Japan	1981-1992	4.2	4.7	3.7
	1993-2005	2.4	2.5	2.0
Sweden	1981-1992	1.6	2.1	1.5
	1993-2005	2.6	3.7	2.5
UK	1981-1992	2.4	2.9	2.3
	1993-2005	2.1	2.8	2.1
USA	1981-1992	1.3	1.8	1.1
	1993-2005	2.0	2.5	1.6

Notes: Labour productivity is measured as GVA per hour worked. For the United States, the data is drawn from the SIC-based tables in the EU-KLEMS database. The contribution to growth from the market sector rests on the same methodology, outlined in Annex 2.A1.
Source: EU-KLEMS March 2008 release additional tables.

Recent developments in labour productivity

Labour productivity fell in 2007 and 2008 by 2% and 2.7% respectively. As discussed in Chapter 1, GDP growth weakened in 2007 and GDP contracted in 2008. The labour market had been very tight, with unemployment falling to record lows. Hence, businesses may have been unusually reluctant to lay off staff that they had fought hard to recruit. However, by end-2008, the labour market turned around sharply and unemployment began to rise rapidly. With a steep fall in GDP likely, productivity may fall again in 2009 but seems likely to recover strongly in 2010 as production picks up ahead of employment.

It is often argued that one positive impact from a recession is that it spurs structural adjustment. The downturn may be used to reallocate less productive workers, so productivity could accelerate as the recovery sets in. However, the exceptionally severe financial crisis may work against this. Indeed, heightened uncertainty has likely increased

the value of waiting for new information rather than pushing ahead with new investment plans. To the extent that this uncertainty persists, it will dampen the investment rebound, so that the contribution to productivity growth from capital deepening may be reduced in the near term. There is also some risk of an impact on productivity if the crisis leads to a significant cutback in R&D and innovative activity.

The contribution of labour composition and capital to productivity

Labour productivity growth can be decomposed into contributions from changes in the skill composition of the workforce, from capital deepening and from TFP. This section focuses on the contribution of labour composition and capital deepening in order to more closely examine the impact of the trend rise in labour supply in Denmark over the past decade and a half.

The labour market and human capital

It has been argued that wider inclusion in the labour market is one factor behind slower labour productivity growth since the early 1990s (Danish Government, 2008a; Iversen and Riishoj, 2007). There has been a trend increase in the employment to working-age population ratio and in average hours worked. As a result, total hours worked have risen by about 0.6% per year from the early 1990s to the mid-2000s. This compares to a fall of about 0.4% per year from the early 1980s to the early 1990s (Figure 2.5). Even so, average hours worked in Denmark remain amongst the lowest in the OECD.

Figure 2.5. **Labour utilisation has grown**

Source: OECD Analytical Statistics Database.

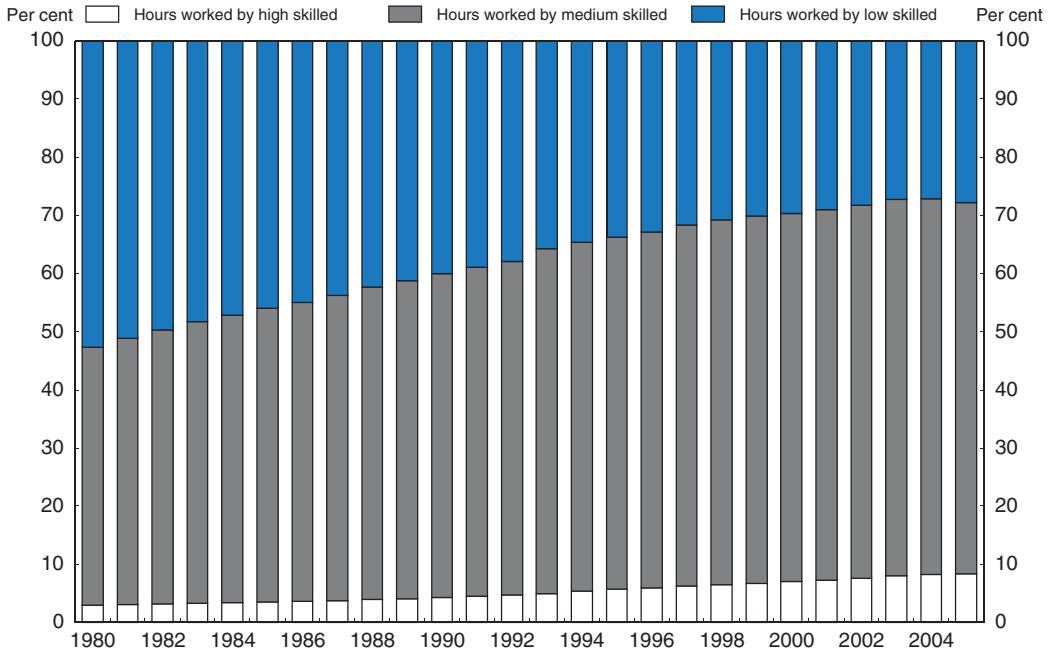
StatLink http://dx.doi.org/10.1787/734807838150

There is likely to be some trade-off between employment and productivity, even over the longer term. In the short term, weaker productivity performance can result from both lags in adopting new capital to complement additional labour and the effect of new workers having lower levels of productivity than the existing workforce. In the long term, the trade-off flattens out as additional capital is added but the heterogeneity effect can remain even if capital fully adjusts (Turner and Boulhol, 2009). Higher employment resulting from increased labour supply can lead to an expansion of labour-intensive activities. To the extent that these have lower average productivity, this could depress aggregate productivity (OECD, 2007b). However, an increasing trend in average hours worked is less likely to have a negative effect on labour productivity, apart from the short-term impact through lagged adjustment of the capital stock, insofar as already employed workers do not have the same learning phase as new workers. There seems to be a negative relationship between working hours and productivity, but it is much smaller than the one between employment participation and productivity (Mc Guckin and van Ark, 2005). Additional hours worked might be associated with lower productivity if hours worked are already high, for example due to fatigue. However, the low level of average hours worked suggests that this is unlikely to be a general issue in Denmark.

As in many countries, the general skill level of the Danish workforce is rising but this trend appears to be slowing down. The share of hours worked by workers with medium and high skill levels seems to have risen at a slower pace over the past decade (Figure 2.6). The slowdown in the trend is driven mainly by a slowing in the rate of increase in the share of the total hours worked by medium-skilled workers aged 30 to 49. Comparing the

Figure 2.6. **The skill level of the workforce is rising more slowly**

Total hours worked by skill level[1]



1. High-skilled is long-cycle higher education, medium-skilled is medium and short-cycle higher education plus. vocational education and training, low-skilled is basic school.

Source: EU-KLEMS March 2008 release.

StatLink http://dx.doi.org/10.1787/734812704610

averages for the period 1981-92 and 1993-2005, the rate of growth in hours worked by medium-skilled workers has declined – the growth rate for hours worked by high-skilled workers has increased and hours worked by low-skilled workers, which have been trending down, fell less rapidly in the latter period. This suggests that there may have been an impact on labour productivity from wider inclusion of low-skilled workers, consistent with the growth accounting analysis in Table 2.1. The total economy analysis, based on EU-KLEMS data for educational attainment, indicate a larger contribution to productivity growth from labour quality than the Statistics Denmark data for the market sector only. However, both analyses indicate that the slowdown in growth of educational attainment contributed only around 0.1 percentage point to the overall slowdown in labour productivity.

The growth accounting figures discussed above account only for educational attainment in differentiating labour inputs when, in fact, new entrants to the workforce might have lower productivity even if they have average or above-average educational attainment. It seems reasonable to expect that newly-hired persons who have been out of the labour market for some time might have lower-than-average productivity levels when first rejoining the workforce, as they acquire workplace-specific skills and re-adjust to working life. Some simple calculations have been made to test the effect of assuming that new workers in the labour market have lower levels of productivity than existing workers.[5] Under some fairly extreme assumptions about the productivity levels of new workers, aggregate labour productivity growth could have been about 0.2-0.3 percentage points lower on average over 1993-2006 due to the addition of new low-productivity workers. Somewhat more plausible assumptions give an effect of about 0.1 percentage point (Annex 2.A1). Accordingly, while the expansion of the labour supply may have contributed to the slowdown in labour productivity, the effect was probably small. Hence, the growth rate of the productivity of the existing labour likely declined.

The increase in hours worked might have been concentrated in the public sector, where productivity growth is set to zero. However, between 1993 and 2006, total hours worked increased by 12.3%, while hours worked in the general government sector rose by 7.3%. Over the same period, the general government sector share of total employment shrank by 1.1 percentage points. Average hours worked in the public sector (based on total employment excluding people on leave) rose about 0.8% in total between 1993 and 2006, while in the private sector it rose by 2.3%. Hence, concentration of the rise in hours worked in the public sector does not seem to explain the productivity slowdown.

Capital deepening

A key driver of labour productivity growth is capital deepening – increasing the amount of capital per unit of labour increases the amount of output that can be produced with that unit of labour. Capital services, which capture the stream of productive services created by the stock of capital, are estimated to have grown on average by 3.4% per year between 1981 and 1992 and 3.7% between 1993 and 2005. Growth in the capital stock instead has slowed markedly. A key element of the difference between growth in the capital stock and capital services is accelerating ICT capital formation.[6] However, ICT capital investment might not generate productivity gains in the short term. This could be due to the benefits of ICT capital investment, such as customisation and differentiation, not being captured in output measurement and considerable time lags in implementing new technologies or adjusting work practices to facilitate their use (Pilat *et al.*, 2002).

One potential explanation for a slowdown in labour productivity is that there has not been enough capital deepening since the early-to-mid-1990s to keep pace with the increase in labour supply. A slowdown in labour productivity within skill-level cohorts of the labour force could result from a reduction in capital deepening. Growth in the capital/labour ratio has slowed, as has the contribution to growth in labour productivity from capital deepening (Table 2.1).[7] If the growth in the capital/labour ratio had remained unchanged at its 1981-92 average, labour productivity growth could have been about one-quarter of a percentage point higher on average per year than actually recorded over 1993-2005 (Annex 2.A1).

The slower rise in the capital/labour ratio appears to be an economy-wide phenomenon rather than a result of a shift in production towards more labour-intensive industries. Overall capital intensity, measured as the share of national income going to capital, has declined by around 1.6 percentage points (Table 2.4). Shift-share analysis suggests that changes in capital intensity within each sector, assuming constant sectoral value added shares at their 1993 level, pushed capital intensity down by about 2.9 percentage points, while reallocation of production between sectors pushed it up by 1 percentage point (the difference being account for by the so-called "cross term").

Table 2.4. **Value added share and capital intensity**

	1993	2006	1993	2006
	Capital intensity		Value added share	
Total	38.4	36.8	100.0	100.0
Agriculture, fishing and quarrying	77.6	87.4	4.2	5.5
Manufacturing	28.2	32.1	16.7	14.6
Electricity, gas and water supply	76.9	82.0	2.4	2.0
Construction	17.1	26.8	4.5	5.9
Wholesale and retail trade	35.6	25.9	14.2	13.4
Transport, post and telecommunication	41.0	45.7	7.6	7.8
Finance and business activities	64.6	53.6	22.6	24.2
Public and personal services	18.4	14.8	27.9	26.5

Note: Capital intensity is calculated as the capital share of income (measured by one minus compensation of employees divided by GVA less other taxes less subsidies on production). Value added share is based on current price data.
Source: Statistics Denmark National Accounts, Tables NAT07 and NAT09.

Conclusion on capital and labour inputs

Aggregate labour productivity growth averaged about three-quarters of a percentage point less in 1993-2006 than in 1980-92. Less than half of this slowdown might be explained by "capital thinning" and the composition of labour supply – slightly more under some relatively strong assumptions about the productivity of new workforce entrants. Slower capital deepening might reflect a relatively sluggish adjustment of the capital stock to a structural increase in labour supply. If this adjustment takes place in coming years, labour productivity growth could be expected to accelerate. However, as mentioned above, the severe economic downturn may work against this insofar as it durably heightened risk aversion. At the same time, the expected adjustment in the capital/labour ratio could come about via reduced employment, due to a rise in structural unemployment, rather than through additional capital.

Structural and policy factors affecting productivity

Even after allowing for slower capital deepening, the addition of low-productivity workers and changes in skill levels, there remains a significant unexplained slowdown in labour productivity growth, attributed by definition to weaker TFP growth. A broad range of potential factors are likely to affect TFP. The following sections discuss the links between structural and policy factors and productivity growth, focusing on TFP, and assess Denmark's performance in these areas relative to other OECD countries. The macroeconomic policy framework, general economic environment, and operation of financial markets, which can also influence labour productivity performance, are discussed in Chapter 1.

Infrastructure

There is cross-country evidence that infrastructure investment boosts economic growth beyond its direct impact on the capital stock. This can come about through facilitating the division of labour, competition in markets, diffusion of technology, adoption of new organisational practices, or through providing access to new markets, resources or intermediate inputs. However, the benefits probably decrease as the infrastructure capital stock rises (Sutherland *et al.*, 2009).

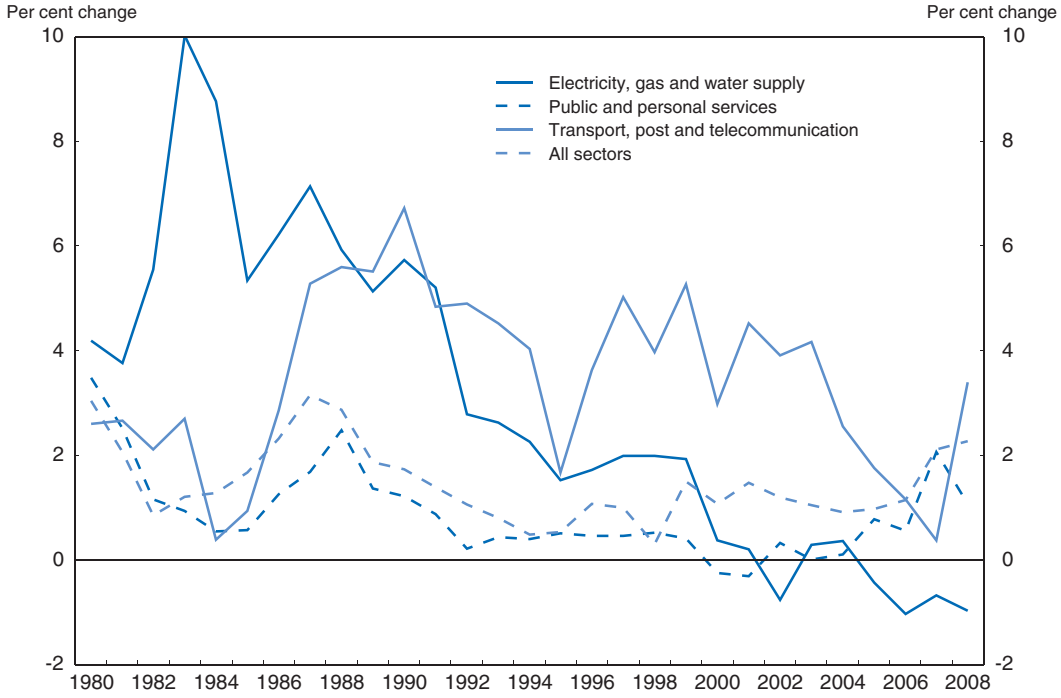
It is difficult to get a clear picture of the development of Danish infrastructure capital from the capital services data discussed above, since infrastructure can be found in a range of sectors. However, the contribution to growth in capital services from non-residential construction and, to a lesser extent, from communication equipment has tended to decline. Turning to capital stock data, it is notable that there has also been a marked slowdown in the growth of the net capital stock in the electricity, gas and water supply industry (Figure 2.7). While the World Economic Forum *Global Competitiveness Report* ranks Denmark 12th out of 133 countries for its overall infrastructure, it points to weaknesses as regards the quality of railway infrastructure, airline passenger capacity and telephone lines (World Economic Forum, 2009).

The government has acknowledged that a significant infrastructure backlog has built up over recent decades, and appointed a Commission in 2006 to analyse the long-term challenges of future public spending on infrastructure. The Commission found that central parts of the road and rail network had been experiencing growing capacity and congestion problems during the past decade, especially during gradually widening peak hours (Danish Infrastructure Commission, 2008). It recommended prioritising investments on the basis of the highest socio-economic returns, ensuring the necessary maintenance of infrastructure, greater private sector involvement in the organisation and management of construction projects, and better coordination of physical planning, including urban and commercial development, as well as infrastructure planning. Following the publication of the Commission's report, the government created a DKK 90 billion fund to finance infrastructure projects over 2009-20, including in environment and public transport. An additional DKK 60 billion will be assigned to several specific infrastructure projects.

The government has also announced the frontloading of infrastructure spending in the Green Growth initiative in 2010 and additional funding for municipal government investment as part of the 2010 budget negotiations. These measures are timely, given the relative effectiveness of infrastructure spending as a counter-cyclical measure in a longer-

Figure 2.7. **Growth in the capital stock in key infrastructure sectors has declined**

Annual percentage change in the real net capital stock



Source: Statistics Denmark National Accounts, Tables NAT08 and NAT09.

StatLink http://dx.doi.org/10.1787/734826210877

than-usual recession, the slowdown in capital deepening and also the medium-term implications for potential output of the decline in private investment over 2008-10.

Taxation

High tax rates can affect TFP growth through a number of channels, as documented in the recent OECD *Tax and Economic Growth* study (Johansson *et al.*, 2008, Vartia, 2008):

- Personal income taxes have a bearing on entrepreneurship and labour mobility incentives. High marginal tax rates affect both successful entrepreneurs and the skilled people who make crucial contributions in supporting positions. Taxation also influences the international mobility of skilled labour. Being able to attract workers with strong skills is important for firms' capacity to adapt and implement new technologies and processes. Furthermore, high personal income taxes can also affect labour productivity via the incentives to invest in human capital formation (OECD, 2008c).
- Corporate income taxes affect the rate of investment and capital deepening, including in the form of foreign direct investment (FDI). By changing relative factor prices, corporate taxes might also affect TFP by forcing firms to adopt a sub-optimal combination of labour and capital. TFP can also be negatively affected to the extent that corporate taxes reduce incentives to invest in innovation.
- Social security contributions can influence TFP through their effect on relative factor prices. They may lead firms to use sub-optimal combinations of inputs, especially in countries where collective agreements with widespread coverage reduce the ability of firms to pass the incidence of the tax on to labour.

Taxes could be a significant factor affecting productivity in Denmark, since the Danish overall tax burden is the second-highest in the OECD. While the Danish corporate income tax rate is relatively low at 25%, the top marginal personal income tax rate is amongst the highest in the OECD and sets in at incomes only modestly above average earnings.[8] However, the statutory corporate income tax rate has been reduced significantly and marginal tax wedges have trended down in Denmark since the 1980s (OECD, 2008c). Therefore, the slowdown in productivity cannot be ascribed to taxation.

The tax reform package agreed in early 2009 between the government and the Danish People's Party, following on from the recommendations of the Tax Commission, moves Danish tax policy strongly in the direction recommended in the *Tax and Economic Growth* study (Box 1.4 in Chapter 1). While the top marginal tax rate is being reduced by the elimination of the middle tax and the reduction in the rate of the bottom tax (the bottom, middle and top taxes add up to the marginal tax rate as income rises), further reductions in the top tax rate would yield additional benefits. The concomitant increase in the threshold for the top tax rate reduces the tax burden, but further increases in the threshold would be needed in future to avoid bracket creep. Also, reducing the top marginal tax rate by lowering the bottom rate is a very expensive way to reduce the burden for higher income earners compared with cutting the top rate. While further cuts to taxes on above-average incomes might meet with concerns about the impact on equity, lower taxes would lead to changes in skill supply, for example by raising the incentive to take further education, which would probably increase the wages for lower-skilled workers (OECD, 2008c).

Entrepreneurship

Entrepreneurship is an important driver of productivity through the creative destruction process of new, more efficient firms replacing older and less efficient ones. Studies of firm dynamics generally find a significant role of entry and exit for productivity growth in all countries and a stronger role of entry in dynamic industries where new firms may better harness new technologies (Arnold *et al.*, 2008).

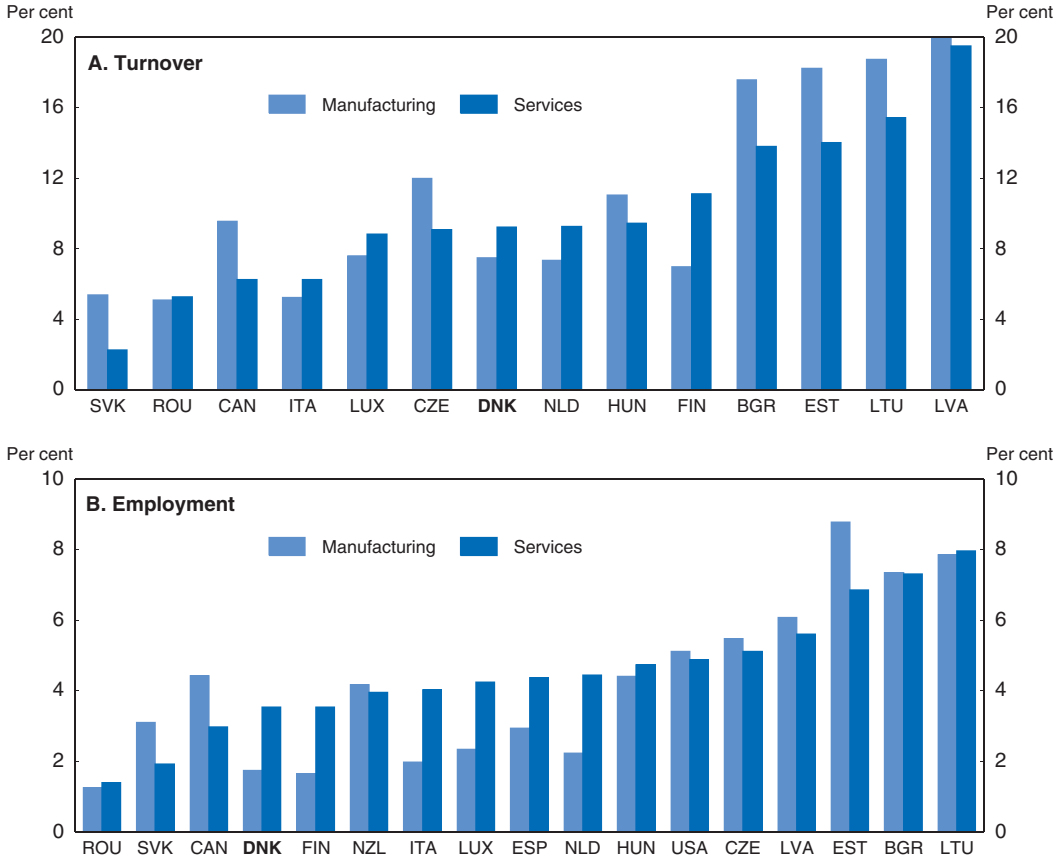
The overall conditions for entrepreneurship in Denmark are generally sound. The World Bank ranks Denmark fifth of 181 countries, and third OECD-wide, on the "ease of doing business" index (World Bank, 2008). The general macroeconomic policy settings are sound, with a strong fiscal framework and a highly credible fixed-exchange-rate monetary policy regime.

The Danish start-up rate has trended up since the early 1990s, despite a marked downturn in 2000-03, and reached 13% in 2005 – amongst the highest in Europe. The percentage of start-ups surviving for three years has also been rising gradually (OECD, 2008a). Overall, one fifth of all Danish private companies either enter the market or close within a year. However, evidence from Denmark suggests that only about 16% of annual productivity growth between 1997 and 2002 can be attributed to replacement of companies via firm turnover, a somewhat lower share than reported in some other countries (Danish Competition Authority, 2009a). Denmark has a lower share of high-growth, recently-established firms than many other OECD countries (Figure 2.8). The share of high-growth enterprises with more than 10 employees has risen when measured in terms of turnover but has been relatively stable in terms of employment (OECD, 2008a).

The government's globalisation strategy set targets for Denmark to become one of the OECD countries with the highest share of high-growth start-ups (Danish

Figure 2.8. **Denmark has a relatively low share of growth enterprises**

Share of growth enterprises, 2005[1]



1. Growth enterprises are all enterprises with average annualised growth in employees (or in turnover) greater than 20% a year, over a three-year period, and with ten or more employees at the beginning of the observation period. The share of high-growth enterprises is compiled as the number of high-growth enterprises as a percentage of the population of enterprises with ten or more employees.

Source: OECD (2008e).

StatLink http://dx.doi.org/10.1787/734836103707

Government, 2006). Accordingly the funds and infrastructure available to support young enterprises with high growth potential have increased substantially. However, the focus on high-growth start-ups in the globalisation strategy might be problematic insofar as recent research suggests that high-potential firms are not necessarily young (OECD, 2008a).

Entrepreneurship education

Greater focus on entrepreneurship in the Danish education system is warranted, along with better evidence to measure the effects of new educational initiatives. The EU Entrepreneurship Survey shows that in Denmark the most important barriers to entrepreneurship are in supply of skills and entrepreneurial capabilities: 28% of respondents indicate this as the main obstacle to entrepreneurship – the highest proportion EU-wide. In the Survey questions about whether schools promote the role of entrepreneurship, Denmark scored much lower than other EU countries (European Commission, 2007). It is estimated that approximately 3 to 5% of all students at Danish universities attend an entrepreneurship course during their studies, compared with 10-20% in leading international universities (OECD, 2008a).

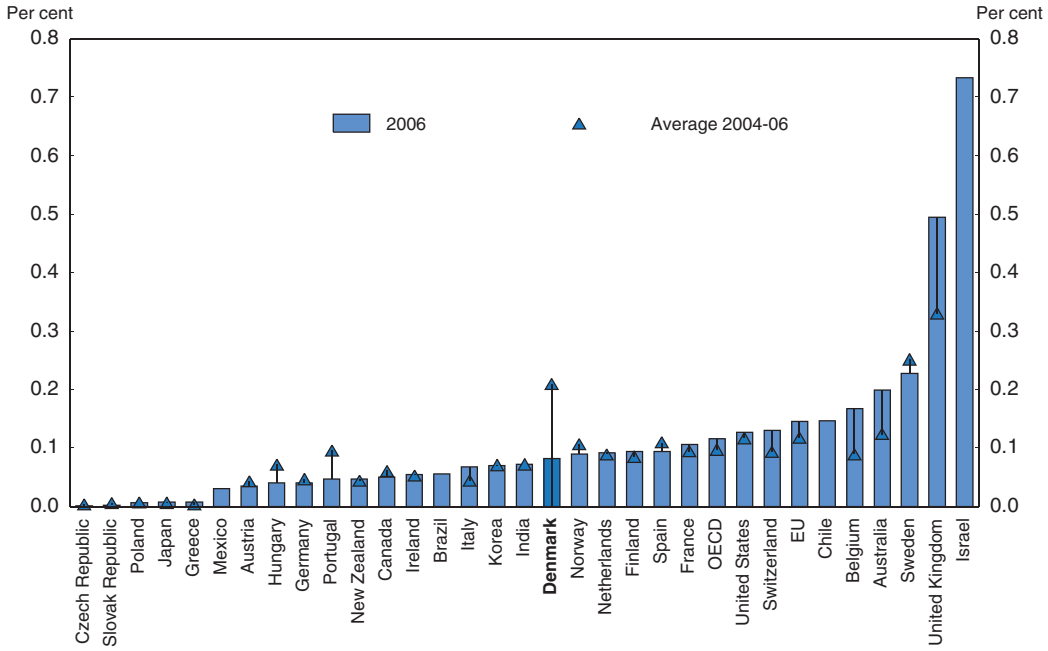
The government's aim to provide access to entrepreneurship courses to all students in tertiary education is commendable. In many countries, entrepreneurship courses tend to be offered only in business and economics schools, whereas innovative and viable business ideas are more likely to arise from technical, scientific and creative studies (European Commission, 2008). At the same time, careful consideration needs to be given to education programme design. There is some evidence that, to be successful, entrepreneurs also need work experience as an employee to complement formal education (Iversen *et al.*, 2008). This suggests that entrepreneurship training programmes should include such employment experience rather than focusing solely on developing the students' own business ideas.

Venture capital

Entrepreneurship may be held back by the small size of the venture capital market. The overall venture capital market is less than 0.1% of GDP, below the OECD average (Figure 2.9). Public funding plays an important role in venture capital through the government-owned venture capital fund *Vaekstfonden* (about 12% of total venture capital investment) and budget funding of the Innovation Incubators programme. The dominant role of public money in venture capital is especially clear in the market for seed finance, where the public investments through *Vaekstfonden* and the innovation incubators account for more than 61% of investment. Venture capital may also be held back on the demand side – that is, too few businesses seeking funding. However, a recent report suggests that over 2005-08 firms funded via venture capital experienced faster growth in employment, sales and exports (Vaekstfonden, 2009).

Figure 2.9. **The Danish venture capital market is relatively small**

Venture capital as a percentage of GDP, 2004-06[1]



1. Venture capital includes the seed, start-up, early development and expansion stages. Later stages and buyouts are excluded except for Mexico, Chile and Brazil. Total OECD excludes Luxembourg, Turkey and Iceland.

Source: OECD (2008a).

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OMX First North in Denmark was launched in December 2005 to provide an alternative investment market for smaller growth companies. Among other things, the intention was to improve the possibility for entrepreneurs and venture capital investors to sell their business, but it has not been particularly successful in this regard due to a lack of share liquidity, limited investments from institutional investors and insufficient monitoring of listed companies.

Expansion of venture capital financing could come through greater involvement of Danish pension funds in the Danish venture capital market. Most pension funds have historically allocated only a very small proportion of their assets to venture capital. In 2005, the government and the pension funds agreed that the latter would aim to double the share of investments in venture capital by 2010. However, the financial crisis is likely to dent pension funds' risk appetite and so attaining the 2010 goal may now be unrealistic.

Other entrepreneurship policies

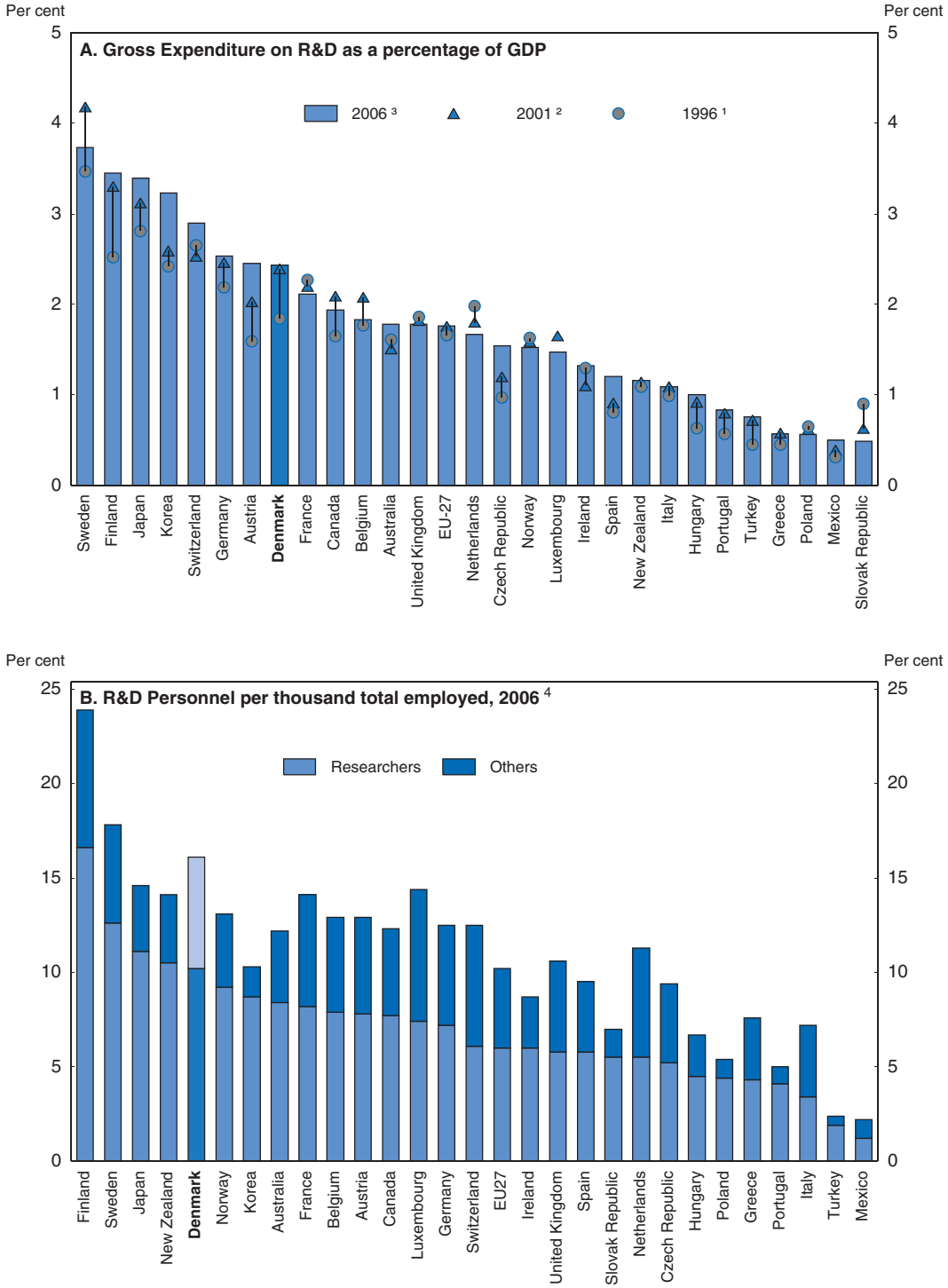
Greater opportunities for foreign high-skilled workers and potential entrepreneurs to move to Denmark could boost entrepreneurship. Denmark has a low share of professional or technically-skilled migrants in total such staff compared with other OECD countries. High marginal tax rates as well as cumbersome administrative arrangements and procedures for visas are obstacles in this area. For example, in September 2009, average regional state administration and Immigration Service processing time for work entry was 2.8 weeks for immigrants from EU member states, just below the target of 3 weeks, and 74 days for immigrants from non EU member states. For the latter type of immigrants, the target of having 90% of all applications processed within a targeted period, which varies between one and two months depending on the application scheme, was not met for half of the schemes in 2009. In a study of attitudes of expatriates in Denmark, work and residence permits and taxation were named as the two areas creating the most problems for foreign knowledge workers (Oxford Research, 2007). The Labour Market Commission's recommendations (Box 1.6) include a number of measures to attract foreign workers, including reducing the income floor in the "Pay Limit Scheme" and expanding the "Positive List", but entrepreneurship might also be served by expanding the "Green Card" scheme, where an existing job offer is not required.

Coordinating the various elements of entrepreneurship policy remains a challenge. The globalisation strategy acknowledged the mutual interdependence of areas like education, entrepreneurship and innovation. The government is currently working on a plan to create more cohesion between different publicly-funded initiatives. It will aim at a "no-wrong-door" approach, where firms regardless of where they enter the system will be guided to the right place.

Research and development and innovation

R&D investment was on a rising trend in Denmark between the early 1980s and the early 2000s, suggesting that the productivity slowdown is not related to a lack thereof. Gross domestic expenditure on R&D in Denmark, at about 2.5% of GDP, is slightly above the OECD average and well above the EU average (Figure 2.10, Panel A). This share rose progressively from 1.75% in the early 1990s to 2.5% in the early 2000s and has been stable since. The percentage of R&D financed by industry is slightly below the OECD average but has risen over the past decade, the share financed by government has fallen and is slightly below the OECD average and the share of R&D financed from abroad is higher than the

Figure 2.10. **R&D spending is relatively high and R&D activities are labour-intensive**



1. 1997 instead of 1996 for Greece, Iceland, New Zealand, Norway and Sweden.
2. 2000 instead of 2001 for Australia, Luxembourg and Switzerland.
3. 2004 instead of 2006 for Australia and Switzerland; 2005 for Iceland, Italy, Mexico and New Zealand.
4. 2005 instead of 2006 for France, Italy, Mexico, New Zealand, Norway and Portugal. 2004 for Australia, Canada and Switzerland.

Source: OECD (2008b).

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OECD average but has been fairly stable. Business R&D is largest in pharmaceuticals, followed by computer and related activities. The number of researchers per thousand employed (full-time equivalent) is amongst the highest OECD-wide and total R&D personnel is the third-highest in the OECD (Figure 2.10, Panel B). The number of firms reporting product or process innovations as a share of the total number of firms is slightly below the average reported in other countries (Danish Competition Authority, 2009a) and the share of turnover from new product innovations is amongst the smallest for OECD countries where data is available (OECD, 2008b).

The link between R&D, innovation and productivity

There is evidence that R&D investment boosts productivity at the firm level in Denmark. R&D-active firms account for close to half of total value added in the private sector, but only for 17% of the total number of firms, reflecting the fact that larger firms are more likely to be R&D-active. R&D-active firms have 40% larger value added per employee than the others, and R&D-active firms have a higher level of value added per employee in all firm size categories, although the difference between R&D-active and inactive firms increases with firm size. Estimates based on a production function approach with R&D capital identified separately suggest that the rate of return to all firms from R&D capital is 11% and that amongst R&D-active firms it is 34% (Graversen and Mark, 2008). The figure for R&D-active firms is significantly higher than found in previous research on Danish data, which indicated a return on R&D capital of 9 to 12% (Smith *et al.*, 2004). In an analysis of OECD countries, a model estimating the impact of sales of new products on firms' labour productivity (sales per employee) finds a strong statistical connection in almost all countries (OECD, 2008b). The magnitude of the coefficient in the model for Denmark is at the lower end of the range of countries, suggesting that innovation has a smaller impact on firm productivity than in some other countries. For Denmark, the overall result appears to be driven by a link between innovation and productivity in manufacturing: no such link being found for services. It may be the case that Danish companies invest a lot in the early stages of R&D activities, for example in pharmaceuticals, which could lead to greater increases production abroad than in Denmark.

Public incentives for R&D

There is Danish evidence that public funding increases business R&D activities, with estimates that a 1% increase in public funding boosts business R&D by between 0.062 and 0.11% (Bloch and Graversen, 2008; Sørensen *et al.*, 2003).[9] Cross-country research supports the view that fiscal incentives for R&D are effective, but their effect is small. Business R&D is more positively affected by a strong non-business R&D sector and strong links between the business sector and non-business R&D. In addition, general framework conditions are important, particularly access to the stock of foreign R&D knowledge and liberal product market regulations (Jaumotte and Pain, 2005). However, there is evidence from cross-country analysis that the link between firms' spending on innovation and receipt of public support for innovation is strong in Denmark relative to other countries (OECD, 2008b).

As discussed in Chapter 1, there is a risk that the financial and economic crisis may have adverse medium-term implications for economic growth, in part because spending on R&D and innovation may be curtailed. In recent years, public-financed R&D expenditure has increased to around 1% of GDP as foreseen in the Globalisation Strategy, with business sector R&D reaching at least 2% of GDP (Box 2.2). The government announced investments

Box 2.2. **Danish R&D policies**

Danish R&D policies are focused on direct financing and linking R&D activities with business. The Ministry of Science, Technology and Innovation allocates research funding both directly and through a number of research funding councils. The Council for Independent Research is the umbrella organisation for five research councils and provides support based on researchers' initiatives. It carries out open competitions based on independent assessment. The Council for Strategic Research supports research based on politically-defined programmes, and gives advice on research and technical subjects and focuses on increased co-operation between public and private research. The Ministry for Economics and Business Affairs, operating through the Danish Enterprise and Construction Authority, looks at entrepreneurship, public-private co-operation, user-driven innovation, regional innovation, design, standards and trade regulations. *Vækstfonden,* the government-owned venture capital fund, invests in early-stage ventures mainly in life sciences, medical technology and high-tech firms. The Danish National Research Foundation is an independent fund which finances larger research activities based on researchers' own ideas and contributes to the development of centres of excellence. A Foundation for High Tech Development funds strategic high-tech projects which involve interaction between public knowledge institutions and companies.

The OECD 2006 *Going for Growth* study on innovation policies made specific recommendations to boost innovation in Denmark. These included strengthening the capacity for cross-border research, thereby complementing recent policy efforts to improve technology transfers, and increasing the share of public research grants allocated on a competitive basis while allowing private and semi-private entities to bid (OECD, 2006). Since then, the government has stepped up efforts to strengthen international collaboration. The Danish research and innovation councils are now allowed to hand over parts of their funds to international bodies or programmes, and thus they are better capable of actively engaging in international R&D collaboration. New Danish innovation centres have been established in Silicon Valley, Shanghai and Munich in order to enhance R&D collaboration and technology transfers. Bilateral science and technology agreements have been signed with China, India and Israel in order to strengthen collaboration with these countries. Since 2006, the Danish government has been working towards increasing the share of public research grants allocated on a competitive basis, with a goal that at least 50% of the funds should be subject to open competition. A new model for competition between universities has been implemented in 2008, with each university's management bidding for large-scale, long-term research projects. A special competitive grant pool has been created in the State Budget for the purpose of financing investments in cross-cutting research infrastructures that are so large that they will be difficult for universities to finance out of their ordinary budget.

of an additional € 1.5 billion in R&D over 2007-10 (Danish Government, 2006). Coincidentally, given the economic situation, the planned increase in R&D funding is well timed.

Consideration could be given to whether tax incentives might be more effective than direct financing of private R&D.[10] In recent years, there has been a shift in OECD countries towards indirect rather than direct public funding. In 2008, 21 OECD countries offered tax relief for business R&D, up from 12 in 1995. Tax credits are appealing because they do not discriminate in terms of fields of research and technology or industry. However, R&D tax incentives may be motivated by tax competition and so need careful evaluation of their

effectiveness (OECD, 2008b). Empirical research has found modest positive effects of R&D tax incentives on raising productivity, and the effect is larger for industries with more R&D. Tax incentives have been found to have generally more effect than direct funding (Johansson *et al.*, 2008; Jaumotte and Pain, 2005). At the same time, deadweight losses may be larger for tax incentives, and the incentives are generally only available for formal R&D, thus having little effect on productivity in sectors where R&D activity is informal (Box, 2009).

Competition and regulation

Countries that have reduced barriers to trade and competition appear to have experienced higher levels and growth rates of productivity. Market-friendly regulations tend to ease the reallocation of resources towards the highly-dynamic firms that tend to drive productivity growth. Regulations that shelter them from competition and increase adjustment costs curb the incentive to exploit their potential. Countries with less restrictive regulatory environments tend to invest more in ICT capital. In ICT-using sectors, inappropriate regulations restrain productivity growth of the best-performing firms – that is, those that are catching up and that are closest to the productivity frontier. In these sectors, firms with relatively better productivity performance are the ones with the potential to further advance the technological frontier (Arnold *et al.*, 2008; Conway *et al.*, 2006; Nicoletti and Scarpetta, 2005).

The Danish Competition Authority's 2009 *Competition Report* indicates that the number of sectors "with substantial competitive problems" has fallen in recent years, accounting for approximately 12% of GVA, as against more than 20% four years ago (Danish Competition Authority, 2009b). This substantial reduction should boost productivity in the long run. However, the connection between this indicator and aggregate productivity growth is not straightforward. The reduction in the number of sectors with competition problems simply represents the number of sectors with competition indicators above a certain threshold level. The indicator does not capture improvements in competition in sectors that are already below the threshold. Conversely, competition issues may not arise in the entire sector but rather in some sub-sectors. The report also calls for the need for regulatory reform in relation to the pharmacy and taxi industries, as well as further changes to the Competition Act to raise fines and improve merger control (Danish Competition Authority, 2009b).

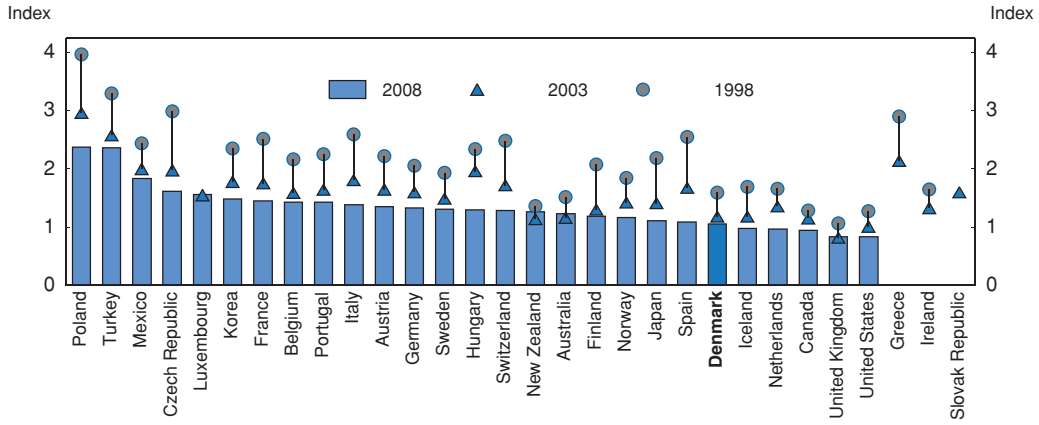
OECD product market regulation (PMR) indicators show Denmark to be a relatively lightly-regulated economy. The extent of regulation has fallen less since 1998 than in many other OECD countries, but this may reflect the fact that Denmark started from a relatively low position (Figure 2.11).

Even with relatively light regulation, there may be additional gains to productivity in the long run from continuing with reforms. The restrictiveness of regulation in Denmark exceeds the OECD average in four areas: license and permit systems, anti-trust exemptions, barriers to entry in services and regulatory barriers to trade and investment (Figure 2.12).

- The above-average value of the indicator for licenses and permit systems stems from the absence in Denmark of a "silence is consent" rule (where licenses are issued automatically if the licensing office has not acted by the end of the statutory response period).

Figure 2.11. **Product market regulation is relatively liberal**

Index of overall product market regulation



Source: OECD Product Market Regulation Database.

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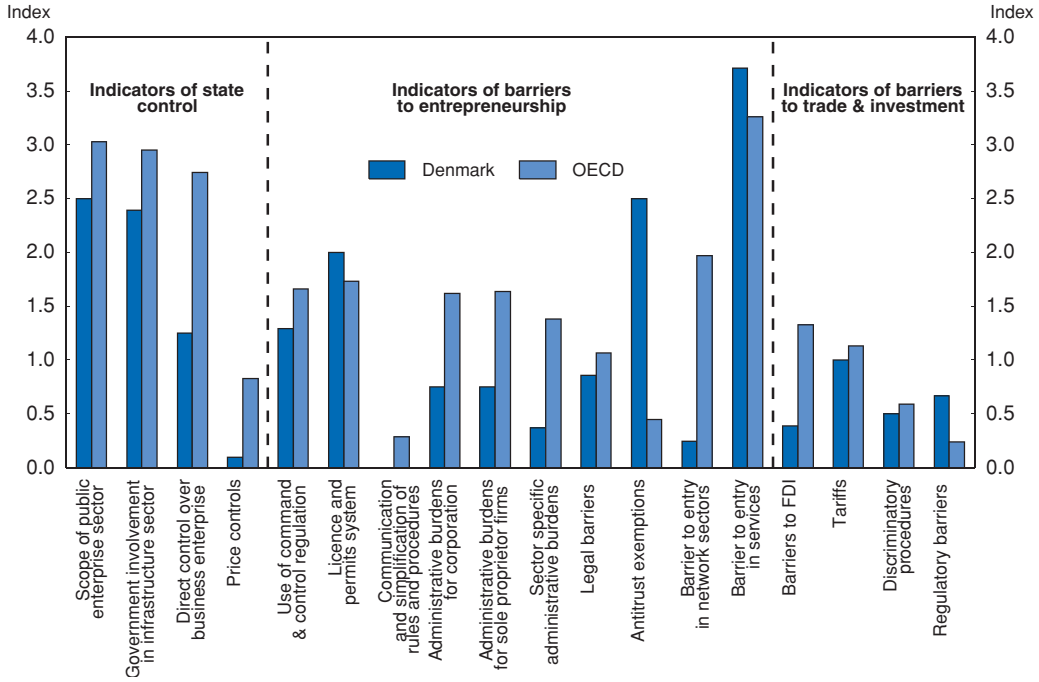
- The relatively high value of the indicator of anti-trust exemptions for public enterprises or state-mandated actions reflects a clause in the Danish Competition Act which provides for exemptions from the law when an anti-competitive practice is a direct consequence of public regulation. One-third of the OECD countries that responded to the relevant questions of the PMR indicator survey have such exemptions.

Figure 2.12. **Regulation could be lower still in a few areas**

PMR low-level indicators in 2008[1]



1. For Greece, Ireland and the Slovak Republic, the indicator values for 2003 are used since 2008 data was not available at the time of writing.

Source: OECD Product Market Regulation Database.

StatLink http://dx.doi.org/10.1787/735167537340

- The high value of the PMR indicator for barriers to entry in services is primarily due to the legal services profession having exclusive rights to provide an array of services. Also, in retail distribution, Denmark is amongst the one third of OECD countries in which professional bodies or representatives of trade and commercial interests are involved in licensing decisions. In addition, Denmark has a relatively low threshold for the surface area above which regulation of large retail outlets applies. Indeed, the Planning Act puts strict limits on the size and placement of new shops, impeding entry in the retail market. Furthermore, approval decisions are made partly based on discretionary assessments of market need by local or regional authorities (Jørgensen, 2005).
- The above-average value of the PMR indicator for regulatory barriers to trade and investment comes about because Denmark is one of a handful of OECD countries that does not have specific provisions which require or encourage regulatory administrative procedures to avoid unnecessary trade restrictiveness.

Greater competition could also be achieved in a number of areas where Denmark's PMR is below the OECD average. For example, there is still relatively widespread public ownership. Government commissions are currently considering liberalisation of the railway sector and the national postal service. Also, there is a relatively high level of government involvement in infrastructure sectors. There is scope for liberalising retail opening hours (which may not have any direct beneficial impact on productivity but would improve consumer choice) and reducing the regulation of the legal sector.

Enhancing competition in the public sector could boost economy-wide productivity by improving the efficiency of services delivered to the private sector.[11] Reducing red tape affecting businesses would work in the same direction. In March 2009, the government unveiled a new package of reforms to that effect, including providing better conditions for starting and operating businesses. It will facilitate access to the authorities, make it easier to file accounts and is meant to allow a new company to be established within seven to eight hours. The government estimates that these measures will save businesses up to DKK 4 billion per year in administrative expenses (Danish Ministry of Economic and Business Affairs, 2009). Efforts to improve the overall quality of regulation could be helped by an overall vision for regulatory reform, covering regulation impact assessment, quality control, public consultation processes and processes to review the stock of regulation in addition to assessment of new regulations (OECD, 2009).

Foreign direct investment

There is a theoretical connection between inward FDI and productivity, through imitation, technology transfer, labour mobility and investment in training of locally-engaged staff, increased competition and expanding market size by creating export spillovers (Görg and Greenaway, 2004; Lesher and Miroudot, 2008). The evidence of these effects is mixed, although this could be because studies have tended to focus on within-industry effects, whereas the benefits might be more likely to accrue to other, related industries such as suppliers and distributors (Kugler, 2005).[12] It could also be the case that spillovers are stronger in services while many studies have focused on manufacturing. There is evidence of strong productivity effects of FDI in services, particularly through linkages with downstream customers and linkages between trade openness and the productivity benefits of FDI (Lesher and Miroudot, 2008). The most recent official Danish study on the connection between inward FDI and productivity provides weak evidence that

sectors with high inflow of FDI tend to have higher productivity (Danish Ministry of Economic and Business Affairs, 2003).

To the extent that there are links between FDI and productivity, Danish conditions suggest that FDI should be supporting productivity performance. The stock of inward FDI in Denmark was 45% of GDP in 2005, as against some 21% for the OECD as a whole (reflecting low inward FDI stocks in large OECD countries like the United States and Japan). Manufacturing accounts for a modest share of the aggregate stock of inward FDI, the bulk of which is concentrated in services, business activities (such as legal, accounting, book-keeping and auditing activities; tax consultancy; market research and public opinion polling; business and management consulting). Denmark ranks below the OECD average in the restrictiveness of regulations towards FDI and the ranking would be lower if it had fewer restrictions in legal services, accounting and air transport (OECD, 2007a).

To increase potential for spillovers between FDI and productivity, the focus should remain on policies that promote openness to trade, a generally sound business environment and nurture the capacity of domestic firms and workers to learn new techniques from foreign producers. In this regard, and alongside the policies related to entrepreneurship and competition discussed above, the Danish government has focused on improving labour supply through reductions in income taxes and efforts to step up international recruitment.

Labour market policies and human capital

Labour market policies can affect productivity growth through various channels. Overly strict statutory employment protection legislation appears to dampen productivity growth, by restricting labour mobility into higher-productivity firms. Higher minimum wages appear to be associated with higher productivity levels but it is not clear whether this results from improved incentives to invest in training or substitution of skilled for unskilled workers. Reforms that reduce the generosity of unemployment benefits could depress productivity by reducing the time and resources available to workers to find well-matched jobs, but activation policies could replicate the positive effects of generous unemployment benefits by improving the quality of matches. Parental leave is also estimated to have a positive impact on productivity (OECD, 2007b). Denmark has relatively liberal employment protection legislation (apart from protection for collective dismissals, which is above the OECD average), no statutory minimum wages and relatively generous parental leave arrangements. However, unemployment benefit duration is amongst the longest in the OECD, at four years, but active labour market programmes are extensive.

General increases in the skill level of the population lift productivity insofar as higher-skilled workers have higher productivity. A higher-skilled workforce can create the impetus for restructuring of production towards higher-value-added activities. Human capital is also important in relation to entrepreneurship since a combination of formal training and work experience contributes to the emergence of successful entrepreneurs. Human capital is important for R&D and the spillover effects of FDI since the benefits are greater when employees have the skills to adapt to new technologies, techniques, and processes. Businesses need to have highly-qualified staff who have sufficient knowledge to deal with specialists in academia and translate their insights for operational purposes in the firm (Graversen and Mark, 2008). Recent research, which attempts to explain TFP growth in the Nordic countries, documents that human capital (measured by tertiary educational enrolment) has been a strong contributor to TFP growth in Denmark, but that the

contribution has declined since 1996. Simulations suggest that if Denmark raised its tertiary educational enrolment to the US level by 2015, the contribution to TFP growth from human capital development could be significantly higher in 2006-15 than in 1996-2005 (Skaarup and Blomquist, 2009). Given the important role of human capital in productivity improvement, the following chapter reviews Danish human capital and education policies in detail.

Box 2.3. **Main recommendations on productivity**

A robust macroeconomic policy framework, openness to trade and investment and a sound general business environment are all conducive to productivity growth. Further specific measures to boost productivity in the long run are listed below.

- The government's tax reforms can be expected to promote entrepreneurship and human capital formation. Further reductions in income taxes on higher-income earners would magnify this effect.
- Entrepreneurship policies should not focus too narrowly on young high-growth firms since there is evidence that not all high-growth firms are young.
- 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.
- Further efforts are needed to streamline immigration processing to ensure that high-skilled workers can quickly and easily migrate to 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 "silence-is-consent" rule, whereby licenses are issued automatically if the licensing office has not acted by the end of the statutory response period, needs to be introduced.
- The "market need" discretion in approval of retail outlets in the Planning Act ought to be removed and size and placement restrictions reviewed.
- The regulatory framework for legal services needs to be reviewed to identify unnecessary restrictions on competition.

Notes

1. Productivity is measured as GDP per hour worked, rather than per worker, to capture the effect of changes in working hours. Industry-level analysis measures productivity as gross value added per hour worked.
2. This aggregate masks a strong growth in productivity in the mining sector during the 1990s, due to oil discoveries in the North Sea, which has recently reversed as production has declined.
3. Denmark currently has an exemption until 2012 from European Commission guidelines to move towards an output-based approach to measuring the public sector in the national accounts.
4. The high tax burden and potentially greater regulation associated with a large government sector might indirectly affect labour productivity. However, other countries with large public sectors such as Sweden and Finland have not experienced the same weak productivity performance. Also, the Danish public sector has not expanded since the 1980s.
5. In this simulation, labour heterogeneity is only in the form of existing and new workers, no account being taken of skill heterogeneity.
6. The capital services approach weights the growth in the capital stock for each asset by the user cost of that asset, rather than purchase prices. This allows for a greater impact on the capital

services series if there is an increase in investment in assets with high marginal products. ICT assets are generally thought to have higher user costs and high marginal products, so a shift in the capital stock towards ICT assets would be associated with increased growth in capital services. The implication for productivity analysis is a higher contribution from capital deepening and a lower contribution from TFP growth. Conceptually, this approach embodies improvements in the productivity of capital into capital deepening rather than into TFP. See Schreyer (2002) for further details.

7. The slowdown in growth of the capital/labour ratio is by no means unique to Denmark. Several other OECD countries, including Belgium, Canada, Finland, France, Japan, New Zealand, and Spain, have recorded sharper reductions in the growth of the capital labour ratio than Denmark, when comparing the periods 1981-92 and 1993-2006. All of these countries, with the exception of Canada, have experienced a slowdown in labour productivity growth over the same period. In the case of Spain, New Zealand and Japan, the slowdown in labour productivity growth was more pronounced than in Denmark; for Belgium, France and the Netherlands, the slowdown was about the same as in Denmark and for Finland the slowdown was significantly milder.

8. The *Taxation and Economic Growth* study highlights the link between taxes and entrepreneurship, noting that the effect of taxes is likely to be stronger in industries with high rates of enterprise creation and in countries with highly regulated product markets. While the latter is not the case in Denmark, there is a high rate of firm creation (OECD, 2008a). Furthermore, the enterprise creation rate is relatively evenly distributed across industries, with enterprise creation rates well below average only in agriculture, fishing and quarrying and electricity, gas and water supply.

9. The latter study found that public innovation support has an indirect positive effect on productivity, but the estimate is insignificant and the bulk of the variation in productivity is related to domestic productivity shocks and spillovers from foreign R&D capital.

10. In OECD (2008b), Figure 2.3 indicates that the tax treatment of R&D in Denmark is close to the average for OECD countries. However, this overstates the true extent of the tax incentive since the result is largely driven by an R&D tax concession available to firms that collaborate with universities. In the calculations underlying Figure 2.3, this incentive is treated as if it applied to all firms. Without the collaborative tax concession, Denmark would record a small negative value for the overall tax subsidy to R&D.

11. Outsourcing or private provision of publicly-funded services could boost the level of measured productivity to the extent that it results in activities being carried out in the market sector where productivity is measured separately rather than the public sector where outputs are assumed to be broadly equal to inputs.

12. Multinational companies that undertake FDI in a country might seek to protect their firm-specific technical knowledge from domestic competitors in the same industry in order to protect their market share.

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ANNEX 2.A1

Background technical analysis

Growth accounting and simulated impact of increased capital deepening

Growth accounting estimates presented in Table 2.1 were calculated according to the methodology outlined in Timmer *et al.* (2007). In this production-function framework:

$$GDP_t = A_t L_t^{\alpha} K_t^{(1-\alpha)}$$

where *A* is total factor productivity, *L* quality-adjusted hours worked and *K* capital services. This expression is rearranged to measure labour productivity growth as follows, where *H* is total hours worked:

$$\Delta \ln\left(\frac{GDP_t}{H_t}\right) = \Delta \ln(A_t) + \alpha_t \Delta \ln\left(\frac{L_t}{H_t}\right) + (1-\alpha_t)\Delta \mathrm{h}\left(\frac{K_t}{H_t}\right)$$

where α = *compensation of employees/(GDP – indirect taxes + subsidies)*. In growth terms, *L* captures the effect of a shift the composition of the workforce towards workers with relatively higher skills, as measured by level of educational attainment. *L* is constructed as an index using the following relationships:

$$\Delta \ln L_t = \sum_j \bar{v}_{jt} \Delta \ln H_{jt}$$

and $$\bar{v}_{jt} = \frac{1}{2}\left(\frac{w_{jt}H_{jt}}{\sum_j w_{jt}H_{jt}} + \frac{w_{jt-1}H_{jt-1}}{\sum_j w_{jt-1}H_{jt-1}}\right)$$

The *j*'s in these expressions represent categories of employees grouped by age (15-29, 30-49 and 50+), sex (male and female) and skill level (low, medium and high). The skill levels are based on educational attainment with high-skilled being employees who have completed a long cycle higher education, medium-skilled employees who have completed a medium or short cycle higher education or a vocational education and training programme, and low-skilled employees who have only basic schooling. The *w*'s represent the wage level per hour worked for each of these groups. The data used for these variables was taken from the EU-KLEMS database.

The expression for labour productivity growth is solved for *A*. The contributions to growth in labour productivity are then calculated according to the three terms on the right, for TFP, labour quality and capital deepening respectively.

This production function was then used to simulate the impact on labour productivity of higher growth in capital services. Given the observed total hours worked, the capital

services series was adjusted to ensure an annual increase in the capital/labour ratio of 3.8% (*i.e.* the average for 1981-92) between 1993 and 2005. This artificial capital series was then used, along with the originally estimated TFP series and the observed total hours to recalculate GDP and labour productivity growth. Under these assumptions, growth in GDP per hour worked was boosted by about one-quarter of a percentage point per year on average between 1993 and 2005.

Industry-level contributions to labour productivity growth

Aggregate labour productivity growth can be approximated by the following relation:

$$LP\ growth_t = VA\ growth_t - hours\ growth_t$$

where VA is value added. This approximation can then be decomposed as the sum of the contributions to aggregate VA growth in each sector i and the contribution to growth in labour input for each sector i (OECD, 2001):

$$LP\ growth_t = \Sigma_i[(nominal\ VA_{it-1}/nominal\ VA_{t-1}{}^{*}VA\ growth_{it}) - (hours_{it-1}/hours_{t-1}{}^{*}hours\ growth_{it})]$$

A sector can make a positive contribution to growth in aggregate labour productivity even if it experiences negative productivity growth, for example, if it has a large share of aggregate value added but a small share of aggregate hours – that is, a high productivity level. This is the case with the letting and sale of real estate sector, which recorded negative productivity growth on average over 1993-2006. Since its level of labour productivity was five times the economy-wide level, the contribution to growth in labour productivity from growth in value added outweighed the subtraction from growth in labour productivity due to growth in hours worked.

Stylised illustration of the effect of labour composition on productivity

Some simple calculations have been conducted to assess how productivity performance is affected if new workers entering the labour market are initially less productive than existing workers. They rest on the assumption that labour heterogeneity only takes the form of existing *versus* new workers, no account being taken of skill heterogeneity. The productivity of the existing stock of hours worked is assumed to grow by 2.4% per annum, *i.e.* growth remains constant at the average observed during the 1980s. The calculations examine the increase in employment since 1993, assuming average hours worked per worker is constant from 1993. This adjustment is made since it is assumed that an additional hour worked by someone already employed is as productive as the hours he or she already worked, but that additional employees may have lower productivity levels than existing employees.

As the stock of hours worked grows, the extra hours are assumed to have 50% of the level of productivity of the existing stock in the first year and 75% in the second year. By the third year, the additional hours worked are assumed to have caught up to the original stock of hours in terms of productivity levels. From that point on, the new hours worked record the same productivity growth rate as the initial stock of workers. Under these assumptions, the observed trend increase in employment leads to a reduction in aggregate productivity growth of around 0.09 percentage points on average between 1993 and 2006.

The calculations were conducted again with the same assumptions about the initial level of labour productivity and the rate of catch-up, but assuming that the added hours record productivity growth of only 1% per year, while the existing stock records productivity growth of 2.4%. This reduces aggregate labour productivity by around

0.13 percentage points per year on average between 1993 and 2006. Assuming that the new workers had half of the original stock's labour productivity level but that it grew at twice the rate, implying a slow rate of catch-up to the productivity level of the existing stock, aggregate labour productivity growth would slow by about 0.25 percentage points. Assuming that the new hours had 50% productivity and the same growth as the existing stock (that is, no catch-up), aggregate labour productivity growth would be reduced by about 0.3 percentage points (Table 2.A1.1).

Table 2.A1.1. **Scenarios on the possible impact of new workers having lower productivity than existing workers, 1993-2006**

Productivity level of new workers relative to existing stock (%)		Productivity growth rate after transition period (%)	Change in average productivity growth relative to baseline of 2.4% (%)
First year	Second year		
90	95	2.4	–0.02
80	90	2.4	–0.04
60	80	2.4	–0.07
50	75	2.4	–0.09
50	75	1	–0.13
50		4.8	–0.25
50		2.4	–0.29
50		1.2	–0.31

Source: OECD calculations based on data from *OECD Analytical Database*.

Shift-share analysis of capital intensity

Capital intensity is calculated as the share of national income going to capital. This is measured as:

KI = 1 – (compensation of employees/GVA – other taxes less subsidies on production)

This can be decomposed by industry:

$$KI_t = K_t / VA_t = \frac{\sum_i K_{it}}{VA_t} = \sum_i (K_{it} / VA_{it} * VA_{it} / VA_t)$$

with VA_i representing value added in industry i.

Defining $VAshare_{it}$ as VA_{it}/VA_t, the percentage change in capital intensity (*KI*) can be decomposed as follows:

$$\Delta KI_t / KI_{t-1} = \frac{\sum_i (\Delta KI_{it} * VAshare_{it-1})}{\sum_i (KI_{it-1} * VAshare_{it-1})} + \frac{\sum_i (KI_{it-1} * \Delta VAshare_{it})}{\sum_i (KI_{it-1} * VAshare_{it-1})} + \frac{\sum_i (\Delta KI_{it} * \Delta VAshare_{it})}{\sum_i (KI_{it-1} * VAshare_{it-1})}$$

Where deltas refer to the change between 1993 and 2006 and all other variables refer to the level in 1993. The first term on the right is the effect on the aggregate percentage change in capital intensity of changes in capital intensity within each industry (within effect). The second term measures the impact of changes in the share of value added assuming the original capital intensities within each sector (between effect). The third term measures the combined effect of changing capital intensity and value added shares in each industry (cross term). The analysis was carried out using eight sectors (agriculture, fishing and quarrying; manufacturing; electricity, gas and water supply; construction; wholesale and retail trade; transport, post and telecommunication; finance and business activities; public and personal services).

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Chapter 3

Human capital: key to higher productivity

Human capital is a major determinant of growth in productivity and national incomes. Adopting new technologies requires a skilled workforce with capacity to adjust. In this regard, Denmark is in a relatively strong position, with gradual improvements in school outcomes and ample provisions for life-long learning. However, home-grown talent may not be sufficient for Denmark to remain a good location for firms wanting to be at the global cutting edge. This chapter first reviews labour market outcomes to assess trends in skill supply and demand. Thereafter it goes through the key policy issues, covering: compulsory education, where learning outcomes can still improve; upper secondary education, where completion rates must rise to avoid future labour market exclusion; and tertiary education, whose supply of top talent seems not to be keeping pace with demand.

Human capital has traditionally been a strong point for the Danish economy, boosting income levels and the economy's capacity to adjust, but there is room for improvement. The productivity slowdown, analysed in Chapter 2, calls for a review of policies affecting the creation, allocation and use of human capital. Skill mismatches and the resulting unemployment spells could be reduced through enhanced early education, even though the positive results will take years to materialise. Increasingly skill-intensive labour demand requires large investments in education to create a matching supply. But if this investment were to be met entirely *via* public funding, it would add to the fiscal challenges of ageing and drive up taxes. Those taxes, however, are already an important reason behind short working hours of skilled labour and compound some of the adverse incentives in the education system. The policy challenges are therefore not just about what happens in schools and universities, and human capital policies must be considered in a wider economic perspective. For example, the extensive income redistribution via high taxes and generous benefits also shapes the relative attractiveness of different educational choices as well as the supply of graduates. Accordingly, this chapter analyses human capital with an emphasis on economy-wide linkages. After disentangling how labour market outcomes vary across skill categories, it reviews learning outcomes and policies in compulsory education. The chapter then turns to upper secondary and thereafter tertiary education. The international mobility of students and skilled professionals is also considered.

Educational attainment and market outcomes

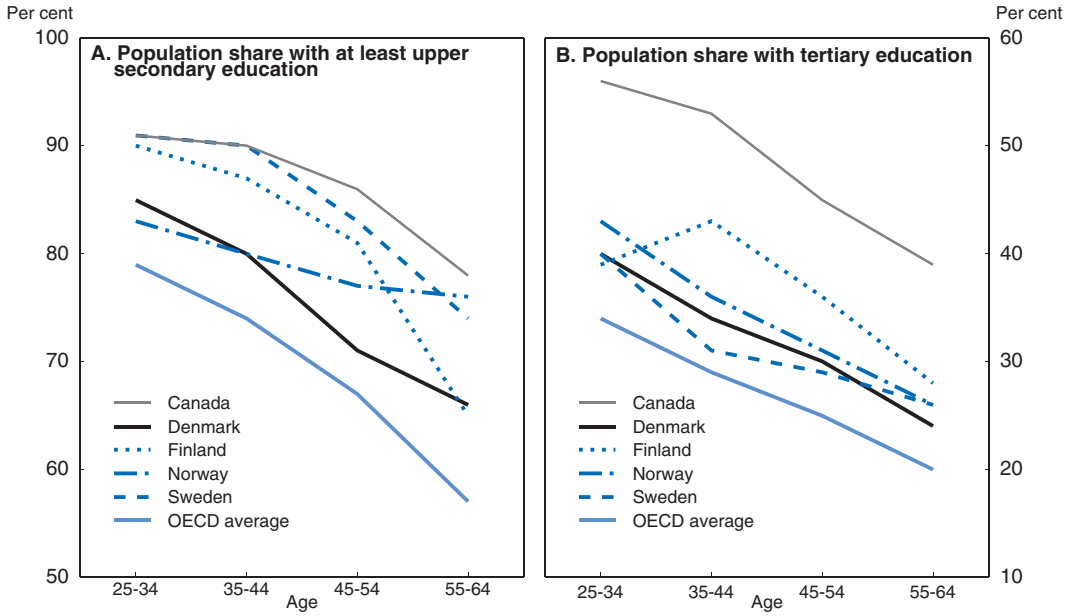
By international standards, educational attainment is relatively high in Denmark. The population share having attained upper secondary education far exceeds the OECD average, though it is below that of Canada, Norway and Sweden. The share having attained tertiary education is also above the OECD average, but here the distance to the leading countries, such as Canada, is larger (Figure 3.1).

Based on current student flows, projected completion rates for tertiary education, after rising significantly during the 1990s, have declined somewhat in recent years, with less than half of each youth cohort now likely to complete a tertiary degree (Figure 3.2). The share set to attain at least upper secondary remains at some distance from the government's objective of 95% for 2015. Short-run movements in projected completion rates should, however, not be over-interpreted. In particular, the 2007-08 economic boom saw severe labour shortages, which likely encouraged higher employment among youth and temporarily reduced projected completion rates for upper secondary programmes (given the way this is estimated in the Danish government's model). Moreover, the 95% target may need to be revised in order to realistically take account of certain types of vocational education not currently included.

Education completion differs considerably across national origin and gender. For the share completing at least upper secondary education, the gap between persons with immigrant *versus* Danish origin widened to more than 20 percentage points in the mid-

Figure 3.1. **Educational attainment compared internationally**

In 2007[1]



1. International comparisons shown in this chapter are all based on the ISCED classification of educational programmes as applied in the *OECD Education at a Glance* publication. In ISCED the concepts of upper secondary and tertiary education tend to be wider than the similar Danish concepts used in national statistics shown in this chapter. Based on the national concepts underlying Figure 3.2, the share of 35-44 year olds having completed secondary and tertiary education, respectively would be only 80% and 34% in 2007, *i.e.* lower than when based on the internationally-comparable concepts.

Source: OECD (2009a), *Education at a Glance*.

StatLink http://dx.doi.org/10.1787/735168800422

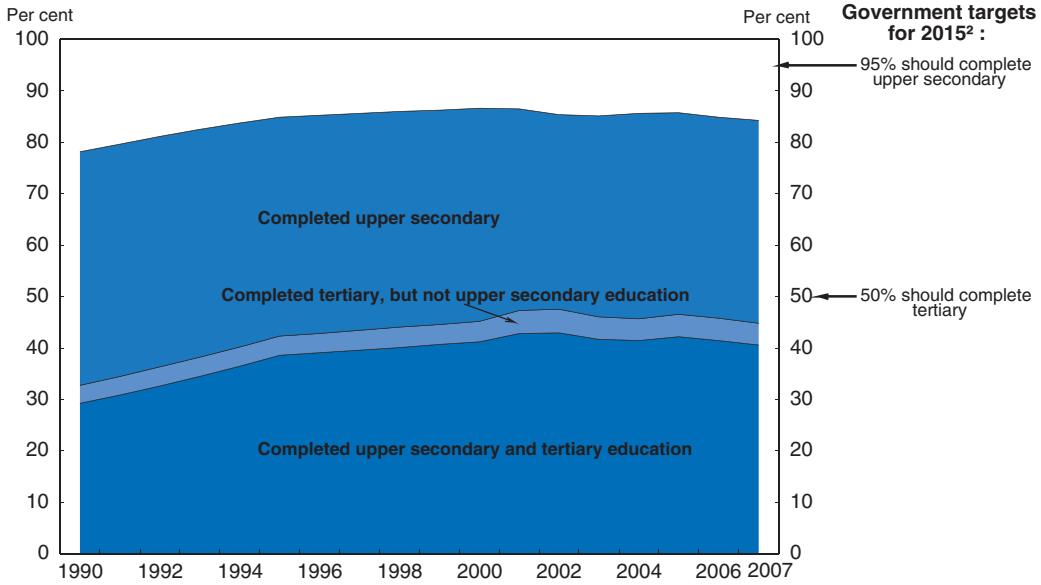
1990s.[1] Although it has narrowed steadily since, it remains wide, at 14 percentage points in 2007. Meanwhile, gender differences have become a more important component of the gap. Among persons of Danish origin, the share of women completing at least upper secondary education remains 6-8 percentage points higher than that of men. Among persons of immigrant origin, women have improved their position far above that of men with the gender gap widening from eight percentage points in 1990 to 15 percentage points in 2007 (UNI-C, 2009).

For tertiary education, the gender gap has tripled in less than two decades and now far exceeds differences between native Danish and those of immigrant origin. For persons with immigrant and Danish origin alike, the share of women completing tertiary education was about 5 percentage points higher than for men in 1990, but this has widened to over 15 percentage points in 2007. The share of women of immigrant origin completing tertiary education is now 10 percentage points higher than that of men of Danish origin (UNI-C, 2009).

Youth unemployment has not been a problem area in recent years. At 7.5% in 2006, before the peak of the economic expansion, the unemployment rate for 15-24 year olds was among the lowest in the OECD and well below some neighbouring countries (OECD, 2008b). Virtually no youth unemployment spells lasted more than a year, partly because activation programmes set in before then. Such low rates and short spells may nevertheless be difficult to sustain during the current deep downturn. With rising unemployment and early activation requirements, resources in public employment service offices are likely to be stretched, as discussed in Chapter 1.

Figure 3.2. **Completion of post-compulsory education compared over time**

Projected completion rates 25 years after leaving compulsory education[1]



1. Based on the so-called profile model which estimates the theoretical completion rate 25 years after leaving compulsory education given behaviour and transition frequencies across the education system and age groups in a given year. Immigrants are only included if having arrived in the country at age 15 or before.
2. These targets were established in the Danish government's strategy *Progress, Innovation and Cohesion* (Danish Government, 2006).

Source: UNI-C (2009).

StatLink http://dx.doi.org/10.1787/735235480674

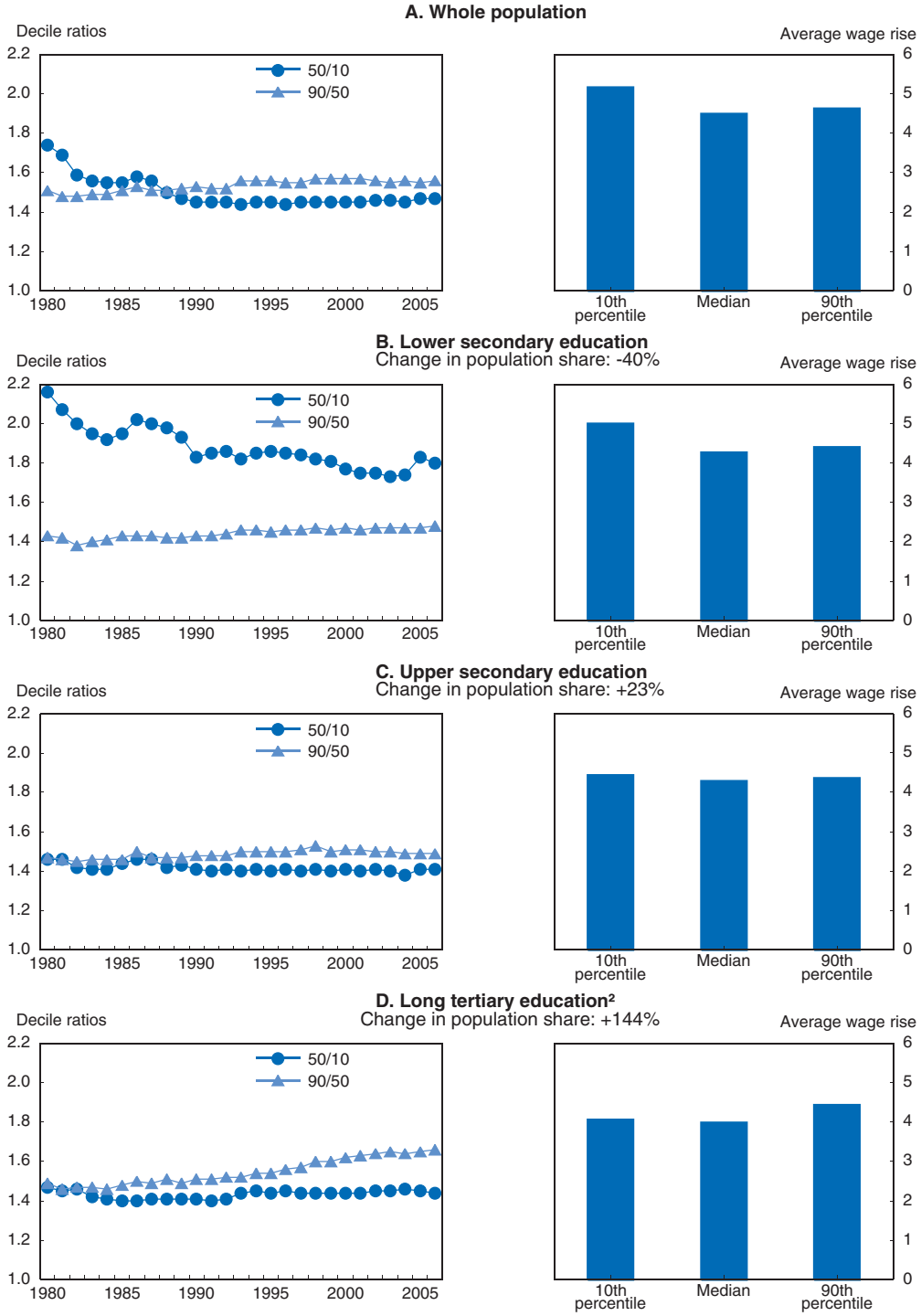
Unemployment amongst older workers is around the OECD average, but increases sharply amongst people in their mid-50s relative to the rest of the Danish labour force. Over the current decade, on average, Danish unemployment rates have been below the OECD total for each age cohort except for 55-59 year olds. This may be because workers who are laid-off in their late 50s do not search intensively but remain unemployed until eligible for the voluntary early retirement pension scheme at age 60. As discussed further below, unemployment is generally lower amongst people with higher levels of education and this applies also to older workers. As shown in Chapter 2, the proportion of total hours worked that is undertaken by higher-educated workers is growing, but at a slower rate in recent years. In general, replacement of low-skilled workers who retire from the labour market with higher-skilled young people would boost the skill level of the workforce, but this effect may be waning in Denmark. The share of the workforce aged 60-64 with only basic schooling was around 23% in 2008, compared to almost 40% in 1997. In 2008, the share of 60-64 year-olds in employment with tertiary education was about the same as the share for 25-29 year old employees.

Diagnosing the economy's demand for skills

To assess movements in the balance between skill supply and demand, a useful first approach is to look at movements in the distribution of wages. For the employee population as a whole, the distribution of hourly wage earnings has narrowed over the past quarter century. Low-income earners had relatively strong wage increases, leading to compression of the lower part of the distribution during the 1980s (Figure 3.3, Panel A).

Figure 3.3. **Earnings distribution across and within skill categories**

Based on hourly wage earnings of employees, 1980-2006[1]



1. The figures show the distributions of individual (not family) gross wage earnings per hour worked. All employees with non-zero wage earnings are included, irrespective of age. The percentiles are counted in ascending order so that the 10th percentile represents a low-income individual, and the 90th percentile represents a high-income individual.
2. Long tertiary education is 18 years of schooling leading to a master's or doctoral degree.

Source: Own calculations based on micro data for the entire Danish population drawn from the *IDA Database*, Statistics Denmark.

StatLink http://dx.doi.org/10.1787/735247551843

Meanwhile, median-income earners had slightly weaker wage rises than high-income earners, leading to a slight widening of the upper part of the distribution.

The compression in the lower part of the earnings distribution may reflect two factors in particular. First, gradual turnover with more trained generations coming into the labour market and ample adult education offers has reduced the number of low-skilled workers considerably. The share of the working-age population having only lower secondary education nearly halved over the past quarter century. Second, earnings have become more homogenous among employees with only lower secondary education (Figure 3.3, Panel B). Much of this compression came during the 1980s, in parallel with a strong rise in the number of working-age adults living from passive income benefits, as wage formation emphasising stronger relative increases for low-income groups tended to squeeze the lowest-skilled out of the labour market. No similar earnings compression happened among those with upper secondary education.

Among those with long tertiary education (18 years of education, leading to a masters or doctoral degree), the earnings distribution has steadily widened with the top gradually increasing its advantage relative to the median (Figure 3.3, Panel D). Most likely, this results from growing demand for top talent – a demand that wider enrolment to tertiary education has not fully been able to satisfy.

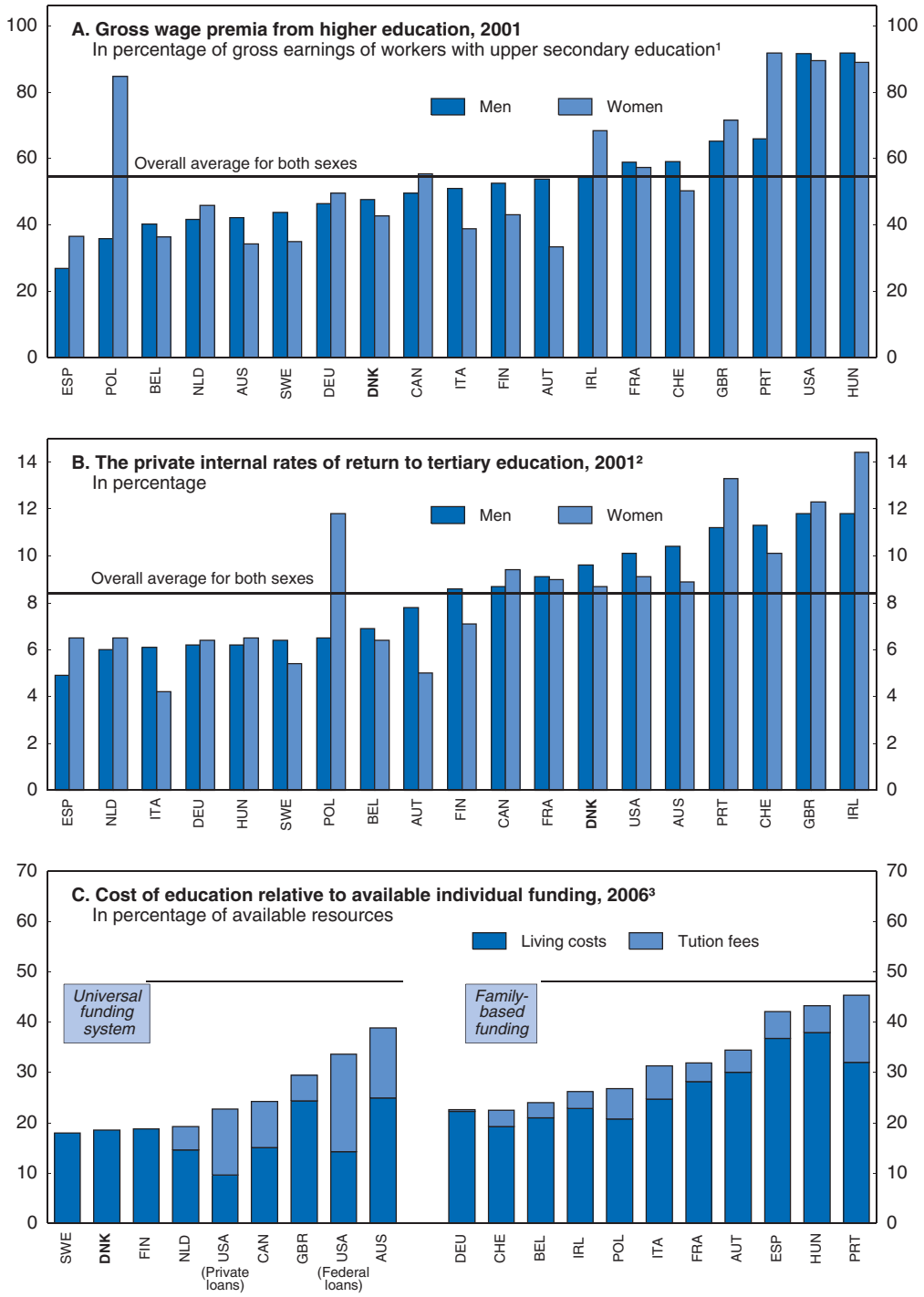
More elaborate quantitative analysis (Annex 3.A1) further shows that:

- The number of years of education has become a more important determinant of individual earnings over recent decades, while the importance of experience has declined (Table 3.A1.1). In particular, wages for those with long tertiary education have increased steadily in relative terms.
- Meanwhile, education has become less of a protection against unemployment, even though the low-skilled remain more exposed to the risk of unemployment (Table 3.A1.4). This could reflect more rapid technological change rendering skills obsolete. A move towards educational choices based less on employment prospects and more on other benefits of studying may also contribute. In principle, it could also reflect wider access to education or that labour market institutions and policies have become better at achieving employment for the low-skilled.

By international standards, the wage premium associated with completing tertiary education in Denmark is below the OECD average. Internal rates of return compare more favourably with other OECD countries, reflecting a balance of opposing factors: free tuition and grants covering living costs push returns up, while high marginal taxes pull them down (Figure 3.4).

While the broad base of workforce skills is seen as a strong advantage by employers, firms wanting to have a global lead often point to a lack of top talent as an impediment for doing business in Denmark. A skilled domestic workforce is necessary to expand knowledge-intensive production and services to replace low-skilled jobs. But to reap the full benefits of globalisation it must also be recognised that knowledge itself is global in nature. A national education system and home-grown talent are not sufficient; unique and diverse talent from abroad must also be welcomed to a larger extent. A key obstacle pointed to is the high tax pressure and strong tax progressivity, meaning that high income earners pay well over half of their income in labour taxes if they stay in Denmark over three to five years. The World Economic Forum Global Competitiveness Report indicates that tax rates and regulations are among the most problematic factors for doing

Figure 3.4. **Wage premia, internal rates of return and living costs**



1. The figure shows how much gross earnings of persons with tertiary education exceed gross earnings of persons with upper secondary education.
2. Rate of return include wage, employability, unemployment benefit and pension premia associated with tertiary education and are adjusted for taxation. They also include the opportunity and direct costs of education. They are calculated assuming that labour productivity grows at 1.75% per year in all countries.
3. Available individual funding includes student loans and grants, expected earnings from part-time work and family resources.

Source: OECD (2008c).

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business in Denmark (World Economic Forum, 2009). A recent survey of foreign firms showed that one-third identified high marginal tax rates as the biggest barrier to foreign investment in Denmark (Slotsholm, 2008). Furthermore, it is sometimes argued that foreigners find it difficult to integrate into Danish society and the labour market. A survey of expatriates in Denmark found that one-third of all foreign knowledge workers felt that Danes were not particularly open or accommodating, both socially and in the workplace, and that these characteristics were important to nearly three-quarters of those taking the survey (Oxford Research, 2007). Employment rates for immigrants and their children are considerably lower than for native Danes and about half this gap persists even when controlling for differences in educational attainment between immigrants and natives (OECD, 2008e).

Another conclusion from the quantitative analysis discussed above and in Annex 3.A1 is that the education system needs to be both more focused on producing skills that are required by the labour market and on the need to make possible a flexible labour market that can swiftly adapt to shocks and technological change. The rest of this chapter goes through the policy issues relevant for strengthening the human capital available in the Danish economy. The focus here is on continued improvements in the education of children and youth (Box 3.1), since an agreement has just been put in place to expand the financing available for life-long learning (Box 3.2). Giving children a strong foundation early on is obviously important, because without basic literacy it is hard to manage in virtually any modern workplace or to pursue post-compulsory education. Before turning to secondary and tertiary education, policies to improve early childhood and compulsory education are therefore reviewed first.

Box 3.1. **The Danish education system in a nutshell**

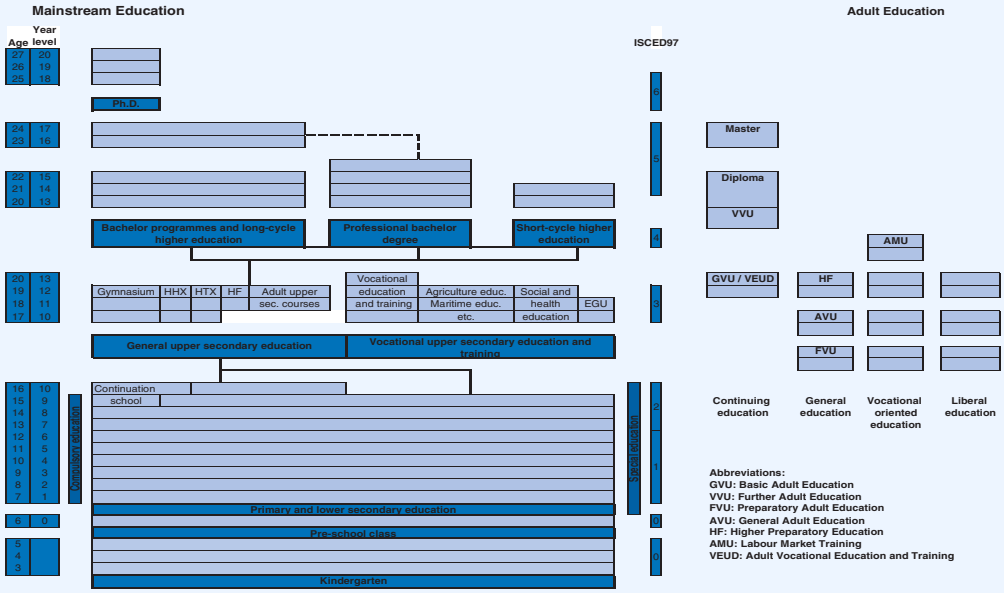
Education is compulsory for nine years, starting in August in the calendar year when the child turns seven (Figure 3.5). Prior to this, virtually all children attend kindergarten (*børnehave*) from age three to five and pre-school class (*børnehaveklasse*) at age six has recently been made compulsory. However, these four years are focused on psycho-social development more than learning (OECD, 2006a). For most students, the nine years of primary and lower secondary education are spent in the same school and with the same classmates.

At age 16, children branch off to a wide number of alternative routes. About half remain for a voluntary tenth year, with the other half going straight to upper secondary education, where schools are either general academic (*gymnasium*), or vocational (*erhvervsskoler*) preparing students for particular professions.

At tertiary level, the traditional structure consisted of short degrees (aimed at a wide range of professions), medium degrees (teaching, etc) and long degrees (research-based university programmes). The bachelor-master-doctoral degree structure is now becoming more common (OECD, 2005). Tuition is free, and grants for living costs are among the most generous in the OECD.

Box 3.1. **The Danish education system in a nutshell** *(cont.)*

Figure 3.5. **The Danish education system**



Notes: ISCED97 is the International Standard Classification of Education. In upper secondary education, STX is a three-year gymnasium programme leading to the school-leaving examination (*studentereksamen*) and HF (*Højere forberedelseseksamen*) is a two-year programme but students must have had 10 years of basic school to enter this stream. Both are academically-oriented programmes preparing pupils for further studies. HHX (higher commercial examination) and HTX (higher technical examination) also grant access to higher education, but prepare students especially for higher business or technical programmes. HHX and HTX also qualify students for employment in trade and industry. EGU is a two-year basic vocational education programme for young people who do not qualify directly for another vocational education programme.

Source: CIRIUS.

Box 3.2. **Life-long learning in the Danish labour market**

Lifelong learning in the Danish labour market is often associated with the Danish "flexicurity" model and its relatively high degree of job turnover. A large share of the workforce takes part in continuing education. The number of hours the average 25-64 year old can expect to spend in non-formal job-related education and training is the highest in the OECD (OECD, 2008a). This helps make the labour market more flexible and employees more mobile.

Adults can access tailored lower secondary courses and preparatory adult education classes to gain entry into upper secondary education programmes. Basic adult education programmes provide an opportunity to have formal and non-formal learning recognised as part of a formal vocational education and training programme. "Continuing vocational training" – or labour market training programmes – aims to upgrade the skills of the workforce and is focused on unskilled employed people. There are also further education programmes for adults, which mirror the structure of the tertiary education system. The social partners play a major role in management, priority setting and quality assurance of adult vocational education. Vocational education providers are mainly state schools but there are some private institutions also. Most of vocational education is financed by the state, although there are user fees for some courses which are usually paid by the employer (the unemployed are exempt from fees).

Box 3.2. **Life-long learning in the Danish labour market** *(cont.)*

A new three-year collective employment agreement for the manufacturing sector, which traditionally serves as a benchmark for other sectors, was negotiated in 2007. It contained a new commitment to employer-financed vocational training. Employees obtained the right to two weeks of training while receiving 85% of their normal wage. Employers will contribute DKK 260 per employee each week, increasing to DKK 520 over the agreement period to a new fund, called the Competence Development Fund of Industry (*Industriens Kompetenceudviklingsfond*). Employee wages while on training will be financed from this fund. Employees are free to choose their training programme, which does not necessarily have to be relevant for the company, but should be relevant for the manufacturing sector.

Early childhood and compulsory education

Learning outcomes in compulsory education have improved in recent years, but they are still not satisfactory in light of the ample public spending on early childhood programmes and compulsory education. At age 15, student proficiency measured by PISA is above the OECD average for mathematics but not for reading and science (Figure 3.6). These results caught considerable public attention when first released in 2001, and a range of measures were taken to strengthen the focus on core skills and monitor learning progress for each child. Overall improvements cannot yet be observed for 15 year-olds, comparing the 2000, 2003 and 2006 PISA assessments,[2] but PIRLS and TIMMS survey results indicate that children at age 10-11 have stronger skills today than 5-10 years ago.[3]

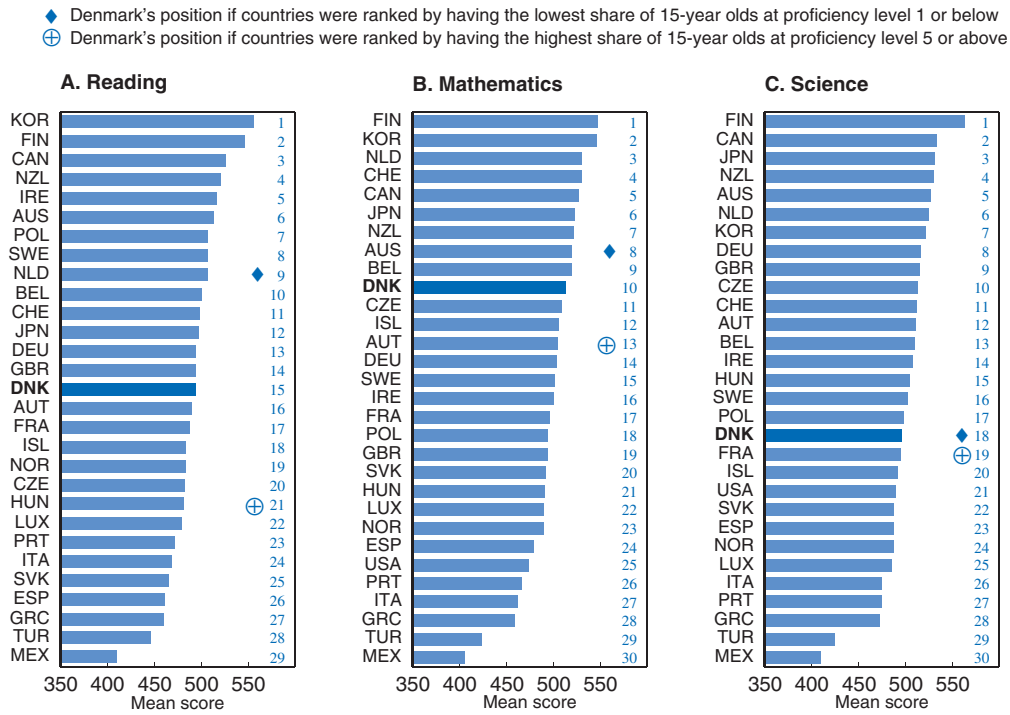
In the domestic debate, it is sometimes argued that what really matters is schools' capacity to improve the weakest students' abilities. On this score, Denmark ranks better on reading (Figure 3.6). Still, as many as 16% of a cohort only attain proficiency level 1 or less in reading, *i.e.* they may be able to locate explicitly-stated information but struggle to identify information that is not prominent, to deal with competing information and to understand relationships. The share of students at these lowest levels of proficiency is three to four times higher than in Finland across all three subject areas – reading, mathematics and science.[4]

There is also scope for improvement in early childhood programmes. More or less all children attend kindergarten from age 3. But the educational component of kindergarten programmes remains too limited in most municipalities. This is unfortunate, as the importance of early childhood education is increasingly recognised by research, which suggests that a strong early education increases the benefits attained from higher levels of education. It might therefore be argued that the returns to investment in early childhood education are higher than in the later stages of education (Heckman and Krueger, 2004; OECD, 2006a). Six-year olds attend the so-called pre-school class (*børnehaveklasse*). This intermediate step was originally intended to smooth the transition to school. Since pre-school class has been made compulsory, further strengthening its educational content could be undertaken and it could then effectively be the first year of primary education. This would mean primary education would start one year earlier than today, but still later than the average for OECD countries.

With the pre-school class now compulsory, stronger educational content in the early years of schooling could reduce the need for the voluntary 10th year. The 10th year was conceived as an opportunity for less able students to catch up on material not learnt well

Figure 3.6. **Learning outcomes in compulsory education**

Average PISA score, 2006



Source: OECD, PISA Results 2006.

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during the nine compulsory years of schooling and clarify their choice of upper secondary education. However, it is currently attended by more than half of each cohort. For many, the 10th year may *de facto* be a distraction from an effective learning path, diverting resources that would otherwise be available to priority areas in the education system, extending the time spent in education and delaying labour market entry (discussed further below). As many as 30% of the students attending the 10th form are thought to be already academically ready for further education and many more would have been with further guidance during secondary school (Labour Market Commission, 2009). Stronger focus on educational content in the early years of schooling may reduce the need for additional time to improve knowledge for a large share of students. New initiatives in 2008 have focused the 10th form more on students who plan to take vocational education, but in general the 10th year could be more targeted at only the weakest students. Closer collaboration between compulsory and upper secondary schools might be a good substitute for the 10th year for those students going on to a more academically focused upper secondary programme.

School choice

Denmark has a century-long tradition of school choice with public funding following students to the school of their parents' choice. The private school sector used to be rather small, consisting mostly of schools with a special learning philosophy or a religious affiliation. Over the past decade, however, more and more parents have chosen private schools. In Sweden, the competition resulting from school choice has raised learning

outcomes in all schools (OECD, 2008b). On the downside, choice sometimes makes it difficult for municipalities to achieve economies of scale via school mergers, as parents may team up to continue small local schools as a private school. There is little systematic evidence on the effects of school choice in Denmark and more research into the mechanisms of school choice would be useful, as it is clearly of growing importance. Further development of school-level evaluation, as discussed below, will help parents make informed choices between possible schools.

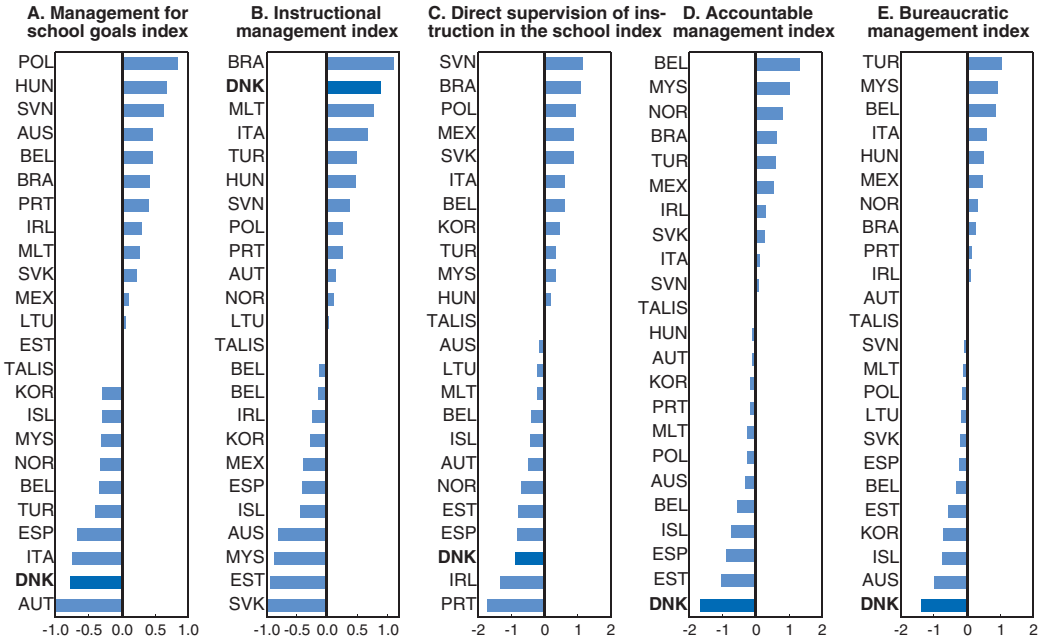
School management and teacher conditions

Given the comparatively ample resources available for compulsory education in Denmark, it is important to pay attention to value for money. In an international context, Danish schools are at a considerable distance from the resource efficiency frontier (OECD, 2008c). And in a national context, research evidence indicates that economic resources at the margin matter very little for learning outcomes across schools (Nannestad, 2003).

School management warrants particular policy attention: it could be strengthened with a clearer outcome focus and by holding managers accountable. Compared internationally, Danish school principals play an exceptionally modest role, notably with respect to accountability towards stakeholders (Figure 3.7). Principals emphasise being available and helpful for teachers seeking advice and spend considerable time attempting to improve classroom instruction, thereby scoring highly on the index of instructional management in Figure 3.7. However, they don't see their role as being to shape the school's goals and curriculum development (management for school goals index), to directly monitor and suggest improvements of teachers' pedagogical practices or to monitor

Figure 3.7. **School principal leadership behaviour indices**

2007-08



Source: OECD (2009b), *Creating Effective Teaching and Learning Environments: First Results from TALIS.*

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students' work (direct supervision of instruction index), to ensure that the school works in accordance with externally-defined educational goals (accountable management index), or to ensure adequate administrative procedures and an orderly task-oriented atmosphere in the school (bureaucratic management index). Collective agreements relating to teacher working hours have also been identified as a barrier to developing school leadership, since they are complex and therefore require a significant amount of the school leadership's time to administer. They may therefore limit the flexibility required by school leaders to develop the school's teaching environment (Pluss Leadership and Molin, 2007).

Further development of training for school leaders should remain a priority. Headteachers (principals) are commonly trained teachers, most of which have taken some form of leadership training, with three-quarters taking a four-week basic training programme. In a 2005 survey, 90% of headteachers stated that there is a need for mandatory leadership training and the areas in which training is most needed are financial and results management (Pluss Leadership and Molin, 2007). The OECD has previously recommended that formal university-level leadership qualifications should be part of the selection criteria for applicants for school leadership positions (OECD, 2004). The central government is working with municipal governments, who have responsibility for recruiting and training school leaders, to further develop training opportunities.

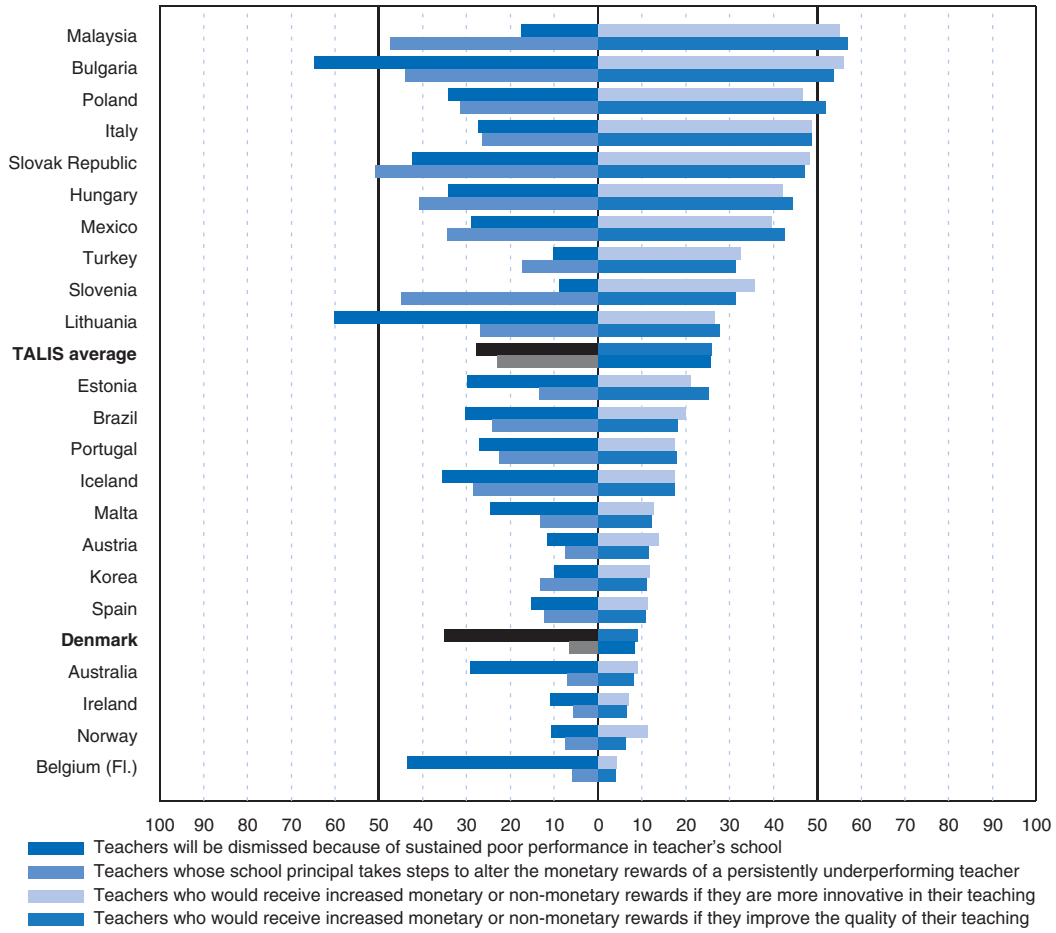
Teachers feel that there are rather limited prospects of being rewarded for good teaching (Figure 3.8). Only one in ten receive any monetary or non-monetary reward for innovative or improved-quality teaching – well below the international average in the TALIS survey. The only perceived response to teaching quality is on the negative side, as a third of teachers consider that sustained poor performance will lead to dismissal.

Teacher competence has been a policy focus for some years and additional training is being introduced for both teachers and school administrators to bolster education quality. Denmark could take inspiration from Sweden where a recent government report, drawing on experience from Scotland and Canada, proposed that Swedish teachers be required to go through an accreditation process after graduation (SOU, 2008). During a probationary year, the new teacher would be introduced to the profession by a mentor. Only if assessed suitable for the profession would she or he be granted accreditation and become eligible to apply for permanent employment. Additional information about each teacher's profile is to be used by school management to ensure that teachers are competent in the subject areas and functions they handle. To encourage continuing professional development, new advanced accreditation levels are proposed, accessible via further study or well-documented practical development activities.[5] By contrast, accreditation would be withdrawn in cases of serious misconduct, such as committing a crime, inappropriate behaviour towards students or, in extreme circumstances, inaptitude in teaching.

Teacher pay could also be made more flexible to attract talented individuals to the teaching profession and retain them. Again, the example of neighbouring countries could be followed: in 1996, Sweden replaced a fixed pay ladder by individualised pay and relaxed its strict working time regulations. Thereby, salaries are determined in discussions between each teacher and the school principal or in negotiations involving the local teacher trade union.[6] In combination with an accreditation system, such flexibility can underpin stronger rewards for teachers to improve their skills. Wage flexibility could also make it easier to attract talented teachers to deprived areas.

Figure 3.8. **Teacher's perceptions of appraisal and feedback and its impact on the school**[1]

2007-08



1. Countries are ranked in descending order of percentage of teachers reporting to receive increased monetary or non-monetary rewards for an improvement in the quality of their teaching.

Source: OECD (2009b), *Creating Effective Teaching and Learning Environments: First Results from TALIS.*

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A culture of evaluation

Monitoring the performance of the education system has historically been hampered by a lack of comprehensive and reliable information on education outcomes and possible shortcomings in the education system. National policy changes in 2006, in part motivated by PISA results, introduced mandatory national testing every year from years two to eight (due to commence in the spring of 2010), a requirement for each student to have a regularly-updated "personal evaluation plan", a requirement for municipalities to produce quality reports on the schools in their jurisdiction and the establishment of an agency under the Ministry of Education to promote evaluation. However, the usefulness of this framework might be hindered by gaps in data collection and uneven implementation of this national framework at the local level. This makes it more difficult for policymakers to monitor equity of education access, enrolment and performance. Furthermore, school staff are not necessarily well equipped to design and carry out assessment and evaluation and

use such information to improve learning outcomes. Better training for teachers and school leaders on evaluation methods seems necessary (OECD, 2009b).

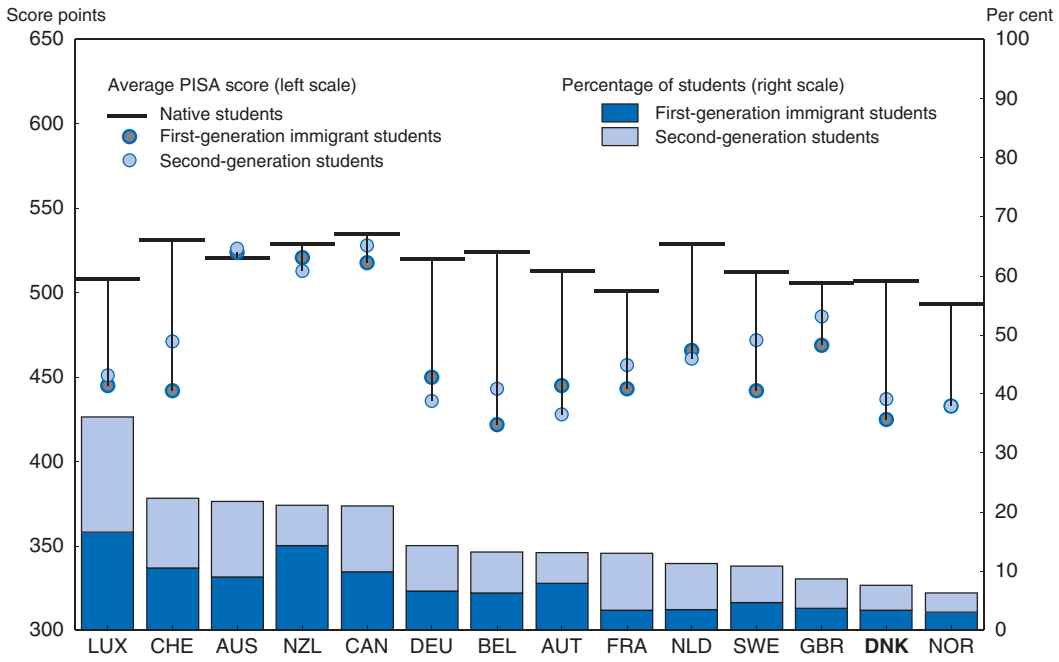
There might be scope, in the long run, for school quality reports and the new compulsory national testing of students to be used in performance assessment of teachers and schools more generally. With free school choice, the contestability generated by such an approach might yield quality gains.

Immigrants and their descendants

Learning outcomes for immigrants and immigrants' children are rather poor. There is a wide gap between the learning outcomes for immigrants and natives, but that may be hard to avoid given language barriers. Few immigrant children arrive with prior knowledge of Danish, which is used as the instruction language in all subjects. More worryingly, the second generation, *i.e.* children born in Denmark from immigrant parents, are not doing much better than the first (Figure 3.9).

Figure 3.9. **Learning outcomes for immigrant and native students compared**

Average for reading, mathematics and science scales, PISA 2006[1]



1. Only including countries with at least 3% of students in each category.

Source: OECD, PISA Results 2006.

StatLink http://dx.doi.org/10.1787/735402313532

Improving learning outcomes for immigrants will require a broad approach. Indeed, family situation plays an important role (Colding *et al.*, 2009), and factors like the culture of achievement may be less developed at schools attended by immigrant students (Rangvid, 2007). The recent OECD *Review of Migrant Education* identified six priorities for policy development: *i)* ensuring consistency of support for all migrant students; *ii)* continuing to implement the "culture of evaluation", including through better data to identify the nature and severity of problems faced by immigrant children; *iii)* strengthening

the capacity of schools and vocational colleges to support migrant students; *iv)* providing adequate language support to all students; *v)* capitalising on parental and community support; and *vi)* increasing retention in the vocational education sector (OECD, 2009c). Measures outside education policies may also be needed, as immigrants' and descendants' qualifications and skills appear to be under-utilised in the Danish labour market, where they tend to be overqualified, thereby weakening the incentives for these groups to invest in human capital.[7]

Segregation, notably along national origin lines, is a considerable public concern in some localities. The municipality of Århus, for example, has a bussing programme taking children from disadvantaged neighbourhoods to schools in other parts of town and has found that reducing segregation in this way helped learning outcomes, albeit at a high fiscal cost. This also impinges on the right to free school choice for the affected families.

Upper secondary education

There is scope to reduce the number of youth dropping out of school, but the official target that 95% of each youth cohort should complete upper secondary education may be unrealistic. The vast majority of youth embark on upper secondary education. In 1990, 90.7% of a youth cohort would have commenced some upper secondary education five years after leaving compulsory school. By 2007, this share had risen to 93.8%. The improvement was particularly clear for immigrants and the second generation: for these groups combined, the share rose from 79.5% in 1990 to 90.9% in 2007. While it is now estimated that about 97% of each year cohort would have commenced a post-compulsory education within 25 years after leaving compulsory education, only around 85% would have completed it.

Research evidence is lacking concerning what leads youth to drop out. Hence, it can be hard to identify the most appropriate policy responses. Even so, the following could be considered:

- Review of the disparate array of paths/degrees in secondary education, in particular to make sure that apprenticeships are well anchored in a generic competence structure to ensure that apprentices acquire the general skills they will need if later in life they have to reorient professionally. While there has been a significant increase in the number of students with practice placements or apprenticeships in vocational education programmes in recent years, the rise in pay levels for apprentices over the past decade might also need reviewing to ensure ongoing employer interest.[8]
- Increase transparency for potential students about the labour market prospects associated with alternative education choices, *e.g.* by publishing data for employment outcomes of recent school leavers. Better integration of IT and management information systems would be helpful in this context (Ministry of Finance *et al.*, 2009).
- Change the structure of vocational programmes to include more practical components early on, as is done in the "apprenticeship pathway" (*mesterlære)* in some technical vocational programmes. Currently, front-loaded theoretical content may lead some students to lose interest and drop out.
- Extend the youth regime in unemployment insurance and social assistance benefits to age 30 for those without children.[9] It is well documented that the less generous benefits introduced in the 1990s for persons younger than 25 have reduced inactivity (Welfare

Commission, 2005). Reducing benefits for those between 26 and 30 would make it more attractive to stay on and complete education programmes.

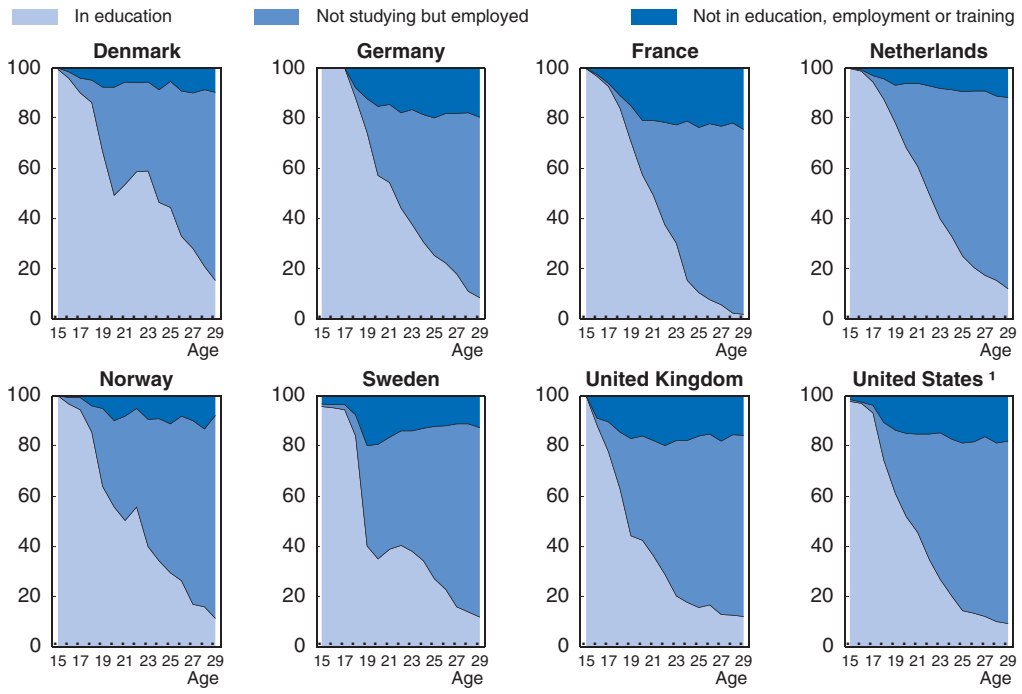
Tertiary education

The share of the population having attained tertiary education is growing, but the potential of this high-skilled labour may not be fully exploited. Students start and complete studies late. To a large extent, this reflects the large share of youth leaving education after completion of upper secondary school to take a prolonged gap before entering tertiary education. At age 20, participation in education drops off and then rises to peak at age 22-23 – a pattern not seen in other countries, except for Sweden and, to a smaller extent, Norway (Figure 3.10). The median age of entry into tertiary education, at almost 22, is the third-highest in the OECD, behind Iceland and Sweden (OECD, 2009a), even though it has declined in recent years (Figure 3.11). Moreover, while the average duration of all tertiary studies in Denmark is lower than the OECD average (OECD, 2009a), the average duration of study for Danish students completing a five-year masters programme is 6.5 years and 7 years in courses in the humanities faculty (Danish Universities and Property Agency, 2009). For a three-year bachelor programme, the average completion time is 3.5 years. At the same time, there are significantly fewer young people neither studying nor training nor in employment than in some other OECD countries.

While many youth appreciate taking a break between secondary and tertiary education – travelling abroad, working in cafés, etc. – this lowers those individual's income for many years and, in aggregate, reduces the supply of high-skilled labour. On the one

Figure 3.10. **Share of youth in education, employment or inactivity by age**

Per cent in 2006



1. Data are for 2005.

Source: OECD (2008e), *OECD Employment Outlook 2008*.

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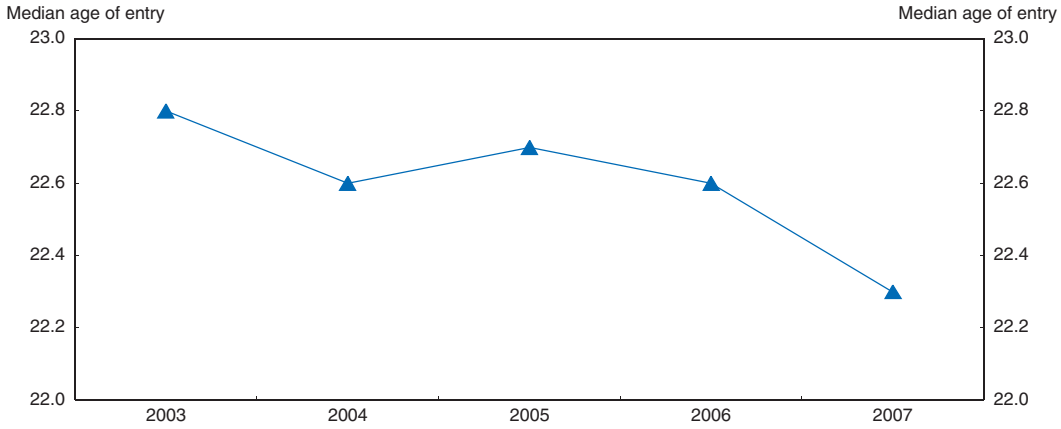
Figure 3.11. **Median age of entry into tertiary education**[1]



1. The figures show the median age of entry into tertiary education of type A (ISCED).

Source: OECD (2009a), *Education at a Glance*.

StatLink http://dx.doi.org/10.1787/735454858438

hand, youth may learn useful workplace skills and be motivated to improve their human capital by spending time in low-skilled jobs between upper secondary and tertiary education. Furthermore, additional time to reflect might also help students make better tertiary education choices, leading to better labour market attachment after graduation. On the other hand, labour productivity levels would be higher over the full working life if students spent more years working in high-skilled jobs after completing tertiary education rather than spending time working in low-skilled jobs before taking tertiary education. Taking longer than required to complete a tertiary education also reduces lifetime earnings and imposes a direct cost on the government budget, as well as an opportunity cost in terms of foregone tax revenue. Analysis undertaken for the 2009 Labour Market Commission found that reducing the delay in average age of starting higher education by one year would boost employment by 0.6% and the level of GDP by 0.5%, and improve the budget position by 0.23% of GDP per year over the long term. The effect comes about via a higher average skill level and higher participation rates of the working-age population (Labour Market Commission, 2009). A study using Swedish data found that postponing higher education results in a persistent earnings penalty, since the returns to post-university work experience are higher than the returns generated by taking time out between secondary and tertiary education. The reduction of lifetime earnings associated with a two-year postponement of tertiary education amounts to 40-50% of one year's earnings at age 40 (Holmlund *et al.*, 2008).

The case for faster completion of tertiary studies is more clear-cut. In addition to the effects on the skill composition of the workforce, faster completion reduces the overall number of students at any one point in time and therefore reduces the direct cost to government finances of the education system. Analysis for the Labour Market Commission found that reducing average study times by one year would reduce the number of students each year by about 15%, raising the level of GDP by 0.7% and improving the budget by around 0.3% of GDP per year in the long run (Labour Market Commission, 2009).

Following the *Welfare Agreement* from 2006, a number of measures have been taken: entry to tertiary education will now be easier if the student does not wait more than two years after completing upper secondary education; and universities will be held more

accountable for study progress. It is too early to evaluate the effects of these measures which are still being implemented. However, the 2009 Labour Market Commission recommended that further measures be implemented. Its recommendations included providing a DKK 10 000 tax-free bonus to students who complete their first year of tertiary studies within three years of completing upper secondary school. Furthermore, the current practice of allowing students to receive study grants for one year longer than the specified duration of their course could be terminated for students starting tertiary studies two years after finishing secondary school (Chapter 1, Box 1.6).

A recent initiative might warrant renewed scrutiny: allowing students to earn more while still receiving full public grants for living costs may delay study completion. Danish research evidence finds that the higher the individual's own earnings while studying, the longer it takes to complete studies (Gupta and An, 2005).[10] The same research also finds that the expected wage upon completion significantly increases degree completion rates. Hence, the tax reform to be implemented from 2010 (Chapter 1, Box 1.4), with lower marginal rates for above-average incomes, can be expected to encourage earlier completion.

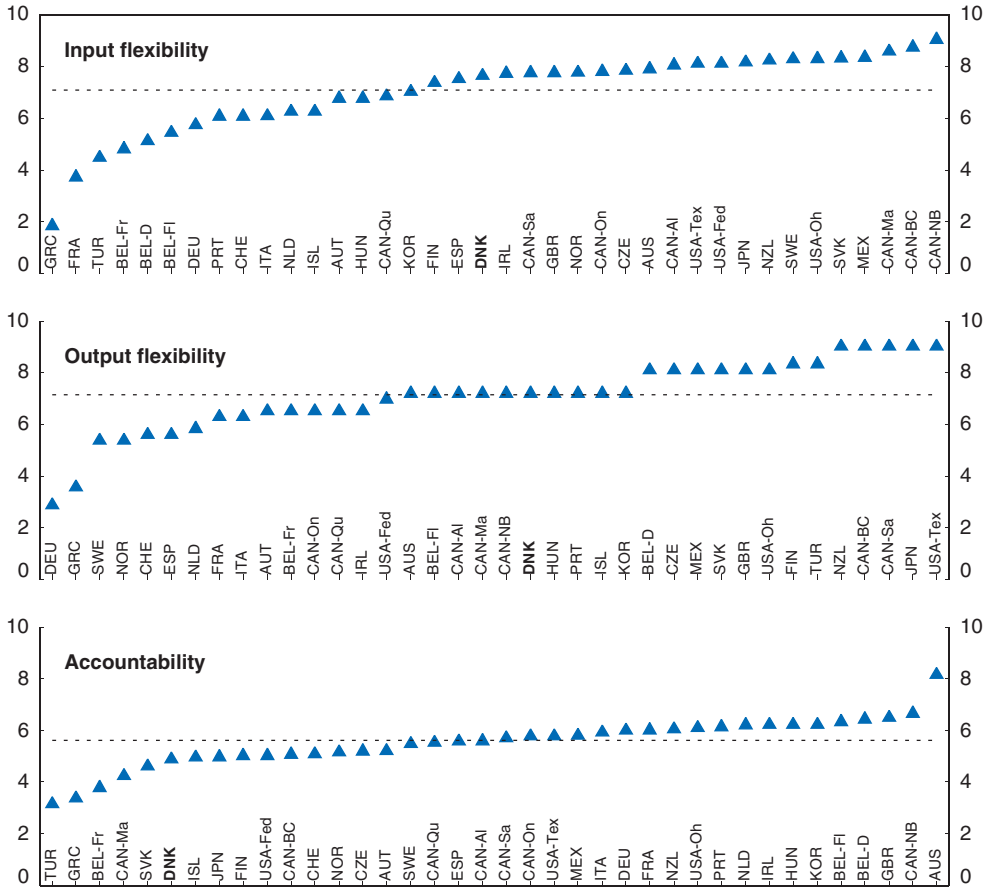
The current system with free tuition and generous grants to support living costs encourages students to take longer than necessary to finish their studies. There is evidence from the Netherlands that the 1996 reform which reduced the duration of financial support to the nominal duration of the study reduced drop-out rates and increased the number of completed courses (OECD, 2008d; Belot *et al.*, 2004). Gradually moving to a system where students are provided loans, rather than grants, to cover their living costs might be warranted. This could be done in a way that encourages on-time completion – the grant proportion could be higher for on-time completion and students taking longer to start or complete their studies could receive fewer grants and more loans.

Going even further, a system of tuition fees with income-contingent loans could 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 might encourage students to take earnings prospects after graduation more into account when making study choices. Such a system would encourage students to start and complete their studies quickly, since this would lead to more years in the labour market in which to repay the loan (Oliveira Martins *et al.*, 2007). Making loan repayment contingent on income would reduce the risk that people from lower socio-economic backgrounds would be excluded from tertiary education. In the Danish case, the recent reductions in income tax rates might provide scope to contemplate tuition fees – without lower income taxes, tuition charges would lower the after-tax return to tertiary education and therefore reduce the incentive to take further education. Possible models for such a system were discussed in the 2006 *Survey* (OECD, 2006b).

In terms of giving universities room to develop their strengths, Danish policy settings are not bad. There is considerable input and output flexibility, while accountability requirements are a bit below the OECD average (Figure 3.12). Increasing input and output flexibility, along with accountability, in OECD countries has been shown to be generally consistent with a higher proportion of the 20-29 year age cohort completing tertiary education (Oliveira Martins *et al.*, 2007). The universities themselves have called for more "degrees of freedom". Amongst other things, they have argued for more flexibility in setting management salaries; focusing centralised accreditation on faculties or institutions rather

Figure 3.12. **Regulation of tertiary education providers**[1]

Increasing flexibility or accountability indicated from 0 to 10, 2005-06; dotted line is average



1. Accountability for USA-Fed is indicative as federal funds only account for a small share of total funding of tertiary education institutions. For Belgium, Canada and the United States, the figure shows selected regions.

Source: Oliveira Martins *et al.* (2007).

StatLink http://dx.doi.org/10.1787/735467234482

than individual study programmes; and less central regulation of enrolment, exam, transfer, and appeals procedures (Universities Denmark, 2009). While greater input and output flexibility could be achieved, it might be inferior to a more centralised system if it is not also accompanied by increased accountability. According to the comparative indicator used in Figure 3.12, accountability would be improved by more stringent external evaluation requirements, in the form of ministerial-level oversight of universities and greater independent evaluation, for example by an agency independent of government or other external stakeholders. Introducing tuition fees would give universities more independence in terms of revenue sources. They should make universities more responsive to student and employer preferences and generate efficiency gains (OECD, 2008d).

International mobility of the highly skilled

For Denmark to be an attractive location also for internationally-leading companies, human capital policies are not only about ensuring good education of children and youth

growing up in Denmark. The conditions for recruiting and retaining talented foreign staff must also be good so as to ensure access to a diverse and highly-skilled labour supply.

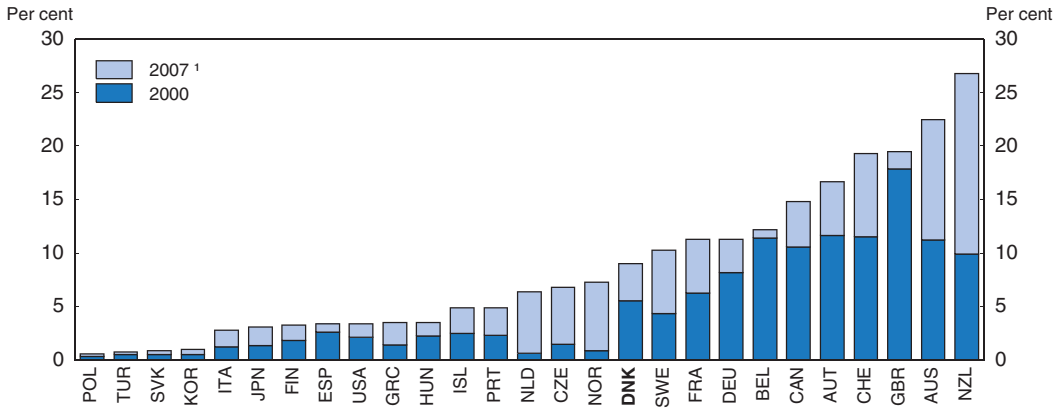
The tax reform to be implemented from 2010 has lowered what was perhaps the biggest obstacle by reducing the marginal tax rates, including on the highest income earners. The reform will make it considerably more attractive for highly-paid specialists to remain in Denmark after the three-to-five years of the expatriate gross wage tax (which allows certain foreign researchers and other approved staff to pay a gross tax rate of 25% for three years or 33% for five years rather than the normal income tax rates). It may also stem the outflow of talented Danes. Indeed, a recent study has documented that the Danes migrating to stay abroad for longer periods have significantly more education than those remaining in Denmark, and that there is a strong over-representation of persons with high earnings ability among those migrating to the United Kingdom and the United States (Poutvaara *et al.*, 2009).

Other challenges remain in immigration policies. Continued efforts are required on the part of immigration authorities to become more service-minded *vis-à-vis* highly-skilled immigrants, including faster immigration processing, and to develop processes for recognition of foreign qualifications. Separately, a recurrent obstacle for attracting more talented foreign workers to Denmark is the lack of international schools to cater for children of foreign workers living temporarily in the country. Municipalities – or private groups – could be encouraged to take more initiatives in this area. Some progress has recently been made – the Danish Parliament passed a law in early 2009 allowing an additional three public schools to offer an International Baccalaureate programme (seven schools already do).

Universities have an important role to play in attracting foreign students with a high potential. At nearly 10% (Figure 3.13), the share of foreign students enrolled in tertiary education is approaching a level where it has more important implications for universities' resources. Presently around 80% of foreign students come from European countries and are therefore entitled to free tertiary education. As discussed above, moving gradually towards a system where not only non-EU students, but also Danish and EU students are charged for

Figure 3.13. **Foreign students enrolled in tertiary education**

In per cent of all tertiary enrolment



1. 2004 data for the United States and 2005 for Canada.

Source: OECD (2009a), *Education at a Glance*.

StatLink http://dx.doi.org/10.1787/735477151563

tuition, while extending the government loans available for students to finance tuition costs, would give universities better conditions to develop attractive offers for foreign students without high costs to Danish public finances.

Conclusions

The human capital chapter of the 2006 *Survey* was written in the context of Denmark's Globalisation Strategy (OECD, 2006b). Under the aegis of this strategy, a series of important initiatives were launched to improve the skill base of the Danish workforce both in the short and the long term. These initiatives are now being implemented. Yet, given the vital importance of human capital for productivity and income growth, further policy changes are called for (Box 3.3).

Box 3.3. **Main recommendations on human capital**

Early childhood and compulsory education

- Since pre-school class (*børnehaveklasse*) has been made compulsory, further strengthening its educational content should be undertaken to make it effectively the first year of primary education. Primary education would still start later than the average for OECD countries.
- With stronger educational content in the early years likely to improve attainment in later years of primary school, the voluntary 10th year could be scaled back and targeted at those students most in need of further development. Encourage closer collaboration between compulsory and upper secondary schools for stronger students as a substitute for the 10th year.
- Do more to evaluate school choice, *inter alia* to understand the relationships between choice and management and teaching effort, scale and classroom composition.
- 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. Municipalities should continue to develop school leadership training and recruitment policies for headteachers.
- Introduce accreditation of teachers and give more weight to teachers' specific competences when allocating tasks among staff. Introduce more wage flexibility, as in Sweden, to attract, retain and develop talented teachers.
- 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.
- A broad strategy is needed to better integrate immigrants and the second generation in the education system, starting at compulsory level.

Upper secondary education

- Increasing completion rates must be a top priority. It requires review of the disparate array of paths/degrees.
- Review the structure of apprenticeships and programmes to make sure that they are well anchored into a generic competence structure. Review the effects of the rise in pay for apprentices over the past decade to ensure ongoing employer interest. Consider whether practical elements can be introduced earlier in vocational education programmes.

Box 3.3. **Main recommendations on human capital** *(cont.)*

Upper secondary education

- Increase transparency for potential students about the labour market prospects associated with alternative education choices, *e.g.* by publishing data for employment outcomes of recent school leavers.
- Extend the youth regime for unemployment and welfare benefits to age 30 for those without children.

Tertiary education and international mobility of the highly skilled

- Reconsider the recent rise in earnings ceilings under the very generous public grants for students' living costs. Research finds that high earnings while studying tend to prolong studies.
- Consider gradually replacing some of today's student grants with loans, particularly if studies are prolonged.
- 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.
- Universities should be given greater flexibility and incentives to improve, including through tuition fees. This flexibility should be accompanied by tighter external evaluation requirements.
- Continue to focus on the factors affecting integration of immigrants into the labour market, including visa processing and qualification recognition.
- Encourage municipalities and private institutions to establish more international schools to cater for children of foreign workers living temporarily in Denmark.

Notes

1. In the profile model, persons with immigrant origin include immigrants (*i.e.* foreign-born) and their descendants (*i.e.* persons born in Denmark with immigrant parents). Persons born in Denmark with at least one parent being Danish-born or having achieved Danish citizenship, however, are classified as having Danish origin.
2. However, performance on science has improved markedly between 2003 and 2006: the mean score has increased from 475 to 496 and Denmark's position has moved from the 26th to the 18th one.
3. PIRLS stands for Progress in International Reading Literacy Study and provides data on the reading literacy of fourth-grade level students across 40 countries (Mullis *et al.*, 2007). TIMSS stands for Trends in International Mathematics and Science Study and provides data on the mathematics and science achievement of US fourth and eighth-grade students compared to that of students in other countries (Gonzales *et al.*, 2008).
4. In Denmark most students with special needs attend ordinary schools, but this should not bias the result as the PISA study generally includes students enrolled in special educational institutions.
5. In Scotland, the 'Charter Teachers' programme creates an additional career path for high-performing teachers, allowing them to gain additional remuneration without moving into management positions. Teachers can apply to become a Charter Teacher, and if their qualifications and experience match the selection criteria, the teacher's remuneration is increased upon completion of a series of training modules (*www.charteredteacher.co.uk/index.html*).
6. Pay rewards are supposed to be linked to municipal school objectives, even if in practice they are more based on competence, effort, etc. The dispersion of Swedish teacher earnings is not wide, though, and it actually narrowed following the 1996 reform, perhaps reflecting that individual-pay dispersion has been offset by less dispersion based on age, as the starting salary was raised

significantly (Strath, 2004). Still in 2007, the upper quartile of earnings was just 20% above the lower quartile for teachers in compulsory education.

7. A recent OECD study found that in Denmark immigrants, even when they are qualified, do far less well in the labour market than comparable natives. This also holds for the native-born children of immigrants raised and educated in Denmark. For both groups, the gaps *vis-à-vis* the offspring of natives with a comparable education level were found to be among the largest in the OECD (OECD, 2007).

8. Both the wages received by apprentices and the wage costs facing employers, have been rising relative to adult wages for skilled workers (Albæk, 2005).

9. Currently, unemployed people under 30 face compulsory activation earlier in the unemployment spell than people over 30. Insured unemployed people under 25 who have no formal educational or vocational qualifications also receive a training allowance equivalent to about 50% of the maximum unemployment benefit instead of regular unemployment insurance benefits. For people who do not have unemployment insurance, the amount of social assistance received is less than half of the amount available for a person over 25 years of age and the amount is reduced after six months of unemployment.

10. The empirical evidence is not unambiguous, however, and other studies have found different results. For instance, Joensen (2007) has found that, when the number of hours worked is limited, employment can have a positive impact on academic achievement and can increase future wages. That said, it is telling that the Swedish Fiscal Policy Council has just recommended going in the opposite direction: raising grants (from a lower level than the Danish) while reducing the earnings limit so as to encourage students to work less and focus on their studies (Swedish Fiscal Policy Council, 2009).

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ANNEX 3.A1

Micro-data evidence

This annex presents some micro-econometric evidence about the supply and demand for skills, using a database covering the whole Danish population.

Wages and length or level of education

A standard Mincer regression can quantify the effects of education length on wages, based on ordinary least squares controlling for potential experience, gender and other background characteristics. It shows that persons with longer educational attainment earn higher hourly wages, and that this extra wage income seems to have increased over time. An additional year of education implied 4.5% higher hourly wage on average in 1985; this premium had increased to 5.6% in 2005 (Table 3.A1.1). Meanwhile, the return to experience fell.

Table 3.A1.1. **Wages and length of education**

Dependent variable: logarithm of the hourly wage

	1980	1985	1990	1995	2000	2005
Education in years	0.050	0.045	0.046	0.053	0.056	0.056
Experience	0.039	0.036	0.035	0.035	0.032	0.032
Experience * Experience	–0.001	–0.001	–0.001	–0.001	–0.001	–0.001
Male	0.240	0.226	0.222	0.216	0.230	0.217
Observations	1 651 822	1 901 462	1 878 690	1 920 789	2 056 869	2 064 785

Note: The sample includes persons aged 16-65 while excluding those for whom information on educational attainment is lacking. Experience refers to potential experience defined as age minus years of education minus 6 years. Other background variables are controlled for in the regression but not shown in the table: whether the person lives in a city, whether the person is immigrant, and whether the person is married. All coefficients are significant at a 5% level.
Source: Own calculations based on the *IDA Database*, Statistics Denmark.

As a supplement to Figure 3.3, wage growth has been regressed on the level of educational attainment. By restricting the sample for each time-window to persons with an unchanged educational attainment, this approach can abstract from composition effects of widening participation in education that may affect the average wage increases shown in Figure 3.3. The results are clear: since the mid-1980s, those with long tertiary education have enjoyed wage increases ½-1 percentage point stronger than those with only upper secondary education (Table 3.A1.2).

Table 3.A1.2. **Average annual wage increases by level of education**

Dependent variable: change in logarithm of the hourly wage

	1981-85	1986-90	1991-95	1996-2000	2001-05
Lower secondary (9 years)	0.001	–0.001	–0.003	–0.003	0.000
Short tertiary (14 years)	–0.002	–0.001	0.006	0.002	0.000
Medium tertiary (16 years)	–0.010	–0.002	0.007	0.001	–0.001
Long tertiary (18 years)	–0.004	0.008	0.010	0.006	0.004
Experience	–0.003	–0.003	–0.003	–0.003	–0.003
Experience * Experience	0.000	0.000	0.000	0.000	0.000
Male	–0.001	–0.001	–0.001	0.001	–0.004
Observations	1 229 092	1 332 476	1 330 599	1 437 057	1 484 606

Note: See Table 3.A1.1. The education categories are based on Danish definitions as in Figure 3.3. The reference category is upper secondary (12 years of education). All coefficients are significant at a 5% level.
Source: Own calculations based on the *IDA Database*, Statistics Denmark.

Unemployment and length or level of education

Education has become much less of a guard against unemployment than previously, even if the low-skilled remain more vulnerable to unemployment risk (Table 3.A1.3).

Table 3.A1.3. **Unemployment and length of education**

Dependent variable: individual degree of unemployment[1]

	1980	1985	1990	1995	2000	2005
Education in years	–3.840	–6.021	–4.435	–3.996	–2.313	–1.922
Experience	–0.665	–0.366	–1.320	–0.230	0.307	0.166
Experience * Experience	0.005	–0.009	0.012	–0.010	–0.011	–0.009
Male	–2.843	–10.653	–11.493	–8.020	–7.810	–6.036
Observations	1 676 600	1 914 035	1 888 091	1 929 378	2 062 797	2 077 215

Note: See Table 3.A1.1. All coefficients are significant at a 5% level.

1. The individual degree of unemployment is a special concept used in Danish micro-data. It is defined as the number of hours out of work due to unemployment in relation to the number of potential hours of work. This variable is normalised to take values between 0 and 1 000, where 0 implies that the individual has been in work for the full year, whereas a value of, for example, 500 implies that the individual has been without work for half of the year.

Source: Own calculations based on the *IDA Database*, Statistics Denmark.

More precisely, in 2005, individuals with nine years of education experienced 1.5% higher "degree of unemployment" (as defined in the footnote to Table 3.A1.3) on average than people with 12 years of education (the coefficient in Table 3.A1.4 on the variable "lower secondary", divided by 10, since the dependent variable ranges between zero and 1 000). People with 16 years of education experienced, on average, 2.3% lower "degree of unemployment" than people with nine years of education (the sum of the absolute values of the coefficients on "lower secondary" and "medium tertiary"). But the differences used to be much larger. In 1985, people with nine years of education experienced 3.1% higher "degree of unemployment" relative to people with 12 years of education and people with 16 years of education experienced 5.2% lower "degree of unemployment" on average than people with nine years of education.

Table 3.A1.4. **Unemployment and level of education**

Dependent variable: individual degree of unemployment

	1980	1985	1990	1995	2000	2005
Lower secondary (9 years)	18.2	30.8	22.0	22.4	15.3	14.7
Short tertiary (14 years)	–7.9	–11.0	–7.4	–1.5	–1.4	–2.1
Medium tertiary (16 years)	–16.8	–20.9	–16.1	–15.9	–9.1	–8.1
Long tertiary (18 years)	–5.2	–9.1	–11.2	–8.5	–3.8	–1.5
Experience	–0.9	–0.5	–1.3	–0.2	0.4	0.3
Experience * Experience	0.0	0.0	0.0	0.0	0.0	0.0
Male	–3.7	–11.1	–11.8	–8.5	–8.2	–6.6
Observations	1 676 600	1 914 035	1 888 091	1 929 378	2 062 797	2 077 215

Note: See Table 3.A1.1. The education categories are based on Danish definitions as in Figure 3.3. The reference category is upper secondary (12 years of education). All coefficients are significant at a 5% level.
Source: Own calculations based on the *IDA Database*, Statistics Denmark.

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