



# OECD Economic Surveys

## GERMANY

FEBRUARY 2012





# **OECD Economic Surveys: Germany 2012**



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**Please cite this publication as:**

OECD (2012), *OECD Economic Surveys: Germany 2012*, OECD Publishing.  
[http://dx.doi.org/10.1787/eco\\_surveys-deu-2012-en](http://dx.doi.org/10.1787/eco_surveys-deu-2012-en)

ISBN 978-92-64-12706-7 (print)  
ISBN 978-92-64-16870-1 (PDF)

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

OECD Economic Surveys: Germany  
ISSN 1995-3194 (print)  
ISSN 1999-0251 (online)

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This Survey is published on the responsibility of the Economic and Development Review Committee (EDRC) of the OECD, which is charged with the examination of the economic situation of member countries.

The economic situation and policies of Germany were reviewed by the Committee on 21 November 2011. The draft report was then revised in the light of the discussions and given final approval as the agreed report of the whole Committee on 2 December 2011.

The Secretariat's draft report was prepared for the Committee by Felix Hübner and Caroline Klein under the supervision of Andreas Wörgötter. Research assistance was provided by Margaret Morgan. The Survey also benefited from consultancy work by Thorsten Ehinger.

The previous Survey of Germany was issued in March 2011.

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## BASIC STATISTICS OF GERMANY, 2010

<b>LAND</b>			
Area, 2009 (1 000 km <sup>2</sup> )	356	Major cities, 31.12.2008 (1 000 inhabitants):	
Agriculture (%)	53	Berlin	3 442.7
Forest (%)	30	Hamburg	1 774.2
		Munich	1 330.4
<b>PEOPLE</b>			
Population (1 000)	81 757	Labour force <sup>1</sup> (1 000)	43 499
Inhabitants per km <sup>2</sup>	230	Employment <sup>1</sup> (1 000)	40 553
Natural increase in population, 2009 (1 000)	-189	Agriculture (%)	2
Net immigration, 2009 (1 000)	-13	Industry (%)	24
		Services (%)	74
<b>PRODUCTION</b>			
GDP, current prices (billion euros)	2 477	Origin of value added (%)	
GDP per capita (1 000 USD in current prices)	40	Agriculture	1
Gross fixed investment (% of GDP)	18	Industry	28
		Services	71
<b>GOVERNMENT</b>			
Public consumption (% of GDP)	20	Composition of Parliament	Seats
General government total revenue (% of GDP)	44	Christian Democratic Party (CDU)/Christian	237
Public debt, Maastricht definition (% of GDP)	83	Social Union (CSU)	
		Social Democratic Party (SDP)	146
		Free Democratic Party (FDP)	93
		The Left	76
		Alliance 90/The Greens	68
		Total	620
		Last general election: September 2009	
		Next general election: 2013	
<b>FOREIGN TRADE</b>			
Exports of goods and services (% of GDP)	47	Imports of goods and services (% of GDP)	41
Main exports (% of total merchandise exports):		Main imports (% of total merchandise imports):	
Machinery and transport equipment	46	Machinery and transport equipment	34
Manufactured items	23	Manufactured items	24
Chemicals and related products	15	Chemicals and related products	13
<b>CURRENCY</b>			
Irrevocable conversion rate (1 euro)	1.95583	Euros per USD:	
		Year 2010	0.75
		November 2011	0.74

1. Domestic concept.

## Executive summary

**F**ollowing a rapid recovery from the 2008-09 recession, growth has slowed in the second half of 2011 and the economy is facing a soft patch with significant downside risks to activity. On the domestic front, a return to lower growth rates from the strong prior upswing was to be expected from a cyclical perspective as potential growth remains weak. This downswing is exacerbated by the substantial deterioration of world trade growth and a loss of confidence due to the euro area debt crisis.

In the current situation, policymakers are faced with a multitude of challenges. As the economy goes through this soft patch, it is essential to let automatic stabilisers work fully as allowed by the fiscal rule. On the structural side, Germany has made major progress, notably on the labour market, which paid off handsomely in the recent recession. However, still more needs to be done to strengthen the growth potential, not least in view of rapid population ageing. Structural policies should focus on the following areas:

- **Strengthening domestic demand**

Reforms to foster domestic demand should focus on improving competition enhancing framework conditions for investment and innovation in Germany's domestic sector. This includes lowering the strict regulation in some services sectors, notably professional services, and improving innovation support, for example by introducing a tax credit for R&D complementing direct R&D support. In addition to raising productivity and potential growth, such reforms would also contribute to reducing the structurally high current account surplus and thus make a contribution to reducing global imbalances in a way which benefits Germany as well as others.

- **Raising labour input**

Past reforms of the labour market contributed to the strong resilience of employment during the past recession by raising working hour flexibility and reducing structural unemployment. The focus now needs to be on raising labour input and avoiding skill shortages. This includes notably increasing female full-time labour participation by lowering fiscal disincentives for second earners and further improving childcare supply. In addition, employment of older workers should be promoted by further removing work disincentives and fostering employability, including by continued reforms of the education and training system, aiming at a higher participation in life-long learning. Importantly, labour migration needs to be better focused on economic needs, which requires lowering the hurdles for high-skilled migrants, for example by introducing a point system.

- **Exploiting new sources of growth in climate change mitigation**

Environmental policies are becoming more important for growth, not least due to the government's recent decision to accelerate the phase out of nuclear power and the ambitious national targets for emission reduction and renewable energy sources. In this context it is essential to implement climate change mitigation policies in a cost-effective way, for example by strengthening the carbon price signal, and to carefully monitor the generosity of the feed-in tariffs. Furthermore, competition in energy sectors should be a priority together with fostering framework conditions for eco-innovation.

## Assessment and recommendations

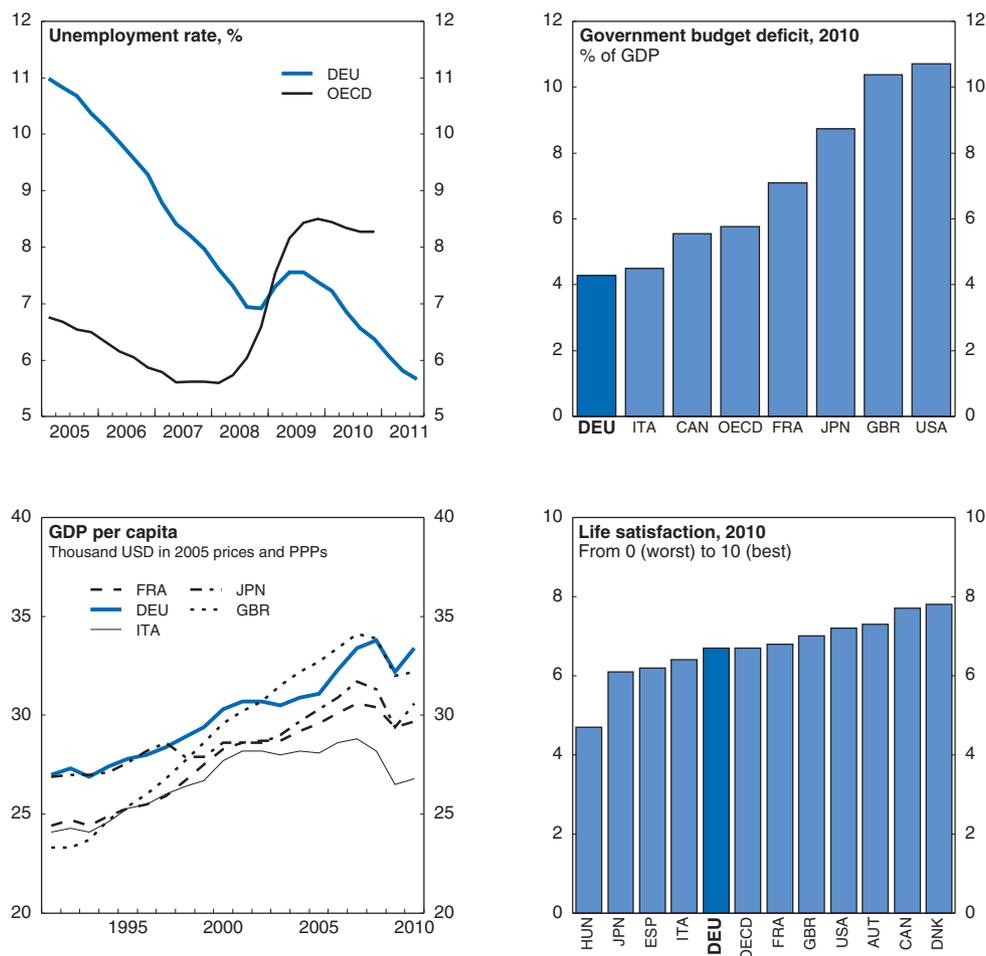
### Growth is slowing after an extraordinary rebound from the recession

Following a rapid and forceful recovery from the deep recession – pre-crisis real GDP was reached again in the second quarter of 2011 – growth has slowed and the outlook has weakened considerably. First, this reflects a moderation of growth rates from their cyclical highs towards their lower potential rates, indicating that the prior upswing was mainly a cyclical one. Second, this slowing is reinforced by a generalised slowing of the world economy, unusually high uncertainty and business confidence that is declining from high levels.

Notwithstanding the weaker outlook, the labour market still remains in relatively good shape. Unemployment barely increased during the crisis and has fallen significantly since then – in stark contrast to almost all other OECD countries (Figure 1). This is due to a decline in structural unemployment as well as a significant increase of flexibility in working hours, demonstrating the beneficial effects of past labour market reforms (Box 1). Regarding government finances, public debt has increased notably in the crisis, but the budget deficit is the lowest among G7 countries, partly due to the good performance on the labour market. The gap in living standards compared to the better performing OECD countries has continuously narrowed since 2005 and in terms of GDP per capita Germany ranked 12th among the 34 OECD countries in 2010. Germany also scores well on several measures of well-being, even though overall life satisfaction is somewhat below the OECD average.

Given rising uncertainties, policymakers are faced with a multitude of challenges. In the short-run, a marked deterioration of the cyclical situation requires to let automatic stabilisers operate fully around the structural consolidation path, as allowed by the fiscal rule. In addition, attention should continue to focus on raising the medium-term growth potential, which remains low at around 1½ per cent and is set to decline to below 1% after 2020 on account of significant population ageing. Ageing will also have a bearing on living standards as the labour force declines as a share of total population and thus fewer contributors face a growing share of benefit recipients.

Boosting potential growth will involve not only raising labour input by activating those parts of the labour force that are currently not fully participating, but also implementing reforms to raise productivity growth, in particular in Germany's less dynamic non-tradable sectors. This would benefit domestic investment spending, which remains relatively low by international standards, thereby contributing to reducing current account imbalances. A stronger German economy with a higher rate of trend growth, stemming not only from a competitive export sector, but also from a dynamic domestic economy would have important spillover effects and give collateral benefits for the world economy overall (Koske and Wörgötter, 2010).

Figure 1. **Economic performance of Germany**

Note: The deficit is general government expenditure minus revenue and that for the OECD is the average of ratios for countries for which data is currently available. The deficit for Japan refers to 2009. Life satisfaction is measured by asking people to rate how they value their life in terms of the best possible life (10) through to the worst possible life (0). The score for each country is calculated as the mean value of responses.

Source: OECD, *Better Life*, *Economic Outlook* and *National Accounts Databases*.

StatLink  <http://dx.doi.org/10.1787/888932559581>

### Box 1. **The German labour market miracle – lessons for other countries**

Despite an above-average fall in real GDP during the crisis, the unemployment rate in Germany increased by only  $\frac{1}{2}$  percentage point during the crisis, compared to 3% in the OECD on average. This unemployment reaction was also highly unusual relative to past recessions in Germany; taking the past output-unemployment relationship as a guideline, one would have expected the unemployment rate to rise by almost 3 percentage points.

Some of the factors behind this outcome are Germany-specific to this recession. For example, the sectoral impact was particular in that it was primarily the German manufacturing sector which was affected while the more labour-intensive sectors, such as construction, were not. Also, employment in public services continued to increase. Furthermore, labour shortages were evident in some sectors ahead of the crisis, leading some companies to hold on to their employees. Moreover, the labour force was growing less than in other countries due to population ageing, thus limiting the hike in the unemployment rate.

**Box 1. The German labour market miracle – lessons for other countries (cont.)**

However, none of these factors can fully explain the benign labour market outcome during the crisis; indeed, evidence suggests that structural factors played a significant role, notably policies to adjust labour via changes in hours worked (the intensive margin) and the beneficial effects of past reforms on work incentives.

**Emphasis on adjustment along the intensive margin**

In contrast to most other OECD countries (and also to past recessions in Germany), the adjustment of labour input has happened primarily through reductions in hours worked per employee rather than through layoffs. Such behaviour has been facilitated by two developments:

- Increased flexibility of the intra-firm labour market explains two-thirds of the total working hour reduction. Over the decade prior to the crisis, German companies, primarily in the manufacturing sector, gradually introduced more leeway into collective bargaining agreements, such as the option to temporarily reduce weekly working hours and salary. Also, working time accounts, which allow for smoothing of working time over the business cycle, were becoming increasingly more widespread. The effects of working time flexibility were particularly beneficial in this recession since it affected predominantly solid firms with strong cash flow positions who could afford such measures.
- The short-time work scheme – whereby part of an employee’s salary lost through fewer working hours is replaced by a transfer from the labour office – also helped to prevent layoffs, notably after the government substantially increased the generosity of the scheme. For instance, employers’ obligations to pay social security contributions on the income lost through short-time work were reduced while earned entitlements from health-, unemployment- and pension insurance remained unaffected. Eligibility to use the scheme was widened by relaxing some of the requirements. Overall, the use of short-time work explains around one-third of the reduction in working hours in 2009.

**Structural improvements in labour market policy**

Past labour market reforms, arguably the most significant among OECD countries during that time, significantly changed labour market institutions in Germany with positive effects on the reaction of unemployment during the crisis.

- A series of reforms starting in 2002, notably the *Hartz* reforms, strengthened work incentives and improved job matching. This had beneficial effects on the structural rate of unemployment over time and throughout the crisis, offsetting some of the cyclical increase in the unemployment rate that would otherwise have happened. Also – and probably related to the downward movement of structural unemployment – wage moderation in the years leading up to the crisis may still have exerted beneficial effects during the crisis.
- In addition, several options for early retirement were phased out in the years leading up to the crisis, thus making it more costly for employers to arrange consensual job-separations for older workers during this recession. By contrast, in earlier crises employees may have been more willing to agree to a layoff and to move into government-sponsored early retirement. The very positive performance of older worker employment in Germany during the crisis is likely to reflect the effects of these reforms.

Will the next recession be as benign on labour market outcomes as the past one? It is likely that the increased working time flexibility has reduced the unemployment-output relationship. Also, the different behaviour of older worker employment may be a lasting feature; at the same time, and unless the government continues to implement labour market reforms, the downward movement of the structural unemployment rate is likely to remain a factor unique to the last recession.

Managing a further reduction in greenhouse gas emissions and the transition towards the ambitious targets set for renewable energy, notably after the decision to phase out nuclear energy, will require making climate change policy more efficient. Reducing regulatory uncertainties in this area will unleash major investments in energy networks and generate the potential for eco-innovation. The benefits from meeting these challenges justify a new broad-based reform effort, building on the success of the changes made in labour market policy in the past decade.

### **The short-term outlook has weakened, ...**

GDP growth has decelerated markedly since the start of the year. To some extent, this is explained by temporary factors, such as the shutdown of nuclear power plants in the spring and weather effects introducing volatility into quarterly growth rates. However, since the upswing was always perceived to be a cyclical rather than a structural phenomenon, some deceleration of growth towards lower potential growth rates had been expected. Nevertheless, a generalised weakening of the world economy over the summer, a substantial increase in uncertainty and worsening business confidence has worsened growth prospects. While annual real GDP growth still reached 3% in 2011, after 3½ per cent in 2010, it is set to fall back sharply this year to around ½ per cent before increasing back towards 2% in 2013 (Table 1). The through-the-year growth rates (fourth quarter over fourth quarter of the previous year) amount to 1.0% in 2012 and 2.2% in 2013.

Table 1. **Short-term projections**

	2011	2012	2013
	Percentage changes from previous year, volume (2005 prices)		
<b>GDP</b>	<b>3.0</b>	<b>0.6</b>	<b>1.9</b>
<i>Without working day adjustment</i>	3.0	0.4	1.9
Private consumption	1.5	0.7	1.1
Government consumption	1.2	0.9	0.8
Gross fixed investment	6.5	1.2	3.8
Public	-0.4	-7.7	-0.3
Residential	5.9	1.3	2.6
Non-residential	7.9	2.4	4.9
Final domestic demand	2.3	0.8	1.5
Stockbuilding*	-0.1	0.0	0.0
Total domestic demand	2.2	0.8	1.5
Exports of goods and services	8.2	3.4	6.6
Imports of goods and services	7.2	4.1	6.2
Net exports*	0.8	-0.2	0.5
<i>Memorandum items</i>			
Unemployment rate	5.7	5.5	5.3
Output gap	-0.8	-1.7	-1.2
Harmonised index of consumer prices	2.5	1.6	1.5
General government budget balance	-1.0	-1.0	-0.5
Government gross debt/GDP (Maastricht)	81.7	82.2	81.3
Current account balance/GDP	4.9	4.9	5.3

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

\* Contributions to changes in real GDP (percentage of real GDP in previous year).

Source: OECD Economic Outlook 90 and Destatis.Data as of end-January.

The weakening of growth in Germany is projected to come mainly from slowing investment and consumption spending, which may temporarily suffer from adverse confidence effects, as well as from weaker trade growth. Over the medium term, domestic demand is set to strengthen. This reflects the solid balance sheets of both households and non-financial companies which mean that there is no need for deleveraging, in contrast to many other OECD countries where housing bubbles and construction booms led to over-indebtedness. In addition, domestic demand benefits from monetary stimulus, notably if the divergence of growth rates across euro area countries continues and monetary conditions remain supportive for Germany. Such easy conditions will support investment in particular, including residential investment and keep the financing costs for government debt low. House prices have already been trending upwards since 2009 after having fallen for most of the time since 1995.

Beyond the weakening in the short-term, consumers are expected to react positively to the improvement on the labour market as unemployment is projected to remain at post-unification lows. Since not all of the labour market improvement is structural in nature, and thus the labour market is getting tighter, wage pressure is likely to set in by 2012. Disposable income may thus grow more than in past years, supporting consumption even though equity price declines and uncertainty may prevent falls in the household saving rate (Hüfner and Koske, 2010).

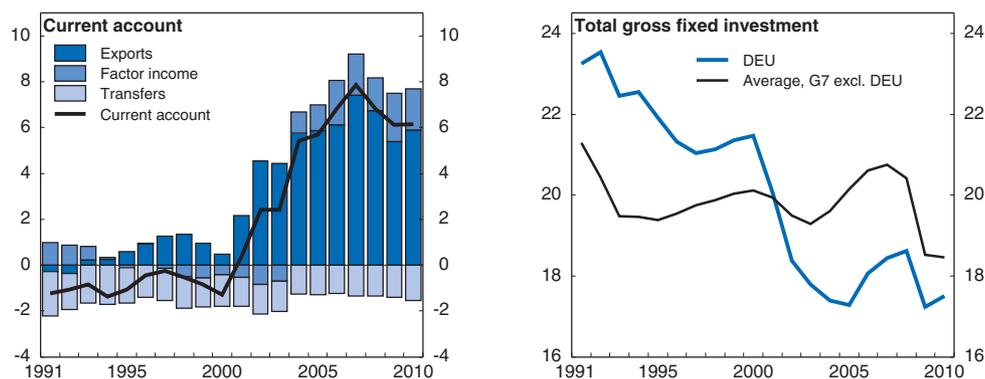
**... is surrounded by considerable uncertainty, ...**

This projection, which presents a baseline scenario assuming a gradual improvement in confidence during 2012, is surrounded by an unusually high level of uncertainty and, notably, considerable downside risks. These risks relate mostly to a further significant worsening of the euro area debt crisis which would have considerably adverse effects on the domestic banking system, possibly leading to severe constraints on credit supply. Also, such a scenario would affect growth in Germany's trading partners, thus inducing a lower export contribution. At the same time, growth could also evolve more favourable in case a spreading of the crisis to other countries can be contained, leading to an improvement in confidence. In this case, a more dynamic investment and consumption development could be envisaged, because German households and firms do not face general deleveraging needs.

**... and imbalances remain**

Despite some narrowing since the highs reached in 2007, the current account surplus (at around 5% in 2011) remains large in historical terms and is expected to be broadly unchanged over the next few years. Partly, this reflects the increasing importance of factor income earned on the considerable net foreign assets (42% of GDP in 2010, one of the highest in the OECD) that accumulated during several years of current account surpluses. Factor income has added close to 2% of GDP to the current account surplus (roughly a third) in each year since 2006 (Figure 2, left panel). But more importantly, corporate investment is still weak with firms continuing to have excess savings; this has been another significant factor contributing to the current account surpluses since 2000 with excess household savings playing only a minor role (OECD, 2010a). Investment spending as a share of GDP remains one of the lowest among OECD countries (Figure 2, right panel). This reflects notably a weakness of business investment and to a smaller extent residential investment. Part of the decline in domestic investment can be explained by a surge in foreign direct

Figure 2. **Current account surplus and investment rates**  
% of GDP



Note: Net current account and components.

Source: Deutsche Bundesbank and OECD, National Accounts Database.

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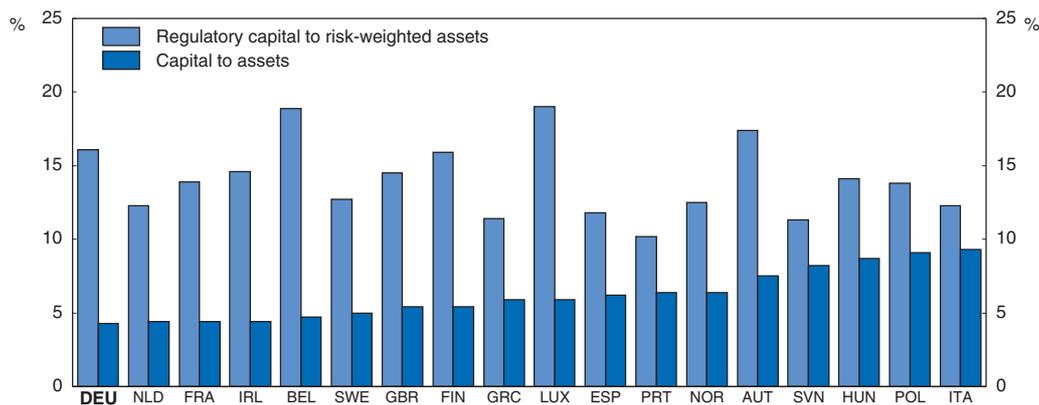
investment outflows since 2004, partly reflecting outsourcing activities towards the new EU member states, which is a welcome market-based response to globalisation. These efforts to regain price competitiveness through outsourcing were complemented by significant wage restraint in Germany, which helps to explain the fall in the wage share by five percentage points between 1995 and 2010. However, the long-run decline in the investment ratio also reflects structural deficiencies that make Germany less attractive as an investment location, also for migration relative to other countries. Addressing these structural deficiencies (along the lines mentioned further below) would have the double benefit of raising potential growth and of lowering external imbalances, not least through higher domestic investment (OECD, 2010a).

## **A stable banking system is essential for sustainable growth**

### **German banks remain highly leveraged**

Following the 2008-09 subprime crisis, the banking system was strengthened by substantial government efforts, including the setting up of the *Federal Agency for Financial Market Stabilisation* and the transfer of some institutions' risky assets to bad banks (which significantly raised government debt in 2010). However, attention has now focussed on the vulnerability of the banking system to the sovereign debt crisis in some euro area countries (IMF, 2011a). In addition, the banking system remains highly leveraged (Figure 3): the (non-risk weighted) capital to total asset ratio was 4.3% in 2010, the lowest among European countries; the ratio has decreased slightly in recent years, whereas in most other euro area countries it has increased. The difference between this leverage ratio and the ratio of regulatory capital to risk-weighted assets is among the highest in the euro area. This indicates a high vulnerability of the German banking system to financial market stress in case risk has not been appropriately assessed. However, it must be considered that international accounting standards allow for considerable netting of positions whereas in German national accounting rules this is not the case to such an extent. Balance sheet total therefore is – everything else equal – structurally higher for German banks. Furthermore, under the new Basel III capital requirements the largest German banks will have to increase their capital by at least EUR 50 billion, equal to half of their 2009 core tier capital (Bundesbank, 2010). German banks have already begun to increase their capital with respect hereto.

Figure 3. Capitalisation of European banking systems, 2010



Note: Capital is balance sheet equity (paid-in capital plus reserves).

Source: IMF, Financial Soundness Indicators.

StatLink  <http://dx.doi.org/10.1787/888932559619>

### Reform efforts should continue

Several reforms have been implemented over the last two years. For example, the Bank Restructuring Act implemented in January 2011 facilitates the recovery and reorganisation of systemically important financial institutions (SIFI) in a crisis situation. In addition, as in some other European countries, banks have to pay a specific annual levy in a restructuring fund. Progress has also been made in reforming banking supervision, including by improving the cooperation between the *Bundesbank*, whose macroprudential responsibilities will be enhanced, the regulator (*BaFin*), which will focus more on microprudential supervision, and the government and by internally reorganising *BaFin*. In other areas, however, reform efforts should continue as discussed in OECD (2010a), preferably within a common European approach. Overall, the government should intensify discussions with the banking sector about how to ensure its adequate capitalisation and should stand ready to provide appropriate support. In particular, the *Landesbanken*, which still lack a viable business model, remain vulnerable due to their low capitalisation and profitability and will be especially affected by the regulatory increases in capital requirements. Some of the *Landesbanken* have already been restructured under the pressure and supervision of the European Commission, but a reform of the sector as a whole is still lacking. Efforts for a coordinated reform of this sector thus need to continue, including a reform of the savings bank sector.

### Growth spillovers from Germany to other countries...

With Germany being the fourth-largest economy in the world, its economic developments – and policy-making – have an impact on other countries, including through higher imports as domestic demand strengthens. Growth spillovers through trade, however, play a smaller role than is often assumed; the impact of higher growth in Germany on other countries is the lowest among large economies (IMF, 2011b). Indeed, trade links to the larger euro area countries are limited (OECD, 2010b). For example, exports to Germany account for barely 3% of GDP in France, Spain and Italy (Table 2). Furthermore, import propensities for domestic demand are rather small in Germany (but higher for exports), underlining that a rise in domestic demand is unlikely to translate into much growth support for other countries (Pain et al., 2005). Given the weakness in trade links, fiscal consolidation in Germany will have only minor trade-related repercussions on other economies.

Table 2. **Trade links of Germany within the euro area, 2010**

	Exports to Germany	
	As a share of total exports	As a share of GDP
France	13%	3%
Italy	11%	3%
Spain	8%	2%
Greece	4%	1%
Ireland	9%	9%
Belgium	12%	10%
Austria	22%	12%
Netherlands	15%	12%
Slovakia	17%	14%

Source: Destatis, OECD.

Due to its strong position as an exporter, Germany acts more as a transmitter to other countries of external shocks from the US and Asia – to which it is more exposed than other economies – rather than being a source of shocks. This is particularly important for smaller euro area countries, with exports accounting for more than 10% of GDP in Austria, the Netherlands and Slovakia – reflecting the tight integration of supply chains with those countries. In other words, economies forming a joint supply base with Germany are currently more dependent on the impact of world trade on the German export sector, than on German domestic demand.

However, if efforts to boost trend growth become successful via invigorating dynamism in the domestic sector, then demand growth spillovers to other countries may become more important, because a more dynamically growing domestic sector, driven by investment and innovation will generate additional employment and income generation opportunities and become a new source for import demand. By improving its own economic performance, Germany would become a growth locomotive for Europe.

### **... are influenced by monetary policy and financial linkages**

However, the fairly tight correlation of business cycles between Germany and other euro area countries suggests that the trade channel is complemented by other forms of transmission, such as the monetary policy channel. Given its size, the German economy affects euro area aggregates more than other countries, thereby influencing monetary policy decisions. Low inflation in the first half of the past decade has thus kept interest rates lower than otherwise, boosting growth in smaller, fast-growing countries. The financial system is another channel of spillovers. For example, lending of German banks to peripheral countries rose sharply in the years prior to the crisis; consolidated claims of German banks on Spanish banks reached almost 25% of Spanish GDP (OECD, 2010b). Channelling funds abroad through the banking system thus transmitted high savings in Germany into growth in other countries.

### **The fiscal rule imposes a return to sustainable public balances...**

With public debt having increased by almost 20% of GDP since 2007, to 83% of GDP in 2010 and in view of a significant increase in age-related costs over the coming years, fiscal consolidation is needed over the medium term. The new fiscal rule (*Schuldenbremse*) requires measures to lower the central government deficit to 0.35% of GDP in structural

terms by 2016. The planned consolidation measures, amounting to EUR 80 bn (3.2% of GDP) until 2014, implemented over time to reach a reduction in the federal budget deficit of 1% of GDP in 2014, are consistent with this rule. The rule allows the automatic stabilisers to work and, in view of the weaker growth outlook and the associated uncertainties, the authorities should let them do so. However, if the economy were to be significantly weaker than projected, it would be appropriate to provide a temporary stimulus to demand in a way that does not harm the credibility of the fiscal rule domestically and internationally.

The structural aspects of the consolidation measures are welcome and their implementation is supported by the introduction of a top-down approach for budget preparation since 2011, as recommended in OECD (2010a). Two-thirds of the measures are expenditure-based cuts with the largest item being the reduction of social security and unemployment benefits, including the readjustment of parental and housing benefits. On the revenue side, the government has announced a number of new taxes including a nuclear fuel tax and a bank levy. Some measures have already been introduced in 2011, such as a tax on air travel. Others, however, are more uncertain, such as the planned introduction of a financial transactions tax, revenues from the nuclear fuel tax (in doubt given the decision to accelerate the phase out of nuclear energy) or the global expenditure cut in 2014 worth 0.2% of GDP. The expected revenues from these measures and how they will be achieved should be further specified.

### **... and tax reform should aim at a more growth-friendly tax structure**

In addition to reducing the structural deficit, there is still the need for a reform of the tax structure, as argued in the previous *Survey* (OECD, 2010a). Taxation remains skewed towards labour, notably because of high social security contributions (Table 3). This is unfortunate, as cross-country evidence indicates that tax systems which put more weight on less mobile bases, notably consumption taxes and recurrent taxes on immovable property, produce better growth outcomes (Arnold *et al.*, 2011).

**Table 3. Tax revenues by category**

% of total tax revenue, 2009

	Germany	OECD average
Labour taxes	64	52
<i>Personal income tax</i>	25	25
<i>Social security contributions</i>	39	27
Taxes on goods and services	30	33
Corporate income tax	4	8
Taxes on property	2	5
<i>Recurrent taxes on immovable property</i>	1	3

Note: Social security contributions include those paid by the self-employed and benefit recipients.

Source: OECD (2011), *Revenue Statistics*.

Given this background, revenues from consumption taxes should be increased. While the standard VAT rate has been increased in the past to 19%, it remains somewhat lower than in many other European countries. However, the main challenge is the taxation of many goods at a reduced rate. The tax losses resulting from the application of reduced rates amount to almost 1% of GDP (OECD, 2008a). Reduced rates should be phased out so as to broaden the tax base. Since such a reform might require compensating transfers to low-income households, the net revenue gain of such a measure would be reduced.

Furthermore, taxation of real estate accounts for just over 1% of total revenues compared to 3% in the OECD on average (and ½ per cent of GDP versus 1% of GDP). The low level of revenues reflects primarily a tax base which relies on the values determined in 1964 (1935 for the eastern *Länder*), an arrangement that has been criticised by the Federal Fiscal Court (*Bundesfinanzhof*). While it is true that municipalities in Germany finance several tasks through fees rather than through tax revenues, the overall level of user fees as a share of GDP, both at the local level and across all layers of government, is slightly below the OECD average. The argument for raising the importance of real estate taxes goes beyond their less adverse growth effects compared to other taxes. Such taxes could provide a comparatively stable revenue source for municipalities, at least compared with their current main source of revenue, the local trade tax (Joumard and Kongsrud, 2003). Reforms to the real estate tax should include moving towards actual prices for evaluating the tax base of the tax on land and buildings (*Grundsteuer*). Also, tax rates (*Hebesätze*) could be raised further, although this is within the competence of municipalities.

Labour taxation is particularly high. The total tax wedge for a single individual without children and average income amounts to 39% of gross wage earnings compared to 24% in the average OECD country (Table 4). The wedge is lower for families, but still exceeds the OECD average. This primarily reflects social security contributions, which are more than double the OECD average in terms of gross wage earnings. High non-wage labour costs are a major disincentive for employment, also because they set in at relatively low income levels. Bassanini and Duval (2006) estimate that a 10 percentage points reduction in the tax wedge is usually associated with a drop in structural unemployment by about 2.8 percentage points. A high tax wedge may also hamper the immigration of the most mobile labour, namely the high-skilled. Therefore, lowering social security contributions, notably for low income workers with full-time earnings, should be a priority within a reform of the tax structure (OECD, 2011a). Such a reform should usefully include measures on the expenditure side of the social security system. Given that the structural unemployment rate in Germany is still higher than in many other countries, despite the improvements over the past years, such a reform would be particularly helpful.

Table 4. **Tax wedge by family-type and wage level**

		% of gross wage earnings, 2010							
Family type		Single	Single	Single	Single	Married	Married	Married	Married
Children		No	No	No	2	2	2	2	No
% of average wage		67	100	167	67	100-0*	100-33*	100-67*	100-33*
Income tax	DEU	13.7	18.7	27.1	-4.1	-0.6	5.5	9.9	13.7
	OECD	10	14.2	20.5	5.1	8.8	9.3	11.2	11.1
Employee soc sec contributions	DEU	20.5	20.5	16.7	20.2	20.2	20.2	20.2	20.5
	OECD	10.2	10.1	9.5	9.9	10	9.8	10.1	9.9
Total	DEU	34.2	39.2	43.8	16.1	19.6	25.7	30.1	34.2
	OECD	20.3	24.3	30	14.9	18.8	19.2	21.2	21

\* Two-earner couple.

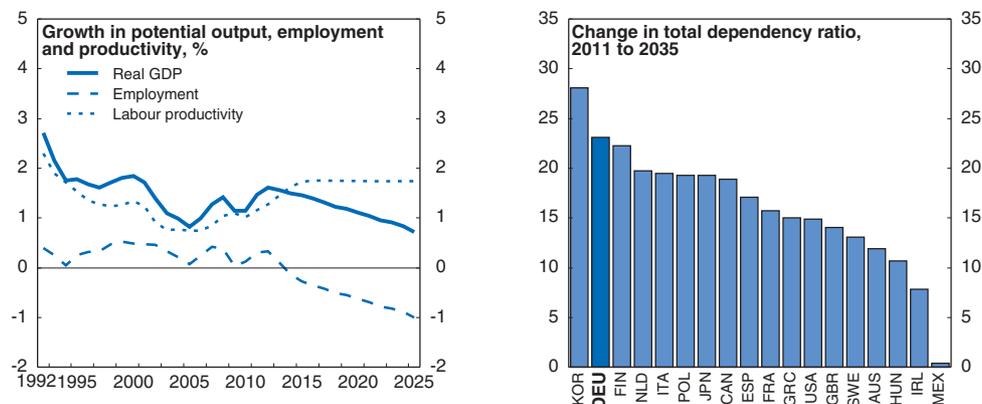
Source: OECD (2010), *Taxing Wages*.

## Structural reforms for stronger and more sustainable growth

### Potential growth is set to decline over the next decade...

Potential growth is set to fall below 1% at the beginning of the next decade, around half the OECD average (Figure 4, left panel). This primarily reflects a decline in potential employment by around ½ per cent per year over the period 2016-25 as the German population ages; by contrast, employment in the average OECD country is projected to increase by ½ per cent per year over the same period. Lower potential growth will also adversely affect real GDP per capita growth because the working-age population shrinks earlier and more rapidly than total population; the share of those aged under 15 and above 64 relative to the working age population is set to increase from 51% today to 74% by the mid-2030s – much faster than in the average OECD country (Figure 4, right panel).

Figure 4. Potential growth and ageing effects



Note: Labour productivity is real GDP/employment. The total dependency ratio is population aged under 15 or 65 and over divided by population aged 15-64 years (working age).

Source: OECD, Dotstat and Economic Outlook Databases.

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### ... requiring reforms raising labour input...

#### Raising incentives for female full-time labour participation

In terms of labour input, Germany stands out with the number of actual hours worked per person employed being the third lowest in the OECD and almost 20% lower than the average. A main factor behind this is the relatively low incidence of full-time female labour participation. As a result of this gender difference, the usual weekly working time (i.e. excluding holidays, sick leave or irregular overtime) of women amounts to only 30.5 hours, one of the lowest among OECD countries and almost 10 hours less than men, compared to a difference of 6.4 hours for the OECD (Table 5). The difference with other countries and to male employment is most striking for married women and for mothers, while employment patterns for single women without children are similar to other countries, notwithstanding some improvement following the 2007 reform of the parental leave benefit system and increased availability of childcare facilities (OECD, 2008a). Further raising the number of hours worked would contribute to both increasing labour input and significantly lowering the gender earnings gap with Germany's being the third-highest in the OECD after Japan and Switzerland (Koske et al., 2012).

Table 5. **Female labour input**

			DEU	OECD
Employment rates	Male	2010	76.1	72.7
	Female		66.1	56.7
	<i>of which: Maternal</i>		63.1	61.4
Share of part-time employment	Male	2010	7.6	7.9
	Female		38.2	24.5
Usual weekly working hours	Male	2009	40.1	41.2
	Female		30.5	34.8

Note: OECD average for working hours is un-weighted and excludes US, Mexico, Japan, Israel, Iceland and Canada.

Source: OECD, *Family Database*, *Labour Force Surveys*.

In Germany the mix of tax and benefit policies significantly favours single-earner over dual-earner couples. This huge fiscal disincentive for full-time dual-earner couples is due both to the free health insurance for non-working spouses and to the system of joint income taxation (which is most favourable for one-earner couples as the tax schedule is applied to the average income of both spouses). In particular the former introduces high marginal tax rates at the wage threshold from which on health insurance premiums need to be paid and helps explaining why women are the main users of so-called *Mini-Jobs* (marginal employment not liable for health insurance if earnings remain below EUR 400 per month). Those jobs have few working hours, thus explaining why one fifth of women work less than 20 hours a week, twice the OECD average. Moving from such jobs into regular full-time employment results in a jump in taxes and insurance costs. Not surprisingly, two-earner couples with full-time jobs are much less prevalent than in other countries.

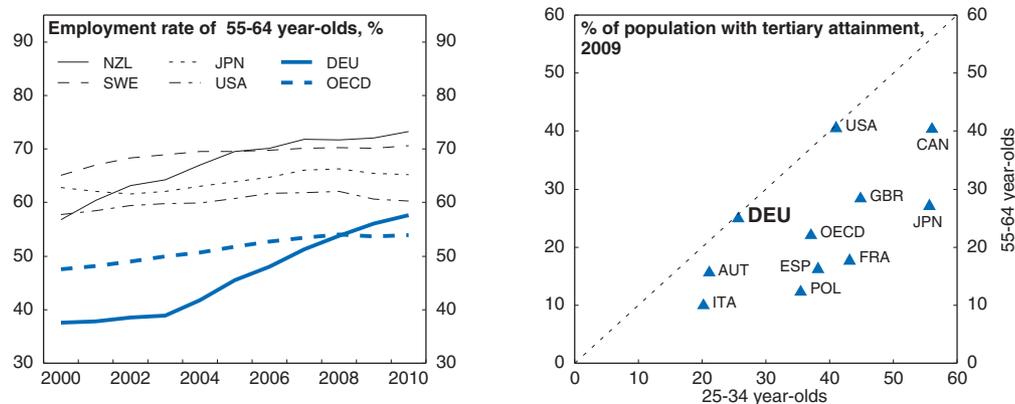
The marginal tax rate for secondary earners when moving from marginal employment into regular full-time employment thus needs to be lowered in order to raise incentives to work longer hours. In this regard, mandatory health insurance premiums should be introduced for non-working spouses. Such a reform would need to be included in a general reform of health care financing (OECD, 2008a). In addition, reforming joint taxation would remove work disincentives for married women, raising their participation rates. While complete mandatory individual taxation of couples may not be possible in Germany for constitutional reasons, individual taxation could be coupled with the option to transfer a certain amount as a tax allowance from the non-working spouse to the working partner (*Realsplitting*), even though labour supply effects would be weaker in the latter option (Steiner and Wrohlich, 2004).

Lack of appropriate childcare facilities is a further hurdle for maternal employment as is suggested not only by OECD comparison but also when comparing employment rates between mothers in the western and the eastern *Länder* (in the latter childcare supply compares well with other OECD countries). Overall, the enrolment rate for children aged 0-2 years at 18% in Germany is only around half the OECD average. At older ages, childcare and school facilities are often available less than full-time, thus helping to explain the large share of women working part-time. The government has rightly addressed this issue with plans to substantially increase the supply of childcare places, notably in the western *Länder*. These plans should continue and be complemented with efforts to further increase the availability of full-day schooling. By contrast, the increase in childcare supply should not be coupled with a subsidy paid to families who chose not to use childcare. Given its adverse incentive effect, the government should instead apply those resources to creating more high-quality childcare places.

### Encouraging a longer working life

Employment rates of older workers in Germany have increased by 20 percentage points over the past decade in response to a series of reforms in the early 2000s limiting early retirement options. While the employment rate for those aged 55-64, at 57% in 2010, exceeded the OECD average of 54%, Germany should aim to catch up with the best performing countries given the seriousness of its ageing problem (Figure 5, left panel). For example, Sweden, Norway and New Zealand have rates around 70%. Activating the old-age population requires reforms raising both the supply and the demand for older workers.

Figure 5. **Employment of older workers and tertiary attainment**



Note: The employment rate is employment as a % of population aged 55-64 years. Tertiary education includes advanced research programmes.

Source: OECD, Labour Force Database and Education at a Glance 2011.

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On the supply side, incentives for continued work should be improved further. To this end, penalties for drawing a pension before the statutory pension age should be raised to the actuarially neutral level. Reducing the duration of unemployment benefits for those aged 58 and above should also be considered, for example by reversing the lengthening from 18 to 24 months that was decided in 2007 or by equalising the duration across all age groups. Finally, the pension system could be made progressive, for example by raising the value of pension points for low income workers at the end of their career, to both avoid old-age poverty and discourage low-income workers from early retirement.

These measures should be usefully complemented by demand side measures. The wage premium of older workers relative to young ones is one of the highest among OECD countries and cross-country comparisons show that this reduces the chances of older workers being hired. One option for the public sector to limit this negative effect is to further change its remuneration system, for instance by continuing shifting from seniority towards performance. Social partners should be encouraged to assess in how far current wage schemes inhibit older worker employability. Also, participation in lifelong learning has a positive impact on the employability of older workers. Given that only 30% of workers aged 55-64 currently participate in training or education in Germany, compared to 60% in Sweden, such activities need to be expanded.

### Continuing education reforms

Raising education outcomes would also contribute to labour participation over a working life: across OECD countries, employment rates for tertiary graduates are around 10 percentage

points higher than for those with upper secondary education (including those with vocational training) and this difference becomes more marked for older workers. Notwithstanding the fact that Germany's employment rates for 25-34 year olds with vocational education and training are higher than the OECD average and their unemployment rate is lower, employment rates for workers with such educational background decline faster at older ages than for those with tertiary education (OECD, 2010a). The share of tertiary graduates for the overall working-age population at 26% is slightly below the OECD average (30%), despite the low level of education costs. In addition, the share of tertiary graduates has remained unchanged from one generation to the next, while in almost all other OECD countries the younger cohorts have much higher tertiary graduation rates than the older cohorts (Figure 5, right panel). This is the outcome of both a lower number of students who qualify to enter tertiary-type A university (54% vs. OECD average of 64%) and lower entry rates of those having the qualification to do so (40% in tertiary A [plus 19% in tertiary B] vs. OECD average of 59% in tertiary A) as well as the availability of well-established vocational education and training options, which lead to very low rates of overall and youth unemployment. Recent measures to make the access to tertiary education for vocational training graduates easier start to show welcome results and efforts should continue in this direction. Furthermore, efforts should be stepped up to increase the participation in lifelong learning, and especially the further education participation of older workers.

In order to further improve access to tertiary education and raise the number of students qualified to pursue tertiary studies, education reforms need to continue as recommended in OECD (2010a). Germany has made significant progress in improving the school system in terms of quality and equity. Reforms to reduce entry barriers of the system should be pursued further. Measures to improve the performance of disadvantaged students have been taken and efforts to increase equity of the school system should continue. Some *Länder* have made considerable progress in reducing the stratification in the school system, notably by delaying the tracking decision to a later age and reducing the number of school tracks. Similar approaches should be adopted in the remaining *Länder*. In addition, the institutional set-up of tertiary education should be improved, including a sufficient and diverse financing of higher education, including private participation, while continuing with measures to facilitate tertiary education for cash-poor students.

### ***Reducing the risk of labour market duality***

In addition to raising the numbers in the labour force, the structure of employment matters for labour market outcomes. In this regard, it is worrisome that the labour market is increasingly becoming divided into those employees with permanent contracts and those with fixed-term jobs. Fixed-term jobs now account for almost 15% of all dependent employment, up from around 10% in the mid-1990s, with their share rising faster than the OECD average (which stood at 12.4% in 2010). Fixed-term contracts have increased especially rapidly for younger workers. Almost two-thirds of younger workers have such work contracts – twice the OECD average. While this also reflects the large number of apprentices in vocational training who are usually hired on a fixed term basis, it is also true that this share increased by 20 percentage points since the mid-1990s.

There have been significant efforts over the past years to facilitate the use of fixed-term contracts, which increased employers' flexibility and created stepping stones into permanent employment (around half of all workers on fixed-term contracts obtain regular contracts after the limitation period has ended [Hohendanner, 2010]). However, it is well

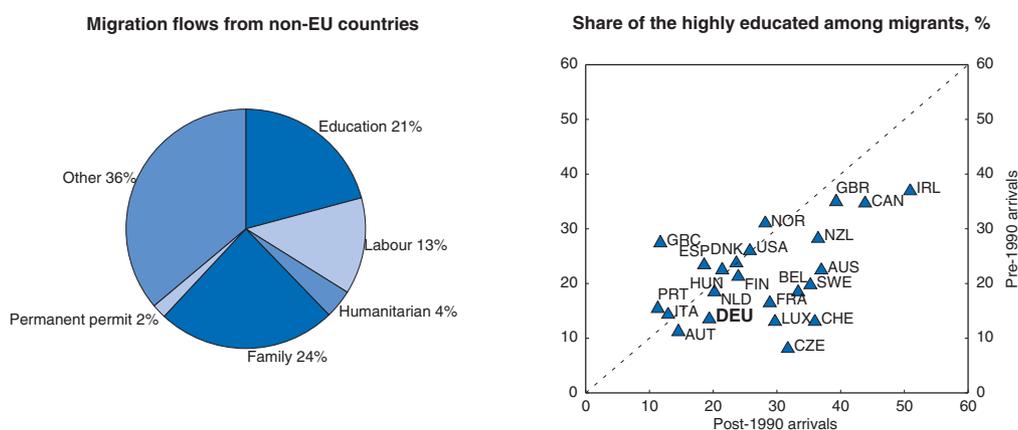
known that employment protection legislation can be a factor behind labour market duality, notably if protection of permanent and fixed-term contracts differs sharply (de Serres et al., 2011). Fixed-term employment can have adverse effects on the long-run employability, especially for young workers, notably because firms are less likely to invest in their training (OECD, 2004). It also contributes to higher income inequality as fixed-term workers tend to earn less than permanent ones (Koske et al., 2012). Germany has substantially liberalised fixed-term work contracts since the mid 1990s to well beyond the OECD average, while protection of regular employment remains among the strictest in the OECD. To lower the risk of dualisation in the labour market, the protection of permanent work contracts should be lowered along the lines suggested in OECD (2010a), for example by moving towards a unified job contract with the degree of protection rising with tenure. At the same time, the government should resist scaling back the prior liberalisation of fixed-term contracts.

### Fostering integration and labour migration

Immigration can also play a larger role, especially in the case of emerging bottlenecks in the labour market. Unfortunately, net migration flows to Germany have declined over the last decade; immigration of workers accounts for only a small share of all immigration, and the proportion of highly educated among migrants is lower in Germany than in many other OECD countries (Figure 6). This outcome reflects a host of factors, such as language and other problems of integration. In this respect, the recent legislation facilitating the recognition of foreign credentials is a step in the right direction. However, hurdles to integration and immigration remain significant and further reform appears warranted. So far, the number of inflows coming from EU member states has been low even after the opening up of the labour market in May 2011. The focus should therefore be on appealing a greater number of, in particular high-skilled, EU-citizens and on making immigration easier for non-EU immigrants with skills that cannot reasonably otherwise be found in Germany.

In case employers intend to hire high-skilled migrants from non-EU countries, they are faced with a labour market test where they need to prove that they cannot fill the position with a domestic worker or EU national. This requirement, however, is waived for jobs with

Figure 6. **Composition of migration to Germany and the education level of migrants**



Note: Left panel data is from 2009. Total inflows are grouped by type of residence permit received. Permanent permit includes permits delivered to high skilled, accounting for 0.7% of the total. "Others" mainly include temporary authorisation to stay for migration candidates, including asylum seekers.

Source: Bundesamt für Migration und Flüchtlinge, *Migrationsbericht 2009*; OECD (2008b), *A Profile of Immigrant Population in the 21st Century*, Chart 4.4.

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an annual income exceeding EUR 66 000. As this wage exceeds that of many young skilled workers, the provision inhibits the immigration of needed skills. Lowering the threshold would therefore be a first step to attracting more highly qualified foreign workers. To further attract the skills needed by the German economy, a points system should be considered, as is practiced in several OECD countries. Indeed, a points system is transparent and flexible and international experience indicates it leads to an increase in the qualification level of migrants. In addition to fostering high-skilled migration, the need for mid- and low skilled migration due to labour shortages in certain occupations should be assessed, as shortages may develop not only in high-skilled occupations. To this end, an institution tasked with designing, assessing and coordinating labour immigration policy, including setting up shortage lists, could be established.

### Box 2. Recommendations for the labour market

#### Raising incentives for full-time female participation

- Reduce fiscal disincentives to work by introducing mandatory health insurance premiums for non-working spouses and by reforming joint income taxation. Continue plans to expand the supply of childcare facilities and further increase the availability of full-day schooling. Refrain from subsidizing families who choose to not use childcare facilities.

#### Raising incentives to work longer

- Raise pension discounts for drawing a pension before the statutory pension age towards an actuarially neutral level and make the pension system progressive to both avoid old-age poverty and discourage low-income workers from early retirement.
- Reduce the duration of unemployment benefits for those aged 58 and above, for example by reversing the lengthening from 18 to 24 months that was decided in 2007 or by equalizing the duration across all age groups.
- Continue shifting from seniority towards performance remuneration in the public sector and encourage social partners to assess in how far current wage schemes inhibit older worker employability. Expand lifelong learning activities for older workers.

#### Education

- Monitor the effect of measures taken to reduce entry barriers of the education system and adjust measures if warranted. Continue to reduce the stratification in the school system, notably by delaying the tracking decision beyond age 10 and reducing the number of school tracks across all *Länder*. Improve the institutional setup of tertiary education, including a sufficient and diverse financing of higher education.

#### Dual labour market

- Lower the protection of permanent work contracts along the lines suggested in previous Surveys. Move towards a unified job contract with the degree of protection rising with tenure.

#### Fostering integration and immigration

- Consider lowering the wage threshold which exempts employers from proving that they cannot fill the position with a domestic worker or EU national before hiring a high skilled non-EU migrant. Consider moving towards a points system for immigration.
- Monitor whether the recent legislation to acknowledge foreign credentials effectively supports integration.
- Consider establishing an institution tasked with designing, assessing and coordinating labour migration policy, notably including setting up shortage lists.

### ... and policies for raising productivity and better balanced growth...

In addition to raising labour input, there is scope for increasing productivity. Growth in productivity per employee over the past decade was only around half of the OECD average (Table 6). This reflects both a stronger decline in the number of hours worked per person and lower growth in hourly productivity. Labour productivity is particularly lagging behind in business services, where the cumulative growth amounted to only two-thirds of the OECD average over the years 1995-2008. Overall, this translates into significantly lower growth in value added in business services compared to other countries, as argued in OECD (2010a).

**Table 6. Labour productivity compared to the OECD**

Average annual growth rates

	1995-2010		2000-10		2000-08	
	DEU	OECD	DEU	OECD	DEU	OECD
GDP per employee	0.8	1.5	0.6	1.4	0.9	1.6
<i>of which business services**</i>	1.0	1.4			0.9	1.7
GDP per hour worked	1.3	1.5	1.1	1.5	1.4	1.7
Hours worked per employee	-0.5	-0.3*	-0.4	-0.4	-0.4	-0.3

Note: \* Unweighted average excl. Chile, Estonia and Slovenia. \*\* 1995-2008. Business services equals total services except for community, social and personal services and includes wholesale and retail trade, restaurants, hotels, transport, storage, communications, finance, real estate and other business services.

Source: OECD Analytical Database and STAN.

### Deregulation of the services sector

One factor that is holding back productivity is remaining regulation in some services sectors, notably professional services (in particular architects, engineers and the legal professions; OECD, 2010a). Germany ranks 22 out of 27 OECD countries in terms of strictness and this is mostly due to strict conduct regulations (restrictions on inter-professional co-operation as well as regulation of advertising and of prices and fees). While there are many arguments for having some regulation in place (such as consumer protection), a too restrictive stance hampers market entry and competition. The 2009 reform of the regulation of prices for architects and engineers is a step in the right direction. But deregulation should continue and importantly should include rethinking compulsory chamber membership. The economic impact of deregulation would be significant as the liberal professions (of which professional services form a large part) directly account for around 10% of GDP. Regarding economy-wide regulations, the license and permit system is more burdensome than in other countries, thus acting as a barrier to entrepreneurship also, but not only, in the services sector. The “silence is consent” rule for issuing licenses should be applied and points of single contact should be allowed to issue or accept notifications and licenses. In order to focus the debate and to identify remaining hurdles to higher productivity, an advisory body tasked with reviewing regulation and other issues – similar to the Australian Productivity Commission – should be established.

Cross-country evidence suggests that reforms, which remove entry barriers, foster competition and eliminate red tape, would not only improve productivity but also raise investment. For example, aligning the degree of economy wide product market regulation with best practice could increase the investment rate by ¼ percentage point (Kerdrain *et al.*, 2011) and labour productivity growth could be 1 percentage point per year higher over a

period of 10 years (Arnold *et al.*, 2009). Gomes *et al.* (2011) show that a reduction in the mark-up by 15 percentage points in the German services sector would increase output by 4.4%, notably through higher investment. Such policies would make the domestic sector more attractive for employment and investment, and likely would lead to higher wages underpinned by higher productivity. Overall, such reforms would thereby help to lower the current account surplus and thus reducing global imbalances, while benefiting the German economy through higher trend growth (OECD, 2010a).

### ***Fostering innovation***

Productivity would also benefit from improved innovation policies. While Germany's current position in innovation activity is quite good when measured by output indicators such as the absolute number of patent filings, its relative advantage is shrinking as the growth of these outputs is declining. This mostly reflects deficiencies on the input side, such as the lack of finance for innovation projects, notably for small firms which tend to produce more radical innovation. As discussed in OECD (2010a), measures should be taken to improve the availability of risk financing, including providing venture capitalists with appropriate exit possibilities. Moreover, Germany relies mainly on direct R&D subsidies at the federal and state level rather than tax incentives, which have become increasingly popular in many OECD countries. While the government is discussing the introduction of an R&D tax credit as an additional instrument, it has not yet been put in place. In their discussion about such a tax credit, authorities should take note of the advantages of a mixed system of direct and indirect support for R&D, while ensuring that the design of such a system sets appropriate incentives for innovation.

### ***Turning the task of climate change mitigation into a new source of growth***

#### ***Germany set itself ambitious targets...***

Germany has reduced greenhouse gas (GHG) emissions substantially more than other countries; emissions were 26% lower in 2009 compared to 1990, thus outpacing their Kyoto target of a 21% reduction by 2012 (Figure 7). However, part of past emission reductions is due to the collapse of the emission-intensive industry in the eastern *Länder* during the 1990s (Weidner and Mez, 2008). Also, outsourcing of manufacturing activities to new European Union member countries during the 2000s and low growth during most of the past decade has limited emissions. Nevertheless, climate change mitigation policies, which benefit from strong public support, have contributed to this success.

Despite past emission reductions, Germany remains a big emitter of GHG. Emissions per unit of GDP are above the EU27 average, partly due to a more carbon-intensive energy mix. Germany has set itself ambitious national targets in its Energy Concept: by 2020, the aim is to reduce GHG emissions by 40% relative to their 1990 level, to reduce primary energy consumption by 20% relative to 2008, and to increase the share of renewable energy sources (RES) in electricity consumption to 35%.

#### ***... and the phase-out of nuclear energy will increase the challenge***

Going forward, ambitious reductions in GHG emissions will be more challenging: *First*, Germany may not benefit from further one-off reductions in GHG emissions and the target implies an even faster abatement than in the past. *Second*, the phase out of nuclear energy production earlier than previously decided (by 2022 instead of 2036) will at least temporarily require increased use of fossil fuel fired power plants as a large source of low

### Box 3. Recommendations for improving resilience and trend growth

#### Financial stability

- Intensify discussions with the banking sector on the means to ensure its adequate capitalisation and stand ready to provide appropriate support.
- Efforts for a coordinated reform of the Landesbanken sector should continue, including a reform of the savings bank sector.

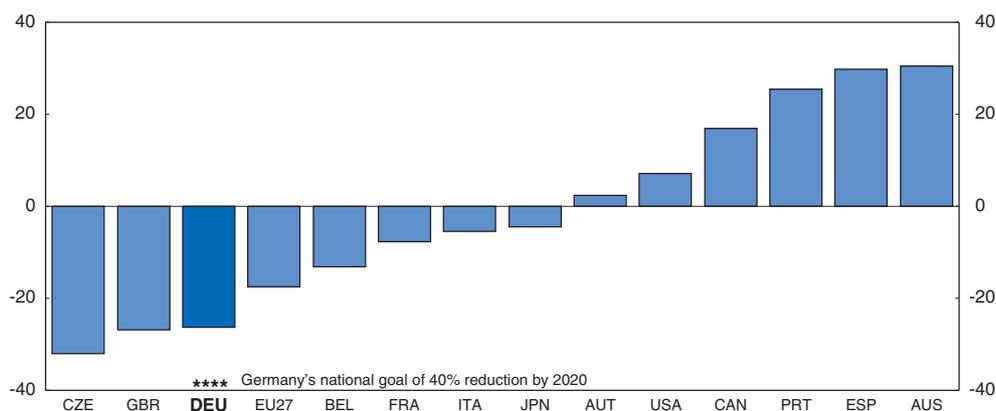
#### Fiscal policy

- Let automatic stabilizers work. In case of a significantly weaker growth outlook provide a temporary stimulus to demand in such a way that does not harm the credibility of the fiscal rule.
- Further specify the consolidation plans.
- Review the structure of the tax system by shifting taxation from mobile bases to immobile bases. Phase out VAT reduced tax rates. Increase real estate tax rates and move towards actual prices for evaluating the tax base. Reduce social security contributions, notably for low income workers, together with a reform of the social security system on the expenditure side.

#### Domestic sector productivity growth

- Continue the deregulation of professional services, including rethinking compulsory chamber membership. Apply the “silence is consent” rule for issuing licenses and allow points of single contact to issue or accept notifications and licenses. Establish an advisory body tasked with identifying and reviewing regulatory hurdles to higher productivity.
- Improve the availability of risk financing, including providing venture capitalists with appropriate exit possibilities. Implement a mixed system of direct and indirect support for R&D, while ensuring that the design of such a system sets appropriate incentives for innovation.

Figure 7. Growth in GHG emissions 1990-2009, %



Source: United Nations Framework Convention on Climate Change (UNFCCC).

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carbon energy production will vanish. Nevertheless, as the government plans to accelerate the expansion of RES and gains in energy efficiency, the negative impact of the nuclear phase-out on GHG emissions may be contained in the medium term.

Even though Germany can benefit from being a first mover in reducing GHG emissions and in developing RES, its strategy is associated with a number of risks, notably extraordinary increases in GHG abatement costs. For example, with the accelerated closure of nuclear power plants, the forced extension and adaptation of the electricity grid as well as the anticipated investments in the fossil fuel fired power plants and in RES will increase the costs related to the reduction of emissions in the energy sector, not least by limiting the development and the use of more advanced technologies. In addition, the immediate closure of some older nuclear power plants will reduce energy supply security in the short run and will make the management of European electricity networks more challenging. Moreover, reducing emissions in the sectors covered by the European Emission Trading Scheme (EU ETS) on top of the reductions induced by the carbon price would not contribute to higher climate change mitigation. As emissions are capped at the EU level, it would instead free up additional allowances for use elsewhere and distort the price signal created by the scheme.

Despite these disadvantages, the government's more ambitious targets may well be justified, for example insofar as they help in the development of new sectors. However, in order to contain any adverse growth effects or even generate an opportunity for additional growth, it is crucial that these targets are achieved in a cost-effective way. This requires significant adjustments to both climate change policies and to the overall framework conditions to foster the development of green energy sources and to further raise energy efficiency.

#### ***Climate change mitigation policies need to become more efficient...***

Germany has several environmental policy tools at its disposal, which often creates overlap and thus requires simplification. For example, some GHG emitters are covered by several measures (such as the EU ETS and feed-in tariffs), while others are not covered at all. Also, instruments are not always dedicated to one objective. For example, in road transportation, fuel taxes, motor vehicle taxes or road tolls for trucks address different externalities (like climate change, air pollution, road wear or congestion) or serve different purposes, such as financing infrastructure. As a consequence, measures do not send an explicit price signal to polluters about the externalities they address. Given this, it is essential that environmental policies are evaluated frequently, in a transparent and comprehensive way in line with the recently implemented monitoring procedure of the government.

#### ***... by improving the carbon price signal in market-based instruments...***

The most efficient way to encourage emission reductions is to put a single price on GHG emissions which reflects their negative externalities (de Serres *et al.*, 2010). In this regard, the German system could be improved with the aim of making the carbon price signal implicit in the instrument used clearer. This also applies to the carbon price set implicitly through the trading of certificates in the EU ETS, which is likely to be too low and too volatile to encourage CO<sub>2</sub> abatement thus discouraging investment. The cap on emissions will be progressively reduced in the third phase from 2013 onwards encouraging emissions abatement in the sectors covered by the scheme. Nevertheless, consideration should be

given to implementing measures to reduce the uncertainty around the carbon price. Examples include a floor price for carbon, implemented through a flexible levy, and ideally applied at the EU level.

In addition, there is no clear and harmonised carbon price in the sectors not covered by the EU ETS. Some taxes, in particular the eco tax based on electricity and fossil fuels consumption, apply to emission-intensive products but are not designed to explicitly tax carbon emissions. The eco tax should be made better targeted by taking into account the CO<sub>2</sub> content of the taxed sources thus creating an effective carbon tax, while also ensuring the adequate pricing of other externalities. In addition, fossil fuel support, which includes both energy tax exemptions and explicit subsidies and accounts for around 0.3% of GDP, encourages carbon emissions. The numerous exemptions and reduced energy tax rates, such as the reduced tax rate on diesel or the refund for export-oriented manufacturing sectors, should be eliminated except if they are designed to avoid double-taxation, notably in sectors covered by the EU ETS. The recent consolidation measures which reduced the generosity of some of these reductions are welcome in this regard. Furthermore, subsidies for coal mining (covering the difference between production costs and the world market price) still amount to around 0.1% of GDP. The government intends to phase them out by 2018 in accordance with EU regulation. The government should consider accelerating its plan for phasing out coal subsidies. In a similar vein, tax expenditures like the commuter tax allowance (0.2% of GDP) should be rethought in light of their environmental impact. As environmental taxes are less distortive than labour or capital taxes, raising revenue through them would also contribute to making the tax system more growth-friendly, while their recycling can limit the losses in competitiveness.

*... making non-market based measures to raise energy efficiency more targeted...*

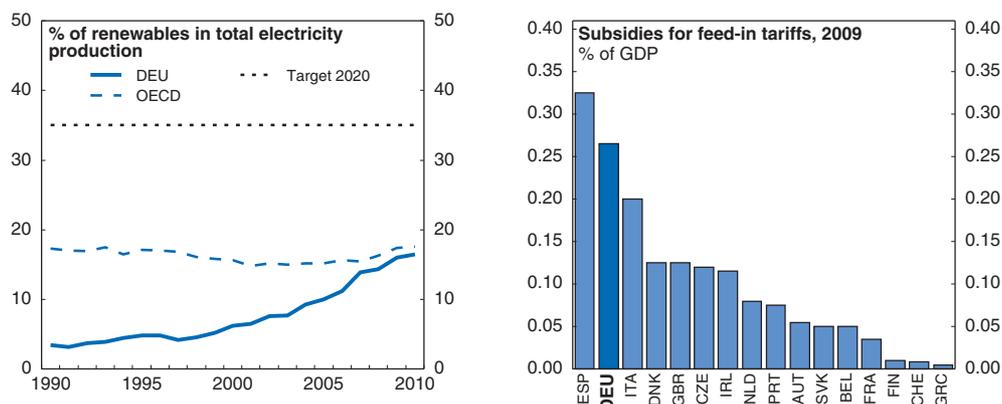
Efficient carbon pricing should usefully be complemented with non-market instruments in cases of clearly identified market imperfections. Germany implements a wide range of such measures, such as providing wide-spread access to information for enhancing energy efficiency, the setting of environmental standards for buildings or the provision of subsidised loans to finance investments in green equipment. However, these instruments could be made more efficient: for example, the allocation of funds should be restricted to low income households or credit constrained firms, rather than handing them out on a first-come-first-serve basis. In addition, proposed changes in rent regulation, which can further remove obstacles to energy savings investments in rental housing, should be implemented swiftly.

*... and readjusting support schemes for renewable energy sources*

Carbon pricing in the EU ETS will not be sufficient to reach the RES target as these technologies are not yet mature enough to compete with fossil fuels. In the past, the development of RES in Germany has been mainly supported by the provision of feed-in tariffs, which guarantee a sale price for electricity generated through RES and preferential access to the grid (Figure 8, left panel). These tariffs are in general well-designed: they are transparent and predictable (thus fostering long-term investment) and are decreasing over time (thus encouraging innovation). Tariffs also vary across technologies; while this is potentially supporting non-mature but promising power sources more than others, it increases CO<sub>2</sub> abatement costs for certain technologies to excessive levels. Given the

relatively high costs of feed-in tariffs (Figure 8, right panel), efficiency-improving adjustments to the system should be considered. It is thus welcome that the government revised the photovoltaic tariffs; it should continue to monitor the generosity of the feed-in tariffs and adjust them tightly in line with market developments. In addition, implicit CO<sub>2</sub> abatement costs related to feed-in tariffs should be maintained at reasonable levels, even at the cost of limiting support to some RES.

Figure 8. **Renewables and feed-in tariffs**



Note: Renewables in electricity production are hydro, geothermal, solar/wind/sea, biofuels and waste. For subsidies, hydro and waste are excluded. Subsidies are calculated by Egert (2011) as the lower and upper-bound feed-in tariffs in excess of the market prices multiplied by electricity production from a given energy source in 2009. The graph shows the midpoint where a range of tariffs exists.

Source: OECD/IEA, *Energy Balances of OECD countries* (2011 edition) and OECD Dotstat Database; Egert (2011).

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### **Continuing the green growth success story**

In the past, Germany was successful in turning the challenge of climate change into a source of growth, helped by the substantial support for RES noted above. It is among the largest producers of environmental goods and services with a share in global trade of climate protection related products amounting to more than 12%. Achieving the ambitious targets for climate change mitigation will likely become more challenging, as the new regime without nuclear power may impose additional costs on the economy. In particular, the development of RES may significantly weigh on electricity prices as it will require financial support and substantial investment in infrastructure. While Germany can build on its experience as a leader in the development of green sectors, continuing the green growth success story requires policy adjustments taking cost efficiency more explicitly into account.

### **Facilitating investment in the electrical grid**

The rising importance of RES supply necessitates substantial investment in the national electrical grid to deliver electricity from suppliers to consumers, which are typically not close together (Dena, 2010). Furthermore, it may also be necessary to expand international grid connection capacity to facilitate eventually necessary substitution of domestic electricity supply sources from abroad (see below). Estimates show that considerable investments are required, generating substantial costs for electricity consumers. In addition, due to the fluctuating and unpredictable nature of RES, investing in electricity storage capacity and improving energy efficiency is necessary to ensure a secure energy supply while limiting the recourse to fossil fuel power plants. The government rightly

made network expansion a key priority and laid the legal framework to facilitate the planning and authorisation process by increasing transparency and public involvement. These procedures need to be put in practice swiftly in order to accelerate the necessary investments. On the distribution side, the government identified the need for “smart grids” which can predict and respond flexibly to changes in supply and demand. Given the monopolistic nature of the transmission sector, the authorities need to ensure that the transmission system operators have adequate incentives to invest in the most efficient technologies.

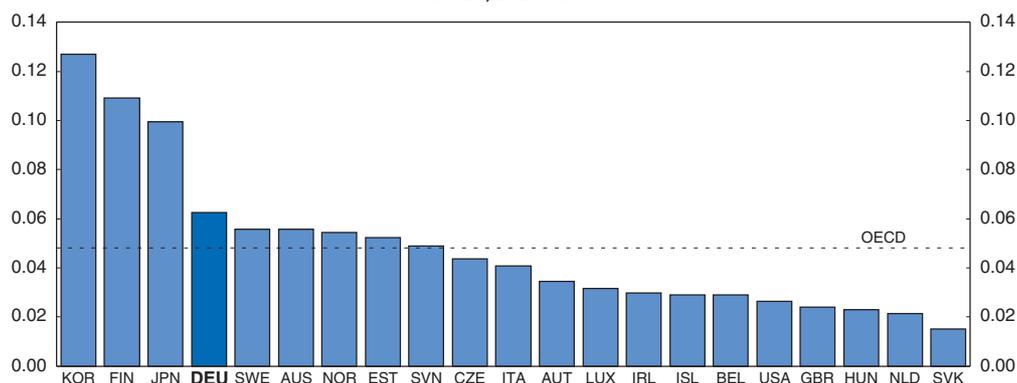
### **Raising competition in the energy sector**

Improving competition in the energy sector is important to facilitate and reduce the cost of RES expansion. Easy access to the grid for new market entrants should be ensured. The recent implementation of the third EU energy package will contribute to promoting increased competition in EU gas and electricity markets. In addition, the establishment of a new body charged with ensuring market transparency on the wholesale market is welcome. Also, greater integration into the European energy market would help to manage electricity volatility induced by the development of RES (IEA, 2011); the interconnection capacity in Germany should thus be expanded. Finally, even though the supplier has non-discriminatory access to final consumers, competition at the retail level remains low. Measures to raise the awareness for consumers about the option to switch their energy supplier could be considered, as this is fostering the innovative activities of energy companies.

### **Maintaining the lead in eco-innovation**

Eco-innovation is an important tool not just to implement climate change mitigation in a cost-effective way, but also as a source of overall economic growth (OECD, 2011b). Germany is a leader in environmental innovation: the number of triadic patents in RES was the second-highest after Japan between 1996 and 2008 (OECD, 2011c). This outcome may be due not least to the early implementation of environmental policies. In addition, government R&D spending in the environment and energy sectors is slightly above the OECD average (Figure 9). While eco-innovation is mainly driven by environmental policies, Germany should ensure other barriers will not hamper eco-innovation. Given increasing global competition in eco-innovative activities and the decline in Germany’s innovative

Figure 9. **Government R&D spending on environment and energy**  
% of GDP, 2010 or latest



Note: OECD refers to the average of countries in the graph.

Source: OECD, *Research and development statistics, Government budget appropriation or outlays for R&D (GBAORD)* available in the OECD Dotstat Database.

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outcomes over the past few years (OECD, 2010a), there is a risk that Germany is falling behind at a time when the importance of such technologies is rising. In addition, limited access to finance or the lack of skilled workers is likely to limit the innovative capacities in the German green sectors. While public support for basic research activities should be maintained, introducing an R&D tax credit would help to counter this trend. Similarly, raising the availability of risk financing is important to foster innovative young companies, which are underrepresented in Germany compared to other innovative countries.

#### Box 4. Recommendations for climate change mitigation and green growth policy

##### Climate change mitigation

- Contribute to discussions at EU level about possible measures to maintain an effective carbon price signal in the EU ETS in line with overall medium and long-term EU emission reduction targets. Consider creating an effective carbon tax in the sectors not covered by the EU ETS and ensure that other, non-carbon related, externalities are adequately priced.
- Eliminate exemptions and reduced energy tax rates (except if they are designed to avoid double taxation, notably in sectors covered by the EU ETS) and accelerate the removal of coal subsidies. Revise environmentally harmful tax expenditures.
- Restrict subsidised loans to low income households or credit constrained firms. In addition, proposed changes in rent regulation, which can further remove obstacles to energy savings investments in rental housing, should be implemented swiftly.
- Continue to monitor the generosity of feed-in tariffs and adjust them in line with market developments. In addition, implicit CO<sub>2</sub> abatement costs related to feed-in tariffs should be maintained at reasonable levels.

##### Green growth

- Provide adequate incentives for the transmission systems operators to invest in the most efficient technologies while extending the grid. Further implement measures which aim at more transparency and public involvement in the decision process of grid extension.
- Improve competition on the electricity and gas markets by raising further the interconnection capacity of the electricity grid and the awareness for consumers about the option to switch their energy supplier.
- Maintain public support for basic research activities, consider implementing an R&D tax credit for innovative firms and raise the availability of risk financing.

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## ANNEX A1

*Progress in structural reform*

This annex reviews action taken on recommendations from previous *Surveys*. Recommendations that are new in this *Survey* are listed in the relevant chapter.

Recommendations	Action taken
<b>Improve labour market performance</b>	
Reduce average effective tax rates on labour income of second earners. Consider replacing the joint income tax assessment for spouses by individual income tax assessment and consider introducing contributions for healthcare co-insurance of non working spouses.	Even though from 2010 onwards the wage tax takes into account the actual relationship between the incomes of the first- and the second-earner for the calculation of the marginal burden ( <i>Faktorverfahren</i> ), the negative incentive effects of the joint income taxation framework for total annual household income remain.
Resist temptations to subsidise mothers staying at home. Consider introducing a voucher system for childcare. Lower regulations for the set-up of childcare facilities to encourage more private supply.	A voucher system for childcare already practiced in some <i>Länder</i> , for example in Berlin or Hamburg.
Consider phasing out the supplementary benefit layer between unemployment insurance benefits and unemployment benefit II (UB II). Refrain from creating a large scale secondary labour market (workfare).	The supplementary benefit layer between unemployment insurance benefits and unemployment benefit II (UB II) is being phased out.
Ease employment protection legislation for regular job contracts by shortening the notification procedure (reforming the requirement for the works council to approve dismissals), by reducing the notice period for workers with a long tenure and, in case of dismissals for economic reasons, by giving employers the right to choose between paying a severance payment or paying a higher unfair dismissal compensation which would replace the court route.	No action taken.
If a minimum wage is deemed necessary to counter the negative effects of monopsonistic labour demand, it should be set on a nationwide basis at a sufficiently low level that will not lead to job losses (and which should be determined by an independent commission of experts).	No action taken. Evaluations of existing regulations for sectoral minimum wages are ongoing.
Provide adequate job counselling and placement capacities. Reform the administration of the basic income scheme for jobseekers quickly while limiting change in procedures for the benefit recipients and maintaining the basic principle of the one-stop shop.	A reorganisation of the administration of the basic income scheme has been implemented; labour offices and communities now mostly provide their services in joint facilities.
<b>Improve competition in product markets</b>	
Make product market regulation more competition-friendly by further simplifying the license and permit system and the insolvency law.	A bill improving insolvency procedures may enter into force in 2012.
Enhance competition in the energy sector, for example, by considering stronger separation of transmission system operation and potentially competitive services, by merging market areas across networks of different owners and by reviewing the capacities of the regulator.	The EU third legislative energy internal market package is being implemented and a body in charge of out-of-court dispute settlement has been created. Market coupling with neighbouring countries, has improved and price coupling is considered in the Central Western European region (France, Benelux countries and Germany).
Raise competition in the railway sector, for example by fully privatising the transport service subsidiaries while retaining state ownership of the tracks, by making tendering of regional railway services compulsory and strengthening the role of the regulator. Lower restrictions on intercity bus services.	An amendment to the general railway law, including strengthening the competence of the regulator for market monitoring and an amendment to the federal passenger Act reducing barriers to new entrants in the intercity bus services is being prepared. Privatising the transport service subsidiaries is also considered.

Recommendations	Action taken
<p>Make domestic service markets in the liberal professions and crafts more open to competition by further reducing restrictions on the co-operation between professions, by further liberalizing prices and by reassessing the need for restrictions on advertising. Simplify entry conditions into professional services by rethinking compulsory chamber memberships (e.g. reduce the number of activities over which certain professions have exclusive rights and further lower education requirements).</p>	<p>The price setting for consulting services by architects and engineers has been liberalised somewhat in 2009.</p>
<b>Make health care financing more sustainable</b>	
<p>Improve healthcare financing by reconsidering free co-insurance of spouses and by including private insurers in the new financing system based on the central health fund.</p>	<p>With the Healthcare Financing Act enacted in January 2011 the contribution rate for social health insurance has been fixed, and income-independent surcharges have been further developed to enhance competition in the health insurance market and to prevent rising labour costs due to rising health expenditure. A tax financed mechanism for social adjustment has been introduced. As a result, the sources for financing have been widened. Members of private health insurance contribute to the solidarity mechanism of social health insurance via tax financing of the social adjustment mechanism and further allowances from the federal budget to the central health fund.</p>
<p>Enhance competition in the pharmaceutical sector by relaxing the requirement that pharmacies can only be owned by a pharmacist who has to work personally in one out of a maximum of four branches he/she is allowed to own.</p>	<p>Competition in the pharmaceutical sector has been enhanced by a comprehensive structural reform of the pharmaceutical market (AMNOG, enacted January 2011). Pricing for products with new agents is now utility oriented, and prices are negotiated between producers and health insurers.</p>
<b>Make the education system more efficient</b>	
<p>Improve teacher quality, for example by holding schools and teachers accountable for the progress of students and by making greater use of financial incentives for good teaching in those <i>Länder</i> which have not yet introduced such measures.</p>	<p>All <i>Länder</i> have established a system of quality management and training is provided to improve teacher quality.</p>
<p>Reduce stratification by delaying the first tracking decision until after age 10 in those <i>Länder</i> where this is still the case, by offering the <i>Hauptschule</i> and the <i>Realschule</i> tracks in one school type and by increasing permeability between education tracks in practice.</p>	<p>Some more <i>Länder</i> have started to combine different tracks in one school type. Programmes for individual support contribute to increasing the permeability between education tracks.</p>
<p>Make tertiary education more attractive and responsive to labour-market requirements by increasing universities' input flexibility and by overcoming the free-rider problem between <i>Länder</i> in the financing of university education.</p>	<p>A Teaching Quality Pact is implemented to improve conditions for study and the quality of teaching. All <i>Länder</i> have opened access to higher education for persons with vocational qualification under harmonised criteria. The Higher Education Pact 2010 includes measures aiming at accommodating different starting positions and unequal burden sharing among the <i>Länder</i>.</p>
<p>Further reform the vocational education and training (VET) system by considering reducing the variety of VET qualifications and providing continuing education offers of general skills (mathematics, German, foreign languages, computer skills) according to labour market needs. Let vocational schools and chambers jointly prepare and carry out the final examination of dual VET programmes.</p>	<p>New training regulations are developed and existing training regulations are updated regularly according to labour market needs.</p>
<p>Raise participation in lifelong learning. Improve transparency in the adult education market and facilitate access to guidance on adult training (incorporation of non-formal and informal activities in the Qualifications Framework for Lifelong Learning). Carefully monitor the outcome of financial support programmes for adult learning and education.</p>	<p>To facilitate access to lifelong learning, financial support is provided to low skilled unemployed and older workers in SME. A standard telephone number and an educational guidance portal have also been developed to improve transparency. Under the "Local Learning" programme local authorities are cooperating with foundations to develop and establish a coherent education management structure at the local level. In addition, two expert working groups have been established to develop recommendations for incorporating non-formal and informal learning in the Qualifications Framework.</p> <p>The outcomes of financial support are assessed through the "Bildungsprämie" programme and it is planned to evaluate the "Aufstiegsfortbildungsförderungsgesetz" (Advanced Further Training Assistance Act, AFBG).</p>
<b>Bring public finances back to a sustainable path</b>	
<p>Monitor implementation of the new fiscal rule and adjust the new framework where necessary. Move towards a top-down approach to budget formulation.</p>	<p>The federal budget 2012 and fiscal plan until 2015 have been prepared by a top-down approach for the first time.</p>
<p>Ensure a stricter enforcement of the law on short-term borrowing by municipalities.</p>	<p>No action taken.</p>
<p>Strengthen the stability council by providing additional inputs from independent experts or institution. Ensure transparency in the determination of output gap by the <i>Länder</i>.</p>	<p>No action taken.</p>

Recommendations	Action taken
Improve public sector efficiency, in particular in health and social spending. Cut grants and government consumption expenditures further.	With the budgetary “ <i>Zukunftspaket</i> ”, the federal government has laid the foundation for a sustainable, growth-oriented consolidation strategy. Main guidelines are to limit government consumption, reduce subsidies and improve incentives by realigning social benefits and making job placement more efficient.
Avoid discretionary changes of the pension indexation formula and make up the past missed downward adjustments of pension increases.	The adjustment will be implemented by bisecting the annual pension adjustments beginning with the 2011 adjustment until pensions will have reached again their level before the discretionary change in the pension formula. According to the current national projections this process will be finished within the next three pension adjustments.
Further phase out tax concessions ( <i>e.g.</i> reduced VAT rates, exemptions from energy taxes for energy intensive industries) when clear justification is lacking or when objectives can be achieved through more efficient means.	Since 2011 Germany has reduced the tax benefits for industrial enterprises, agriculture and forestry that are considerably burdened by electricity tax as part of the consolidation measures.
Consider increasing taxation on land and buildings by linking the tax base to actual prices or by raising the tax rates, while reducing the liquidity constraints related to the tax for people with low incomes and illiquid assets.	Link the tax base to actual prices has been considered by the advisory board to the federal ministry of finance. Different tax models are now tested for feasibility by the <i>Länder</i> . The results will be evaluated.
Consider raising environmental taxes further.	
Consider strengthening the tax autonomy of the <i>Länder</i> by allowing them to levy a surcharge to the income tax, which would not be taken into account in the fiscal equalisation scheme.	No action taken.
Go further in cutting statutory corporate tax rates and avoid differentiation of base-broadening measures by company size.	No action taken.
Consider lowering or abolishing the local trade tax. Do not abolish the inheritance tax.	No action taken.
Increase tax collection efficiency by considering the introduction of self-assessment of tax payers, and by centralizing corporate tax collection at the federal level.	Self-assessment of tax payers is being considered in the field of corporation tax and a research project has been set up.
Re-design inter-governmental transfers so as to reduce the disincentive effects for states to develop their own tax base and tax revenue collection efforts.	No action taken.
Compute equalisation transfer positions of the states on the basis of notional rather than actual revenue.	
Further re-allocate administration of tax revenues, which accrue exclusively to the federal government, or are shared between the different layers of government, from the <i>Länder</i> to the federal government.	Concerning car taxation and insurance tax a process in this direction has been implemented.
<b>Stability of the banking sector</b>	
Ensure adequate bank capitalisation and further clean bad assets from banks' balance sheets. Closely monitor capital adequacy ( <i>e.g.</i> application of stress tests) and maintain support instruments ( <i>e.g.</i> provision of public capital).	The adequate capitalisation of German banks is ensured by the German supervisory authorities and through implementation of the legislative acts adopted by the EP and the Council (CRDs), which take into account the Basel-recommendations, into national law. The German Bank Restructuring Act which became effective January 2011 stipulates industry contributions and thus avoids public funds being used to bail out banks in distress (see below). The more extraordinary stress tests conducted by EBA are supplemented by regular and standardised stress tests executed by the institutions themselves and supervised by the national banking supervisory authorities.
Restructure the <i>Landesbanken</i> through privatisation, consolidation or focusing on core activities according to a viable business model. Ensure a level playing field between the savings banks and privately owned banks, <i>e.g.</i> by opening up the savings bank sector for private ownership.	Germany monitors the conditions to be complied with by German banks in EU state aid proceedings. The restructuring of the <i>WestLB</i> and the refilling of the <i>WestLB</i> 's winding down agency will lead to a sustainable business model for the successor bank.
Centralise banking supervision at the <i>Bundesbank</i> . Strengthen the macro-prudential elements of supervision. Widen the scope for supervision beyond compliance with quantitative requirements. Further move towards a more principle based regulation. Clearly address the risks related to certain business strategies. Consider introducing dynamic provisioning as well as a binding overall leverage ratio. Introduce a framework for restructuring and winding-up systemically-relevant banks.	The planned merger between <i>BaFin</i> and <i>Bundesbank</i> could not be realised due to constitutional barriers. To make supervision more effective, the government has decided on a 10-point plan to reform financial market supervision structure in Germany. The plan envisages expanding the <i>Bundesbank</i> 's mandate in macroprudential supervision. Respective legislation is under preparation. As regards the introduction of dynamic provisioning as well as a binding overall leverage ratio the possible measures adopted by the federal government are bound by the new EU capital adequacy rules which are still under consideration. A special recovery as well as restructuring procedure for systemically important banks has been introduced (German Bank Restructuring Act). A Restructuring Fund has been established for financing restructuring measures with banks contributing to it through a bank levy.

Recommendations	Action taken
<b>Lift potential growth in a globalised world</b>	
<p>Improve the framework conditions for innovation by ensuring sufficient exit possibilities for venture capitalists, make the MoRaKG comply with EU regulation and fix its initial flaws (<i>e.g.</i> reduced transparency stemming from having different supervisors for venture capital and capital investment companies). Consider introducing tax incentives to complement grants.</p> <p>Enhance immigration of high-skilled workers by introducing a points system, reducing the income threshold for obtaining a permanent settlement permit and complementing the employment test with a list of occupations in short supply. Consider engaging more actively in foreign recruitment policy.</p> <p>Introduce a fast and transparent system of recognizing foreign qualifications.</p>	<p>Improving the framework conditions for venture capital is planned as part of the implementation of the EU Directive on Alternative Investment Fund Managers (AIFM-RL) which must be implemented until mid-2013 in German law.</p> <p>A law improving the assessment and recognition of foreign professional qualifications (the Recognition Act) is intended to take effect in 2012. Reducing of the income threshold for highly qualified foreign workers for obtaining a permanent settlement permit is being discussed. The labour market test has been eased for doctors and some engineering occupations. The Federal Labour Office will revise these exemptions on biannual basis and works closely with European placement services.</p>



## Chapter 1

# The German labour market: preparing for the future

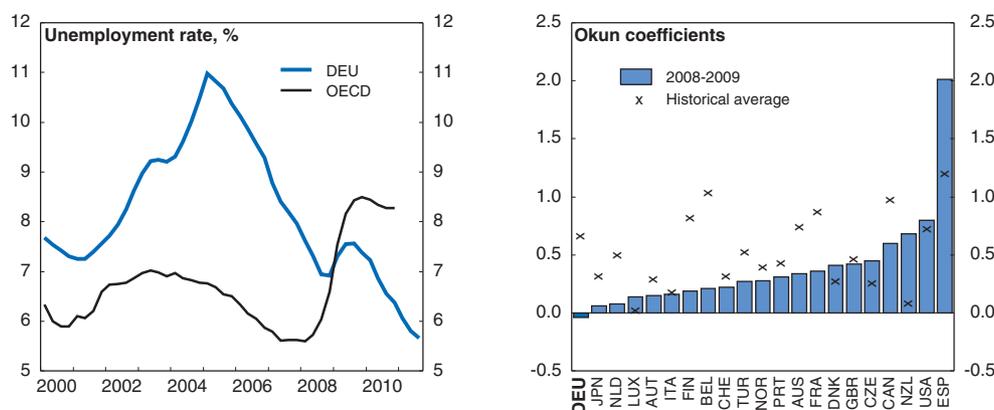
*The strength of the German labour market response to the financial crisis of 2008-09 demonstrated the benefits of past labour market reforms, which raised work incentives, improved job matching and increased working hour flexibility. Going forward, the government should build on this success and address the remaining challenges which include raising the labour participation of females and older workers (which among other things will necessitate adjustments to the tax and education system) and fostering migration, notably of skilled workers. The significant ageing-related decline in the labour force exemplifies the urgency of further structural reforms in this area.*

The performance of the German labour market during the past crisis stands out among developed countries. Employment was preserved to a much larger extent than in other countries, notably when compared with the scale of the downturn, and this forcefully demonstrates the working of past reforms. At the same time, challenges remain. Policies to raise participation of some groups of the labour market, such as female and older workers, are urgently needed. Also, migration policy needs to be rethought. Finally, the structure of employment is rapidly changing with the share of fixed-term contracts rising, possibly risking the development of a dual labour market with adverse effects on training (limiting productivity growth and the possibility to work longer) and potentially income inequality. The urgency of addressing these issues is exemplified by rapid population ageing which will significantly reduce the working-age population.

### Past labour market reforms paid off handsomely during the crisis

The increase in unemployment in Germany during the past recession was the lowest among OECD countries, amounting to just 0.2 percentage point between 2008 and 2009 (Figure 1.1, left panel). This compares with an OECD average of 2.2 percentage points (comprising a wide range of outcomes with the maximum increase over that period being 8.3 percentage points as registered in Estonia). This development is even more surprising given that the German economy suffered an above-average decline in real GDP in 2009 (−5.1% compared to an OECD average of −3.8%). As a result, the relationship between the unemployment rate and real GDP, as exemplified by the Okun coefficient, was the lowest among OECD countries in this crisis (Figure 1.1, right panel).

Figure 1.1. Unemployment rates and Okun coefficients



Note: Okun's coefficient is the peak-to-trough ratio of the percentage point increase in the unemployment rate to the percentage decrease in GDP. It is calculated for the peak and trough during 2008-09.

Source: OECD, Economic Outlook Database and Employment Outlook 2010.

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Moreover, the labour market reaction also differed markedly from previous episodes in Germany. Historically, the German Okun coefficient was very similar to other OECD countries (Figure 1.1, right panel). A model based on past relationships of real activity and unemployment would have over-predicted the actual unemployment response by around 2.8 percentage points (Annex 1.A1). While many OECD countries saw a decline in their Okun coefficient in 2008-09 compared to the past, several other countries experienced a stronger unemployment reaction in this crisis compared to the past, such as New Zealand, Spain and, to a smaller extent, the United States (Figure 1.1, right panel).<sup>1</sup>

The main factor behind the benign unemployment outcome in Germany is a profound change in labour market institutions that occurred over the past decade. Other factors that are sometimes discussed, such as the impact of the specific sectoral composition of the recession in Germany, the role of prior labour shortages in firms' decision to hoard labour, employment protection legislation or demographic factors also played a role; however, none of those is able to fully explain the differences in behaviour during this crisis compared to historical developments in Germany and to other countries during 2008-09 (Box 1.1).

#### Box 1.1. **Alternative explanations for the benign unemployment response**

The benign unemployment response to the recession in Germany is frequently seen as the outcome of a range of factors (see Möller [2010] or Burda and Hunt [2011] for an overview). Compared with the changes in institutional settings (labour market reforms and working hour flexibility) described in the text, however, most other explanations are likely to have played only a small role.

##### **Differences in demographics**

One factor that is putting the small increase in the unemployment rate somewhat in perspective is that the labour force increase during the crisis has been smaller than in other countries. Between 2008 and 2009, working-age population in Germany declined by ½ per cent, while it increased by 0.6% in the average OECD country (Table 1.1). Even though labour force participation increased much more in Germany during this period, the rise in the labour force was less than half of the increase in the OECD average. Hypothetically assuming that working age population and labour force participation in Germany had evolved as in the OECD average (and using the actual employment reaction), the unemployment rate had increased by 1pp more than it actually did. However, since employment is endogenous to the development of the labour force, such a counterfactual scenario of the unemployment response is difficult to interpret and, if anything, should be viewed as an upper limit.

Table 1.1. **Decomposing the increase in the unemployment rate**  
Percentage change between 2008 and 2009

	Employment	Labour force	Working age population	Labour force participation rate*	Memorandum: change in unemployment rate*
Germany	0	0.2	-0.5	0.7	0.2
OECD average	-1.8	0.5	0.6	-0.1	2.2

\* Percentage point difference.

Source: OECD, *Economic Outlook Database*.

### Box 1.1. **Alternative explanations for the benign unemployment response** (cont.)

#### **Differing sectoral composition of the downturn**

One significant feature of this recession was the diverging sectoral impact of the crisis across countries: while some countries suffered significant declines in domestic demand (e.g. as construction output and private consumption fell when housing bubbles unwound) the recession in Germany was almost solely focussed on the tradable sector, notably manufacturing. This matters for employment outcomes since the non-tradable sectors are typically more labour intensive with a lower productivity level; thus, recessions in those sectors tend to affect employment more than in tradable sectors. However, simulations at the sectoral level for Germany indicate that past unemployment-GDP relationships would have predicted a much higher employment decline in manufacturing and in services than what was actually observed (Annex 1.A2); this suggests that institutions must have changed compared to past recessions, supporting the view that those factors are more important than just the sectoral composition of the recession.

#### **Labour shortages prior to the crisis**

In theory, confronted with recruitment difficulties, employers may limit layoffs and accept a decrease in labour productivity during downturns to save recruitment costs during the recovery and to conserve firm-specific human capital. In doing so, they also ensure production factors are available when activity recovers. Indeed, in Germany, firms hit by crisis were those having a particularly high growth rate and experiencing significant labour shortages before the crisis (Möller, 2010), suggesting labour shortages could explain a low unemployment response compared to the past and to other OECD countries (Schaz and Spitznagel, 2010; Schütt, 2010). However, indicators for labour shortages at the aggregate level were neither particularly high with regard to the past nor when compared to other countries. Indeed, cross-country empirical evidence indicates that labour shortages prior to the recession contributed only to a very small extent to the benign unemployment response (Annex 1.A3).

#### **Differences in employment protection legislation**

Another explanation rests on differences in employment protection legislation (EPL) across countries, notably the relatively strict legislation in Germany preventing layoffs and softer legislation in the US leading to more layoffs. However, since EPL in Germany, notably for regular work contracts, has not been changed over the years preceding the recession, it cannot explain the different behaviour in this crisis compared with past recessions. If anything, protection of fixed-term contracts had been relaxed in Germany prior to the recession, which would have argued for a stronger unemployment reaction this time. For these reasons, empirical evidence for the importance of EPL in explaining the low unemployment response in this crisis is lacking (Möller, 2010).

#### **Increased work incentives and better job matching**

Germany stands out among OECD countries as having implemented a large number of labour market reforms in the years preceding the crisis. These reforms have profoundly changed the institutional environment of the labour market and thus help explaining the differences in labour market outcomes relative to past recessions. The reforms are likely to have reduced structural unemployment, an adjustment that is still going on, and to have offset some of the cyclical increase that would otherwise have occurred. While most commentators focus on the *Hartz* reforms in the period 2002-05, notably their impact on

the level of benefits and on eligibility (mainly *Hartz IV*), reforms were much more wide-ranging, covering improvements in job placement, a general cut in unemployment benefit duration and, importantly, the phasing out of early retirement options (Table 1.2).

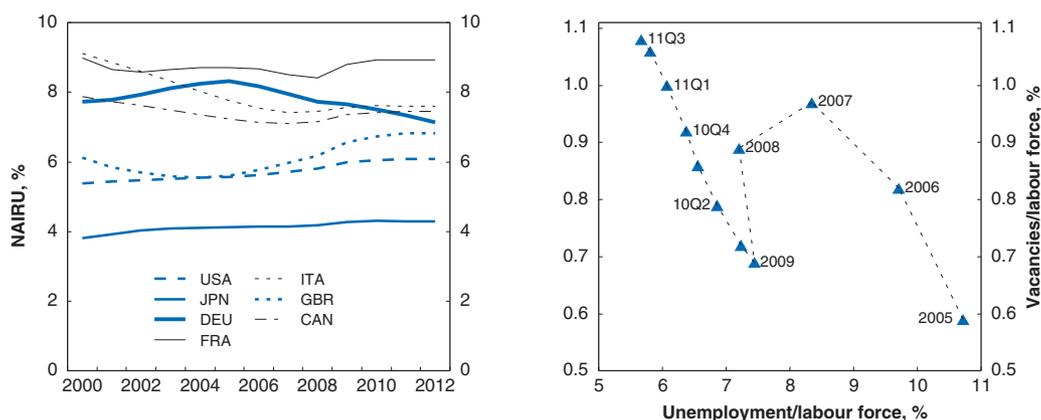
**Table 1.2. A timeframe of labour market reforms in Germany during the last decade**

Reform	Implementation date	Main measures	Likely effect
Job-AQTIV	2002	<ul style="list-style-type: none"> <li>• Introduction of qualitative profiling of jobseekers</li> <li>• More efficient use of ALMP</li> </ul>	Improved job search efficiency
<i>Hartz I</i>	Jan. 2003	<ul style="list-style-type: none"> <li>• Enlisted private firms to help workers search for jobs</li> <li>• Tightened conditions for acceptability of jobs and introduced sanctions for unemployment benefit recipients</li> <li>• Liberalisation of temporary agency work</li> </ul>	Improved job search efficiency Raising incentives for taking up employment
<i>Hartz II</i>	Jan. 2003	<ul style="list-style-type: none"> <li>• Reform of small jobs, e.g. mini- and midi-jobs with limited social security contributions</li> <li>• Subsidies for unemployed who become self-employed</li> </ul>	Raising incentives for taking up employment
<i>Hartz III</i>	Jan. 2004	<ul style="list-style-type: none"> <li>• Reorganisation of the Federal Employment Agency towards a more efficient service provider</li> <li>• Simplification of active and passive policy measures</li> </ul>	Improved job search efficiency
<i>Hartz IV</i>	Jan. 2005	<ul style="list-style-type: none"> <li>• Merging of unemployment assistance and social assistance into the means-tested unemployment benefit II</li> </ul>	Raising work incentives for welfare recipients (reduction in reservation wages)
Shortening unemployment benefit duration	Feb. 2006	<ul style="list-style-type: none"> <li>• Benefit duration was cut to a maximum of 12 months for recipients up to 54 years (from a maximum of 26 months before) and to 18 months for recipients aged 55-64 years (from up to 32 months before)</li> </ul>	Increase work incentives, notably for older workers
Phasing out of early retirement options	2006-10	<ul style="list-style-type: none"> <li>• Increase in age threshold for the early pension for unemployed (<i>Altersrente wegen Arbeitslosigkeit</i>) from age 60 to 63 from 2006 to 2008</li> <li>• Phasing out of the regulation that unemployed persons aged 58 can receive benefits without actively searching for jobs (<i>58er Regelung</i>) in January 2008</li> <li>• Subsidised part-time employment scheme for older employees (<i>Altersteilzeit</i>) closed for new entrants from January 2010</li> </ul>	Increase work incentives for older workers

Source: Wunsch, C. (2005), "Labour Market Policy in Germany: Institutions, Instruments and Reforms since Unification", *University of St. Gallen Discussion Papers 2005-06*; OECD (2008a), *Economic Surveys: Germany*, OECD, Paris, [www.hartz-iv-iii-ii-i.de](http://www.hartz-iv-iii-ii-i.de).

The main impact of the reforms on the labour market that is relevant for the crisis reaction can be summarised as follows:

- Work incentives, notably for low-income workers, were increased as *Hartz IV* reduced the benefit replacement rate, thus lowering reservation wages. In fact, the OECD summary measure of benefit entitlements declined by more than twice the OECD average between 2003 and 2007.<sup>2</sup> OECD (2008a) estimates that this benefit cut the NAIRU by around ½ percentage point. It seems likely that the impact of these reforms occurred over time, thus exercising downward pressure on unemployment even during the crisis (Figure 1.2, left panel).
- Matching efficiency has increased as is visible in the inward-movement of the Beveridge curve (Gartner and Klinger, 2010). This is mostly the result of the first three of the *Hartz* reforms, which, for example, allowed private firms to help in placing unemployed and mandated a reorganisation of the employment agency. These measures significantly accelerated the outflows from unemployment to employment (Fahr and Sunde, 2009). As the Beveridge curve was still moving inward between 2008 and 2009, it is likely that improved matching contributed to the good crisis performance (Figure 1.2, right panel).

Figure 1.2. **NAIRU and Beveridge curve**

Note: NAIRU is the unemployment rate at which inflation is non-accelerating.

Source: Deutsche Bundesbank; Federal Statistical Office; OECD, *Economic Outlook and National Accounts Databases*.

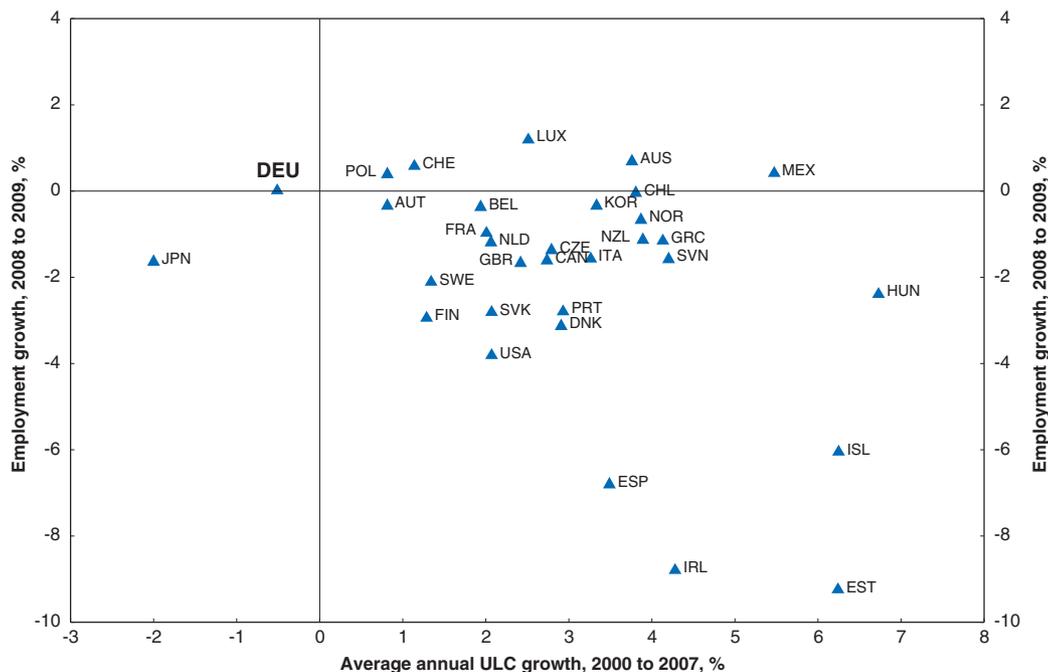
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- Incentives for working longer significantly increased employment among older workers (OECD, 2008a). Reforms that limited early retirement options meant that unions probably did not agree as easily as in previous recessions to lay-offs, thus making it more costly for employers to arrange consensual job-separations for older workers. Indeed, the unemployment rate of 55-64 year olds decreased and employment increased in the crisis, in contrast to previous recessions. Dlugosz *et al.* (2009) show that the cut in benefit duration for unemployed older workers significantly decreased the probability of entering into unemployment since the reform took place in 2006, notably for those with long tenures working in large companies. The development of employment rates for older workers demonstrates the positive effects of these reforms: they increased by 19 percentage points since 2003, almost five times as much as in the average OECD country and, at 58% in 2010, was 4 pp above the OECD average. By contrast, employment rates of 25-54 year olds rose by only 3 percentage points over the same period (at least until 2008, this was almost the same as the OECD average).

### **Wage moderation in the wake of labour market reforms**

Wage moderation during the 2000s was remarkable in Germany, both across OECD countries and in historical comparison. Unit labour costs fell by 2% from 2000 to 2007, compared to an increase of 22% in the average OECD country. Historically, unit labour costs in Germany rose by 15% in the 1990s, 20% in the 80s and 69% in the 70s. The decline during the 2000s was linked to the labour market reforms as increased work incentives increasingly led the unemployed to accept lower-paid jobs (Gartner and Klinger, 2010). Similarly, trade unions lost bargaining power as trade union density (the share of trade union members in all employees) declined by over 6 percentage points between 1999 and 2008 and at 19% in 2008 stood 8 percentage points below the average OECD country. The share of companies following collective wage agreements fell from 63% in 2001 to 47% in 2006 (Antonczyk *et al.*, 2011).

Cross-country evidence suggests that differing developments in unit labour costs in the years leading up to the crisis are related to labour market outcomes during the crisis (Figure 1.3; Boysen-Hogrefe and Groll, 2010). Labour cost increases may not immediately lead to layoffs as the costs of hiring and firing induce some kind of threshold. Firms in

Figure 1.3. **Wage moderation prior to the crisis and employment during the crisis**

Source: OECD, Economic Outlook Database.

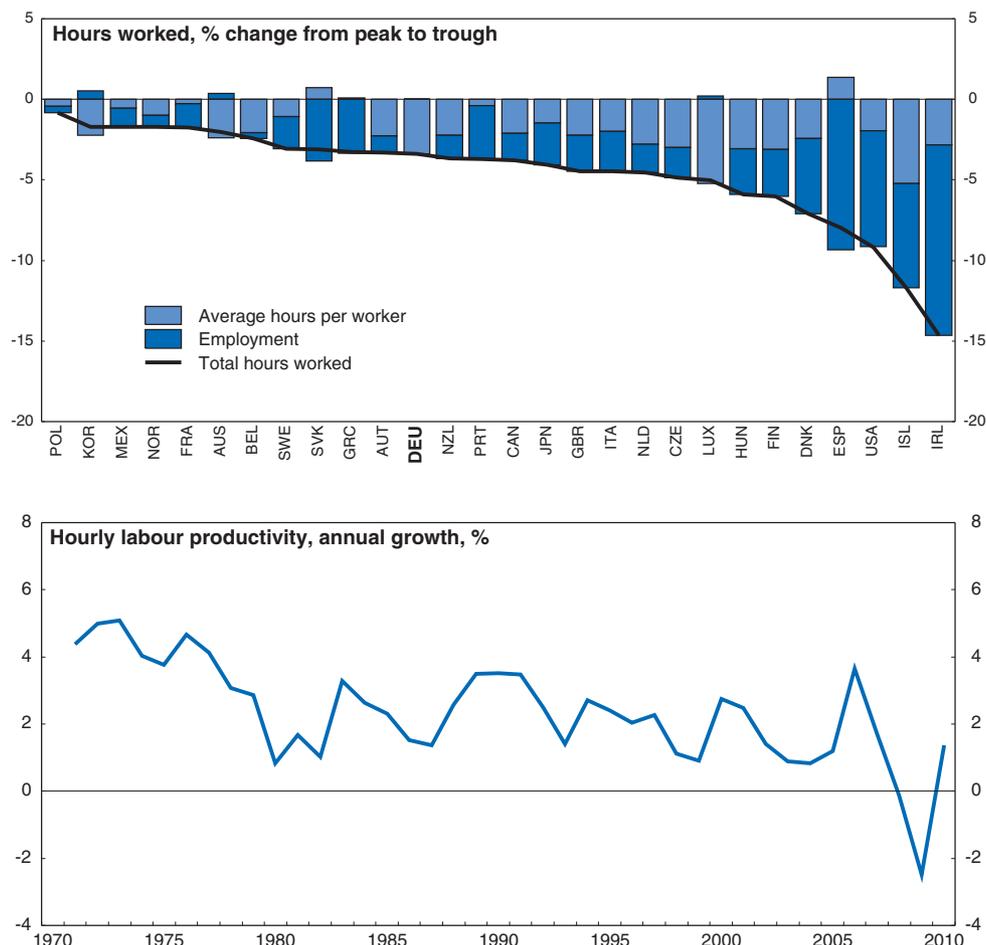
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Germany may have been further away from this threshold due to this earlier wage moderation compared to other countries (Boysen-Hogrefe and Groll, 2010). In addition, Burda and Hunt (2011) argue that the moderation increased employment ahead of the crisis and damped unemployment by 0.4 pp during the crisis (they compare with a counterfactual in which wages rise from 2005 onwards with their earlier trend).

### **Increased working-time flexibility at the firm level**

Instead of reducing labour input through layoffs, German companies – as in Korea and Luxembourg – resorted to a decrease in average hours worked per worker. By contrast, in many OECD countries, layoffs accounted for more than one-half of the reduction in labour input (Figure 1.4, upper panel). However, the flip side of limited employment adjustment was a steep decline in productivity, since the reduction in hours worked was smaller than the decrease in output. Hourly labour productivity declined substantially during this recession, for the first time and in sharp contrast to prior recessions when hourly labour productivity tended to increase (OECD, 2010b; Burda and Hunt, 2011; Figure 1.4, lower panel).

To some extent, the outstanding reduction of working hours in Germany is related to the prior labour market reforms. For example, better matching of employees may have induced companies to hold on to them more than in earlier times or lower working hours were used for older workers which were kept in the company due to significantly reduced early retirement options. However, more important were arguably reforms and policies that increased working hour flexibility at the firm level in the form of the short-time work scheme (*Kurzarbeit*), a reduction in paid overtime, decreases in working-time account balances as well as declines in weekly working hours (Table 1.3). This flexibility has increased substantially over the years preceding the crisis and thus helps to explain the favourable unemployment response.

Figure 1.4. **Hours worked adjustment in the crisis and hourly labour productivity in the crisis**

Note: Peak and trough are respectively the pre-crisis peak and trough for each country. Labour productivity components for 1970 to 1990 were estimated by back casting data for Germany using the growth rate of the data for western Germany.

Source: OECD, *Economic Outlook 89*, May 2011 and *National Accounts Database*.

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Table 1.3. **Contributions to changes in average annual working hours per employee**

Changes in 2009 relative to 2008

	Change in hours
Short-time work	-13.4
Weekly working hours	-10.1
Paid overtime	-7.9
Working time accounts	-7.0
Other	-2.9
<b>Total</b>	<b>-41.3</b>

Source: Dietz, M., M. Stops and U. Walwei (2011), "Safeguarding jobs in times of crisis – Lessons from the German experience", *ILO Discussion Papers*, No. 207.

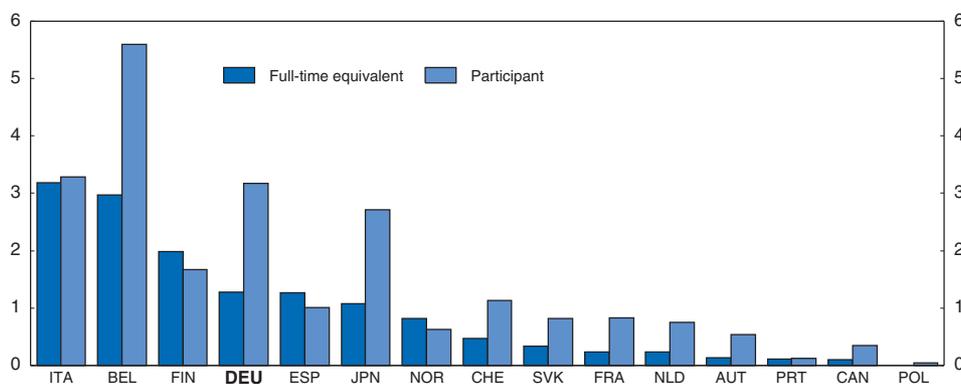
### Short-time work scheme

The extension of the short-time work scheme (STW) during the crisis is frequently mentioned as a main explanatory factor for the German job miracle. The basic scheme, which has existed in various incarnations in Germany for over 100 years, provides income support for employees whose working time and, thus, compensation decrease temporarily. Employers are obliged to pay the social security contributions on the hours not worked which adds to the residual fixed costs of employment, thereby providing some incentive to exit the scheme when it is not needed anymore.

In reaction to the crisis, the generosity and eligibility of short-time work was widened until March 2012.<sup>3</sup> The costs for employers for hours not worked were thus much lower than in many other OECD countries operating such schemes (Hijzen and Venn, 2011). At the peak, around 1.5 million employees were on short-time work in mid-2009, since then their number has fallen to below 100 000 by mid-2011. In 2009 on average, around 3% of all employees were on short-time work, one of the highest shares among OECD countries (Figure 1.5). A simple accounting exercise suggests that with the average reduction in working time amounting to around 30%, potentially up to 500 000 full-time jobs were saved through this scheme. However, such a calculation does not take into account the size of deadweight (STW subsidies that were paid for jobs that would have been retained anyway) and displacement (if STW subsidies preserve jobs that are not viable without the subsidy and thus present a barrier to job creation) effects; in order to derive the true number of jobs saved, *i.e.* after accounting for such effects, the crisis experience must be compared to a counterfactual. Using countries without short-time work schemes as a counterfactual, Hijzen and Venn (2011) estimate that around 235 000 jobs were saved (0.6% of employment), the second highest in the OECD after Japan.

An important feature of any short-time work system is the costs imposed on employers, which provide incentives not to overuse the scheme. Too generous subsidisation, by contrast, risks keeping ailing companies alive, thus preventing needed

Figure 1.5. **Short-time work schemes – take-up by firms**  
2009, %



Note: Full-time equivalent (FTE) take-up rates are calculated as: total short-time work (STW) hours / (total FTE hours worked in the economy + total STW hours) using country-specific assumptions. Participant take-up rates are number of participants/number of employees.

Source: Hijzen, A. and D. Venn (2011), "The role of short-time work schemes during the 2008-09 recession", *OECD Social, Employment and Migration Working Papers*, No. 115.

StatLink  <http://dx.doi.org/10.1787/888932559828>

structural adjustment (Dietz *et al.*, 2011). The German system in 2009 struck a reasonable balance in this regard: the costs for employers, including the reductions legislated during the crisis, amounted to around 8% of total labour costs – roughly the median among 24 OECD countries.

While short-time work explains some of the discrepancy of the unemployment response to other countries, it was not exceptional *vis-à-vis* past experience in Germany. For example, the increase in short-time workers in 2009 was comparable to the recessions in the early 1990s and also to the 1970s (Burda and Hunt, 2011; Boysen-Hogrefe and Groll, 2010).<sup>4</sup>

### **Reduction of weekly working hours**

The substantial reduction in weekly working hours during the crisis period (usually associated with a proportional reduction in pay) was made possible by a much increased wage bargaining flexibility (Reisenbichler and Morgan, 2011). With sectoral wage bargaining becoming less popular, reflecting in part the decline of membership in unions and in employer associations, collective agreements have been made more flexible by giving more leeway to companies (Bellmann *et al.*, 2008). Examples are the introduction of “opening clauses” (*e.g.* exemptions from working time regulations concluded in a collective agreement) or “hardship clauses” (*e.g.* exemptions from a contracted wage level during a precarious economic situation). Often the consent of unions to the application of such measures is connected to explicit pledges by employers, such as employment guarantees. Such “company-level pacts for employment” or “job alliances” aim at strengthening long-term employment relationships by increasing the flexibility of employment conditions, thereby contributing to safeguarding jobs in crisis periods. Apart from agreeing on flexible working hours, such pacts also allow for suspension in annual bonus payments, holiday pay or outright wage cuts. Finding agreements among the social partners on such pacts was facilitated by a government decision to base unemployment benefits on the initial income of an employee and thus not to take into account a temporary reduction in pay for the benefit calculation (Dietz *et al.*, 2011). Such pacts have become more widespread since the mid-1990s and, particularly among companies with more than 250 employees, more than half of all companies had concluded them by 2010.

### **Working time accounts**

A further important feature of this flexibility is the increased use of working-time accounts. By 2009, half of all employees had such accounts, up from one-third in 1999; in the manufacturing sector, which was hit hardest in the recession, the share is higher than in others (Zapf and Brehmer, 2010). These accounts allow for a smoothing of working time over the business cycle with balances being built up during booms and drawn down during recessions. Implicitly, this should also lead to less hiring in an upswing (mirrored by fewer lay-offs during downswings) and indeed Burda and Hunt (2011) find evidence that hiring in the years prior to the crisis was less than would have been expected based on past experience.

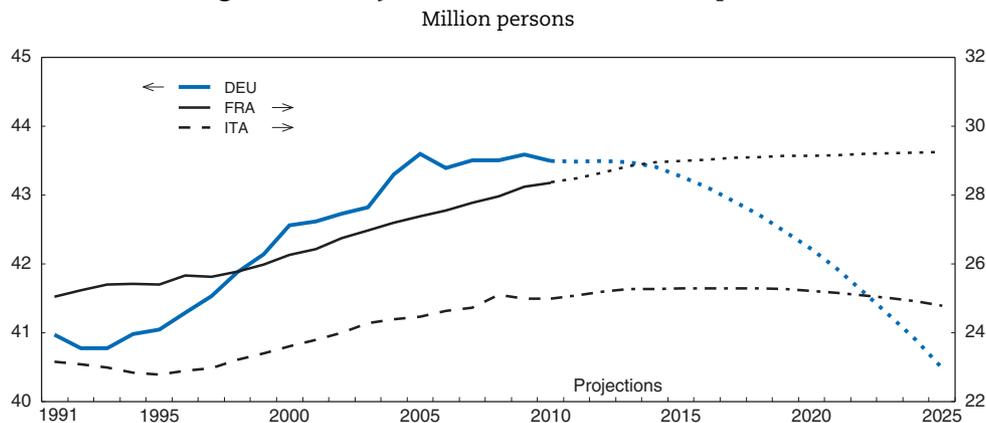
The cumulated surpluses in such accounts increased substantially in the years preceding the crisis. As these surpluses represent financial liabilities that companies owe to laid-off workers, their existence may have postponed a decrease in employment. By the time the account balance was back to zero, it may have already been sufficiently evident that the recession would prove short-lived (Burda and Hunt, 2011).<sup>5</sup>

## Long-term challenges remain

Overall, the fruits of the substantial progress made in improving the labour market – both at the aggregate level by raising work incentives and improving job matching as well as at the company level by increasing working time flexibility – were forcefully demonstrated during the 2008-09 crisis and provide important lessons for other countries. This success should be an encouragement to address the substantial challenges that still lie ahead for the German labour market. Labour market participation of women is still much lower than in other countries due to a low number of hours worked. Employment of older workers needs to be raised further, which requires efforts also in the area of education. Migration needs to be stepped up as labour shortages are expanding in some specific occupations, pointing to a mismatch of supply and demand in particular for high-skilled occupations (notably those requiring MINT qualifications [mathematics, information technology, natural sciences and technology]; McKinsey, 2011).

The urgency of progressing further in these areas is exemplified by rapid population ageing, which will have a profound impact on the economy and the labour market. It will reduce GDP per capita growth, due to its negative effects on different growth drivers: the labour force, productivity growth, investment capacity, wages and domestic demand (Box 1.2). In particular, both the decline in the size of the population and their different participation rates will adversely affect the labour force (Figure 1.6). Some simulations of the total impact of ageing on growth (including the direct effect on labour supply and the more indirect effects on productivity and domestic demand) show that ageing may reduce GDP per capita growth by –0.4% per year between 2011-20 and –0.8% between 2021 and 2030 (Oliveira Martins et al., 2005).

Figure 1.6. **Projected labour force development**



Note: Labour force projections take into account proposed pension reforms and are based on dynamic cohort analysis using the labour force participation rates from 2002 to 2007.

Source: OECD, Economic Outlook Database.

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### Box 1.2. **Impact of ageing on economic growth**

In theory, ageing weighs on economic growth through four main channels: labour force, productivity growth, wages and domestic demand. In Germany, it will mainly have a negative economic impact by reducing labour supply.

Ageing reduces the productive capacities of the economy as the available labour force declines. The fall in working age population will create permanent labour shortages which cannot be sustained in the long run. In Germany, the simple mechanical demographic

### Box 1.2. Impact of ageing on economic growth (cont.)

effects of the reduction in labour supply is estimated to reduce potential GDP growth by –0.2 percentage point in 2011 and –0.9 percentage point in 2025.

Some studies find evidence for a U-inverted relationship between ageing and productivity growth (Werding, 2008). Not all of the main channels through which ageing may have a negative impact on productivity are equally important in the German context:

- First, recent literature finds that productivity is not decreasing over the working life. Even if older workers appear to be less innovative, their experience and accumulated knowledge compensate other negative ageing effects on productivity, such as the depreciation of knowledge or age-related trends in physical and cognitive capacities (Sachverständigenrat, 2011).
- Second, the change in age structure should not modify the average level of qualifications in Germany. While this mechanical impact of ageing on educational level is generally positive in OECD countries with tertiary attainment rising from one generation to the next, it is likely to be neutral in Germany due to the fact that tertiary educational attainment for younger cohorts is comparable to the older one.
- Third, ageing may change the composition of domestic demand towards less productive sectors or sectors where margins for productivity growth are low. For instance, the shares of housing, energy, and health care spending in total consumption increase with age. According to simulations using household surveys, this impact will be relatively modest (Oliveira Martins *et al.*, 2005).
- Fourth, according to the life cycle theory, savings should decrease with ageing and may create a deficit in capital accumulation (asset meltdown). As the old-age dependency ratio is significantly and negatively correlated with the saving rate (Oliveira Martins *et al.*, 2005), a decline in domestic investment and thus in TFP growth should be anticipated.

Ageing may also lead to an increase in labour costs and losses in price competitiveness. Wages should rise with ageing as labour shortages will emerge. Competition between firms for labour force will develop thus putting upward pressure on remuneration. Besides, the age-earning link – the fact that wages increase with age independently from productivity change – is quite strong in Germany (OECD, 2011b).

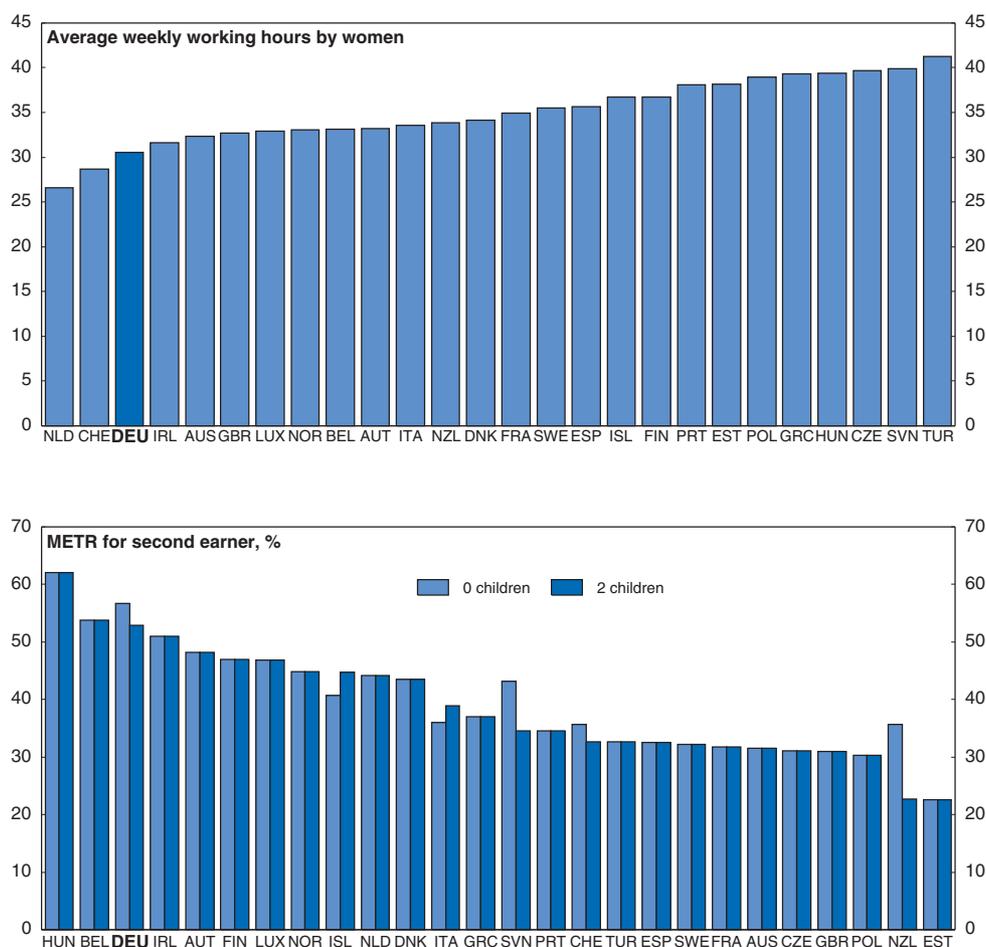
Finally, the impact of ageing on economic growth through the demand channel will crucially depend on the capacity of German consumers to smooth their consumption over the time and on the impact of ageing on old-age poverty. Rapid and extensive ageing in Germany may weigh on elderly disposal income by reducing pensions allocated through the first pillar. In Germany, the sustainability of the first pillar is supported by decreases in the old-age replacement rate (through the automatic pension adjustment formula). As a consequence, ageing will lead to a decline in pension levels drawn from the first pillar. The impact of this drop in pensions on future domestic consumption will differ depending on whether the decreases in income are well anticipated, on whether efficient policies are implemented to encourage savings and to enable workers to save in the short run to smooth their consumption over time.<sup>1</sup> By contrast, increased wage inequalities and the development of a dual labour market may worsen the impact of ageing on domestic demand by reducing the savings capacities of more vulnerable individuals. In addition, a reduced pension level will also weigh on consumption by lowering work incentives for low income workers whose pensions are close to the level of assistance income.<sup>2</sup> This may increase the number of inactive and poor old persons and the burden for tax payers associated with the welfare system, thus reducing disposal income of a larger share of the German population.

1. The income level may drop for workers not able to anticipate this decline in pension or those who are not able to save money due to budgetary constraints, thus weighing on domestic demand.
2. Arent and Nagl (2010) find a growing risk of old age poverty in Germany.

### Raising incentives for secondary earners

Female labour participation compares unfavourably with other OECD countries, in particular for married women and mothers. This is primarily due to the number of hours worked rather than actual employment (Figure 1.7, upper panel). For example, the overall employment rate of women at 66% in 2010 is above the OECD average of 57%; similarly, employment rates for mothers are also higher, though by a smaller margin.<sup>6</sup> However, female work is often less than full-time: one-fifth of all women in the workforce work less than 20 hours per week, the third highest share in the OECD (average 10%) after Switzerland and the Netherlands. This holds notably for mothers: in only 17% of all parental couples do both parents work full-time, less than half the OECD average. But there is also a clear difference between married and single women, even if both do not have children, with the latter working more hours (OECD, 2008a). The share of couples without children with both spouses working full-time is 61%, one of the lowest among European countries.

Figure 1.7. Fiscal disincentives and working hours of second earners



Note: Hours worked are average usual hours per week worked by women in employment aged 25 to 54 years. The marginal effective tax rate (METR) is the earnings which are lost due to increased taxes and reduced benefits. The graph shows the case of earners on the average wage, the second earner having changed from a situation of not working. All data refers to 2009.

Source: OECD, *Hours worked and Benefits and Wages Databases*.

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The low full-time participation of women is unlikely to be voluntary; by contrast, surveys indicate that half of all female employees would want to work longer hours if the framework conditions would be more supportive (Wanger, 2011). Married women and mothers face severe disincentives to work longer hours. Lack of childcare facilities and fiscal disincentives – which tend to have a larger effect on female than on male employment – are the most obvious ones (OECD, 2008c; OECD, 2011c).

### **Reduce fiscal disincentives**

In their paid work decisions, couple households have to consider how the tax/benefit system treats earnings by different partners. Only in Germany does the mix of tax and benefit policies significantly favour single-earner over dual-earner couples, thereby exerting significant disincentives for secondary earners (Figure 1.7, lower panel; OECD, 2011c).<sup>7</sup> This is due to two factors: the free health-insurance coverage for non-working spouses and the joint taxation of income for married couples (*Ehegattensplitting*).

Free health insurance coverage for non-working spouses means that secondary earners face a high marginal tax rate when taking up work. This helps explaining why many of those, who decide to work, do so only in a so-called *Mini-Job* (marginal employment not liable for health insurance if earnings remain below EUR 400 per month) with only few working hours. Women account for two-thirds of all employees which are working only in *Mini-Jobs*. Moving from such a job into regular full-time employment results in a jump in costs due to the need to take up an own insurance, helping to explain the low prevalence of two-earner couples with full-time jobs. The free-health insurance coverage should be abolished, possibly within a larger reform of healthcare financing (OECD, 2008a).

The tax system provides a further disincentive to work for secondary earners. Married couples can choose to be taxed jointly; in this case, the tax rate is applied to the average income of both spouses, doubling the resulting tax amount. In Germany's progressive tax system, the tax advantage (relative to individual taxation) is largest if both incomes are distributed unequally. The maximum advantage amounts to roughly EUR 8 000 and is reached if one spouse earns more than EUR 100 000 and the other is not working. Women, who are often the second-earners, thus face a high marginal tax rate when they increase their labour input, and this is one reason why many of them work only few hours if they work at all. Thus, compared to a system of individual taxation, the system of joint taxation favours one-earner couples and contributes to the low labour participation of married women (Dearing *et al.*, 2007). Following a reform of the system in 2009, married couples can now choose a tax option whereby the monthly wage tax takes into account the actual relation between the incomes of the first and second earner for the calculation of the marginal tax burden (*Faktorverfahren*). However, as this reform simply leads to a different distribution of the annual tax advantage among the member of the household during the year while its overall amount stays the same, it does not alter the adverse incentive effects on second earners.

It is true that income taxation on a purely individual basis likely is not compatible with the German constitution.<sup>8</sup> At the same time, other taxation options are available which would satisfy the constitutional requirements, while reducing fiscal disincentives. One such option is to allow the option of transferring the personal tax allowance from the non-working partner to the working spouse within a system of individual taxation (OECD, 2008a). An alternative option would be to allow transfers of income up to a certain cap from one spouse to the other (limited real income splitting or *Realsplitting*) or family tax splitting

(dividing household income by the number of family members), but these are likely to have much smaller positive effects in terms of labour participation (Sachverständigenrat (2007); Steiner and Wrohlich (2008) and references therein).<sup>9</sup>

### ***Expand childcare as planned***

Childcare is another factor determining the working decision of second-earners; maternal employment is significantly higher in those countries where childcare possibilities are larger (OECD, 2008a). At 18% in 2008, enrolment rates in formal care for children under 3 years of age compares unfavourably with the OECD average of 30%.<sup>10</sup> Childcare supply for toddlers is particularly low in the western *Länder* while the eastern *Länder* for historical reasons have a higher supply; this may be one reason why the share of women who work full-time is much higher in eastern Germany compared to the west (54.6% vs. 46.3%) (Wanger, 2011). Based on a German household panel, Felfe and Lalive (2010) find that female weekly working hours increase by 2.9 hours following an increase in local childcare supply by ten places. Acknowledging the lack of supply, the government has started to implement a reform starting in 2005 with the aim of being able to offer a childcare place for 35% of children aged three or below by 2013 (and installing a legal claim for a place for all children aged two years). The plans appropriately target the challenge and should be implemented as planned. However, as stated in previous *Surveys*, the government should refrain from introducing an additional benefit for mothers who are not using childcare facilities for their kids as this risks offsetting the positive incentive effects from an increase in childcare supply (OECD, 2008a).

Participation in childcare is more favourable for children aged 3-5 years with an enrolment rate of 93%, one of the highest among OECD countries. The high share is in part a consequence of the introduction of a legal claim for a place in kindergarten in 1996 (Spieß, 2011). However, these facilities are often not available on a full-time basis, notably in the western *Länder*; there, only a quarter of children in this age group attend kindergarten for more than seven hours daily. In the eastern *Länder*, the share is almost 80% (Spieß, 2011). Similarly, there is a lack of supply of full-day primary schooling (again with similar differences between eastern and western *Länder*; Spieß, 2011) and only 6% of children aged 6-11 are in out-of-school-hours care services – in Sweden and Denmark, the share is more than 60% (OECD, 2011c). The government has started to support the *Länder* in implementing full-day schooling supply since 2003. These efforts should continue.

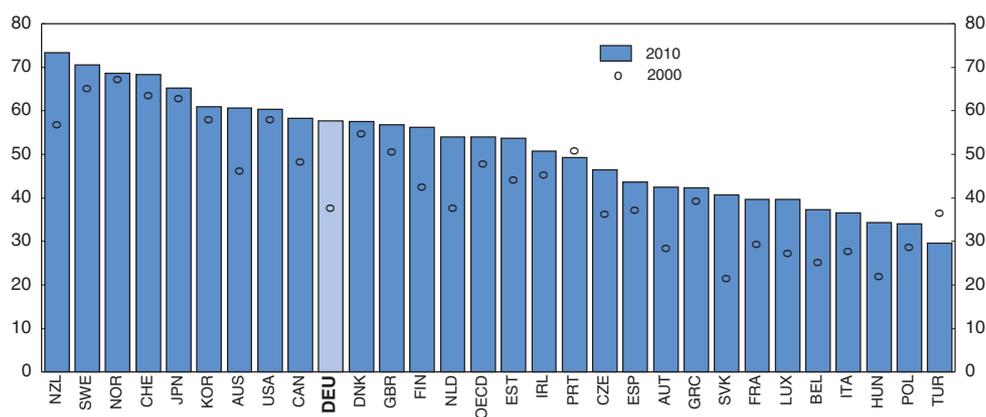
Reducing fiscal disincentives and improving childcare supply could well have very large effects on female full-time participation. This is because some other parameters in German family policy are favourable. For example, the recent parental leave reform (*Elterngeld*) may have contributed to an increase in participation by reducing the duration of parental leave benefit payments (Spieß, 2011; Bergemann and Riphon, 2009). Indeed there is some evidence from household surveys that labour participation of mothers rose by about 8% since 2006 (when the new parental leave benefit system was introduced and the extension of child care facilities started). Also, full time employment rates (> 32 hours) of mothers with their youngest child up to 2 years old increased by about 6 percentage points over the same period. Cross-country evidence indicates that such reforms also have a significant impact on fertility which in Germany is at the lower end of OECD countries (OECD, 2011c).

### Further increasing employment of older workers

A further challenge is to extend the length of working lives, which requires both activating the elderly workforce through a rise in effective retirement age and improving the employability of older workers to avoid creating unproductive and costly pathways from work to retirement.

Labour force participation of older people has increased considerably over the past few years (Figure 1.8). The employment rate of the 55 to 64 year olds rose by two thirds (from 38% to 58%) between 2000 and 2010. That increase was stronger than in any other age group and is the third highest among OECD countries (after Hungary and Slovakia). Reforms on the labour market and in the pension system encouraged both labour demand and supply for older workers. On the supply side, increased reductions in benefits for early retirees and in unemployment benefits increased work incentives for older workers (OECD, 2005; OECD, 2011b). In addition, subsidised part-time employment schemes for older workers (*Altersteilzeit*) have been phased out and wage subsidies are provided to older employees who take up a new job that pays less than his/her previous position.<sup>11</sup> The increase in legal retirement age (from 65 to 67 by 2029) will contribute further to the improvement in older worker participation. On the demand side, employment opportunities of older persons were further enhanced by easing restrictions for the use of fixed-term contracts for older workers and by subsidizing firms for hiring older workers (*Gesetz zur Verbesserung der Beschäftigungschancen*).

Figure 1.8. **Employment rates of older workers**



Note: Employment rate of older workers is employment as a percentage of the population aged 55 to 64 years.

Source: OECD, Labour Force Database.

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Notwithstanding this improvement, the elderly employment rate could be further raised. It is now above the OECD average but still below those of best performing countries (Figure 1.8). While the effective retirement age is progressively converging to the 2004-09 OECD average (age 64 in 2010), it is still below the legal retirement age. In addition, the unemployment rate of older workers (aged 55-64) was 1.6 percentage points above the OECD average and 0.6 percentage point above the total unemployment rate in Germany in 2010.

### **Lowering the incentives to retire early**

Incentives for workers to remain in the labour market beyond a certain age could be further enhanced, in particular for low income workers. On the one hand, pension incentives to work between age 60-64 are high by international comparison, as the pension level is low (thus encouraging longer work) and as the change in net pension wealth related to an additional year of work after 60 is around the OECD average (OECD, 2011b).<sup>12</sup> On the other hand, these incentives are much lower for low income workers as their accumulated pension rights over a working life may not surpass the social assistance level, thus discouraging employment. The sustainability factor in the pension formula (automatically adjusting pensions to changes in the ratio between contributors and pensioners) may accentuate this effect by reducing the gap between the pension level and the level of assistance income for low income workers. One option to counter this effect would be to make the pension system progressive, for example by increasing the value of points for low income workers at the end of their career or introducing a minimum pension. Redistribution in the German pension system, as measured by the progressivity index, is lower than 21 of the other OECD countries (OECD, 2011b) and studies suggest that introducing progressivity may have a positive impact on welfare by reducing the risk of old-age poverty (Fehr *et al.*, 2011). The impact of this measure on public finances should be carefully examined to avoid undermining the sustainability of the pension system. Besides, additional adjustment to pension and labour market systems should help further encouraging old workers to remain on the labour market:

- The pension system could be reformed to include larger pension decrements for early retirees and larger benefit increments for later retirement, so as to ensure actuarial neutrality. OECD simulations show that the 3.6% decrement for early retirement is not high enough and should be raised to 5.5-6% (OECD, 2005). Another option would be to put a higher value to points allocated after the minimum of 45 years of contribution.
- Despite significant reforms to phase out early retirement, some options are still available for workers to exit the labour market before the legal retirement age. For example, the duration of unemployment benefits is higher for workers above 50 years of age, reaching 24 months for those aged 58 or above (compared to 12 months for workers aged up to 50 years of age), thus supporting the unemployment pathway to retirement (OECD, 2008a). The extended duration payments for older workers should be phased out.

### **Increasing employability**

Measures are also needed to increase the employability of older workers (such as their adaptability to labour market needs) by preventing the emergence of wage-productivity gaps at older ages and by countering discrimination against older workers. Empirical studies suggest that discrimination against older workers is significant and has increased in Germany over the last decade (OECD, 2011b). In addition, the chances for older workers to be hired are significantly lower than the chances of being employed until retirement (Heywood *et al.*, 2010). Different factors may explain the low employability of older workers:

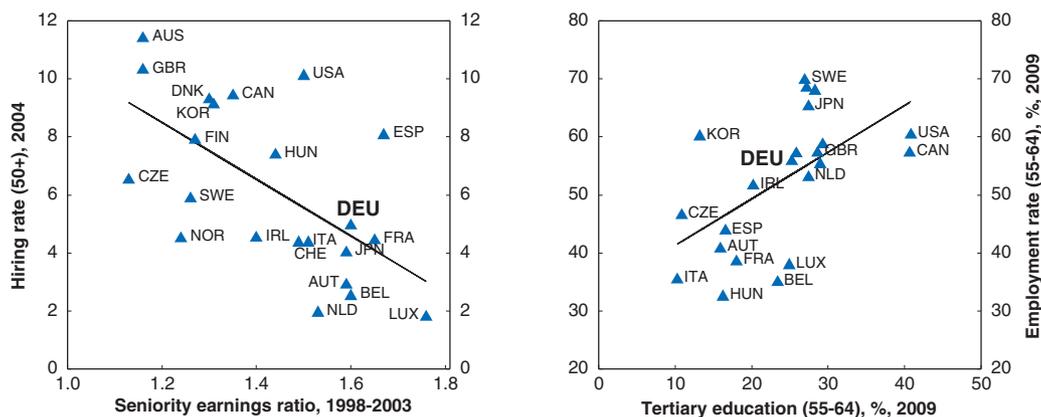
- Labour costs of older workers are above average as they receive seniority wages (wages increase with age irrespective of a worker's productivity growth). Higher seniority wages are correlated with a low hiring rate of older workers (OECD, 2011b; Figure 1.9, left panel). In Germany, older workers earn around 60% more than younger workers (OECD average is 43%), suggesting that seniority wages are hampering old-age employment. While

Germany uses wage subsidies for firms employing workers over the age of 50, thus lowering the adverse effects of seniority wages, consideration should also be given to change the remuneration system.<sup>13</sup> One option is to further shift away from seniority clauses towards performance clauses in the public sector. In addition, social partners should be encouraged to assess in how far current wage schemes inhibit older worker employability.

- Training older workers is less attractive given their lower remaining working life and thus, investment in human capital tends to decline with age. Also, while firm specific human capital develops with experience, general knowledge erodes over time, limiting adaptive capacities and creating barriers to job mobility. Employability of older workers improves with education level: the unemployment rate of tertiary graduates aged 50-64 years is less than half the rate of those with the lowest education level and employment rates of older workers are correlated with tertiary education attainment (Figure 1.9, right panel). Lifelong training is therefore crucial for old-age activation as it helps preventing human capital depreciation over the working life, improving adaptability of older workers to firm's requirement, and increasing the education level. Overall, Germany ranks among the ten best performing OECD countries regarding adult participation in formal and non-formal education (OECD, 2011d). However, participation rates in education in Germany remain significantly below those of Nordic countries, on average as well as for older workers. Less than 30% of those aged 55-64 participated in education or training in 2007 while around 60% did so in Sweden (OECD, 2011d). The increase in the retirement age from 65 to 67 provides new incentives for participation in training as the increase in the length of the working life mechanically raises the rate of return of training. Cross-country evidence suggests that the effective retirement age is positively correlated with participation in training (Figure 1.10). However, more specific measures are needed to foster lifelong learning, such as implementing a standardised system for the recognition of non-formal and informal qualifications and providing better guidance on adult education opportunities (OECD, 2010b). In addition, raising the participation of older workers in training requires improving further its effectiveness by adapting training to the needs of seniors (Zwick, 2011).
- Discrimination is also related to a biased perception of old-age performance. This could be addressed by providing public information and encouraging age diversity in the workplace. Some initiatives to support old-age employment exist in collective agreements (*e.g.* the Joint German Occupational Safety and Health Strategy and the New Quality of Work Initiative). Legislative measures in favour of an older workforce should be used with caution, however, since they may increase protection towards insiders having permanent jobs, thus reducing employability and job mobility (OECD, 2011b).

### **Continuing with education reforms**

Raising education outcomes and fostering training are key measures for addressing the challenge of an ageing workforce and the associated drop in potential growth (OECD, 2011a). Employment rates tend to be higher for the better educated (thus raising labour input) who also are more productive and innovative. In addition, ageing and technological progress will increase the need for high-skilled workers, which will account for a large share of future labour shortages (Bundesministerium für Arbeit und Soziales, 2011). Employment rates for workers with tertiary education decline slower at older ages than for those with other education levels (OECD, 2010a). Tertiary education attainment is low in

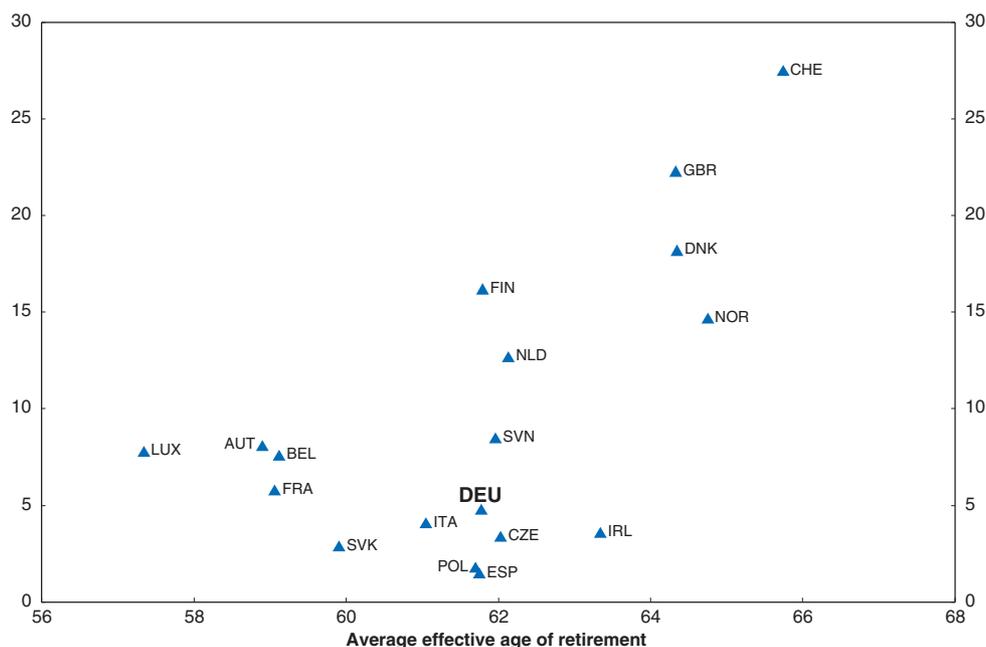
Figure 1.9. **Seniority wages, tertiary education and hiring of older workers**

Note: The hiring rate is the number of employees with less than one year of tenure relative to total employees aged 50-64 years. The seniority earnings ratio is the ratio of earnings of males aged 55-59 to those aged 25-29 years. The earnings data cover full-time workers only for various years over the period 1998-2003. Tertiary education refers to the percentage of persons aged 55-64 years who have attained tertiary type A or B or advanced research programmes. Countries in the graphs are 22 OECD members for which data is available.

Source: OECD, *Pensions at a Glance 2011* and *Education at a Glance 2011*.

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Figure 1.10. **Participation in training and effective retirement age**  
% of males, aged 50-59 in 2009, who participated in education and training



Note: The average effective age of retirement is calculated as a weighted average of (net) withdrawals from the labour market at different ages over a 5-year period for workers initially aged 40 and over. In order to abstract from compositional effects in the age structure of the population, labour force withdrawals are estimated based on changes in labour force participation rates rather than labour force levels.

Source: Eurostat and OECD, *Ageing and Employment Policies – Statistics on average effective age of retirement*.

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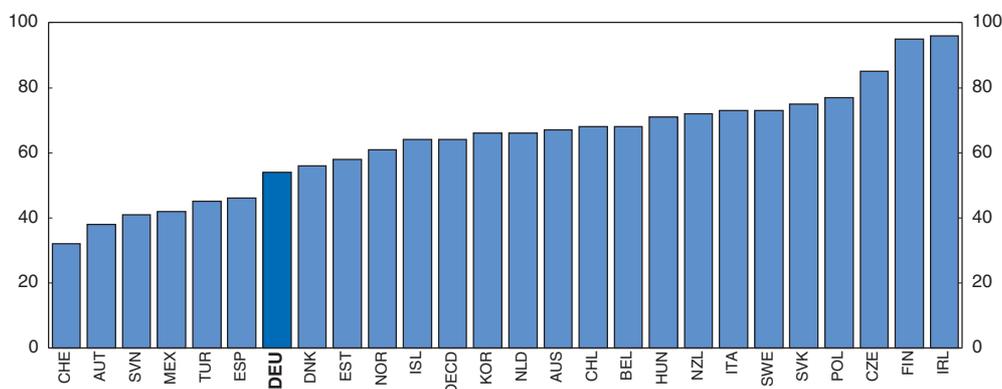
Germany and has not increased from generation to generation (at 26%, the level of tertiary attainment of the 25-34 year-old is only 1 percentage point higher than the one of the 55-64 year-old and stands 11 percentage points below the OECD average). At the same time, the wage premia for tertiary graduates are high compared to other OECD countries, suggesting shortcomings in high-skilled labour (OECD, 2011d). Tertiary education attainment is expected to increase because of recent reforms in the education system, notably the reduction in the duration of secondary education. However, more needs to be done to further raise the education level in Germany.

Some reforms are now being implemented to improve the accessibility of tertiary education and make it more attractive. Universities received more autonomy to select their students and to introduce tuition fees, creating incentives for tertiary institutions to improve performance. Some *Länder* which introduced tuitions fees have since abolished them to improve university access for low income students. However, there is little evidence that tuition fees deter access to university when they are coupled with measures helping low income students to invest in their education (such as income-contingent loans) (OECD, 2008b).<sup>14</sup> Also, Germany has implemented measures facilitating access to university for students with low social background, such as the provision of loans to finance tuition fees. The funds provided rose by 23% since 2005, amounting to EUR 2.7 billion in 2009 (0.1% of GDP). Besides, exemptions from the repayment of loans have been implemented and part-time courses have been developed allowing students to work to finance their studies. In addition, the *Higher Education Pact 2020* contributes adapting to the increasing demand for tertiary education.<sup>15</sup> Other measures also aim at improving the attractiveness of tertiary studies by providing information on opportunities offered to tertiary graduates and assisting students in the transition to professional activity (e.g. the establishment of career services). These measures should be further supported as more disadvantaged individuals tend to underestimate the net benefits of tertiary education (OECD, 2008b).

Further reforms are needed to increase tertiary education attainment. In international comparison, the share of upper secondary graduates prepared to enter university is ten percentage points lower than the OECD average (Figure 1.11). Access to university is limited by the early selection of pupils at age 10 into different tracks, significantly influencing the type of education they will receive (academic or vocational). In 2009, around 40% of pupils were in the upper track – the Grammar school (*Gymnasium*) – which leads to an unrestrictive university entrance certificate (*Abitur*). Notwithstanding some improvements over the past few years, the probability of changing tracks after the selection remains low – notably of moving from a lower to an upper track. This suggests that the disadvantaged tertiary education attainment is related to some extent to the low share of students going into the Grammar school, even though it needs to be acknowledged that graduates from vocational schools represent an increasing share of students at universities. In addition, evidence suggests that in systems with early tracking, children are selected to a large degree on the basis of their social backgrounds and not on their ability, thus contributing to reproducing existing social inequalities without improving educational outcomes (OECD, 2008b). Germany has made significant progress in improving the school system in terms of quality and equity but reforms to reduce entry barriers of the system should be continued. Some *Länder* have implemented a wide range of measures to reduce the stratification in the school system, notably by delaying the tracking decision to a later age and reducing the number of school tracks but also through targeted support to disadvantaged groups. Similar approaches

**Figure 1.11. Share of German youth prepared for university**

Graduation rate, %, from upper secondary and post-secondary non-tertiary programmes designed to prepare students for tertiary-type A education, 2009



Note: Gross graduation rates are estimated as the number of graduates divided by the population at the typical graduation age. Data in the graph refers to upper secondary and post-secondary non-tertiary programmes, which are designed to prepare for direct entry to tertiary-type A education. Tertiary-type A programmes are largely theory-based and are designed to provide sufficient qualifications for entry to advanced research programmes and professions with high skill requirements, such as medicine, dentistry or architecture. Other upper secondary programmes, which prepare for other tertiary programmes focusing more on practical, technical or occupational skills, are not considered here. Data for Australia refers to 2008.

Source: Education at a Glance 2011 (Figure A2.2).

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should be adopted in the remaining *Länder*. In addition, more opportunities should be created to allow pupils to change tracks. Also, the exchange between academic and professional spheres should be improved, for example by further easing access of qualified workers to university. Indeed, the education system should be made more flexible and more responsive to labour market needs as it is not offering enough possibilities for students or professionals to pursue their studies outside of standard training.<sup>16</sup> Recent measures made the access to tertiary education for vocational training graduates easier (OECD, 2010d) and start to show results.<sup>17</sup> Opportunities for higher qualification thus developed contributing to a better utilisation of existing qualification potentials. Efforts should continue in this direction and remaining barriers to an increased flexibility of the education system should be removed. For instance, pathways from vocational training to tertiary education should be made more transparent and support measures for less academically trained people wanting to attend university should be provided (OECD, 2010d).

### **Avoiding the development of a dual labour market**

The share of workers with a fixed-term contract has risen substantially: in 2010, they accounted for just below 15% of all dependent employees compared to an OECD average of 12.4%. The gap to the other OECD countries has significantly widened since around the middle of the 2000s. This concerns exclusively the younger workers: among those aged 15-24 years, 57% have a fixed-term work contract, more than twice the OECD average. By contrast, the share (at around 10%) is almost equal to the OECD average for prime age workers (25-54 years old) and at 4.6% is half the OECD average for older workers (55-64 years old). While it is true that fixed-term contracts among the younger population were always more widespread in Germany than elsewhere, as apprentices in vocational

training are usually hired on this basis, this cannot explain the dramatic increase in the share by almost 20 percentage points since the mid-1990s (while the OECD average rose by less than 5 percentage points over the same period).

Changes in employment protection legislation are likely to play a role in this development. Not only is regulation of regular work contracts one of the strictest among OECD countries; the difference between EPL for regular work contracts and fixed-term work contracts is also higher than in many other OECD countries and has increased significantly since 2000 as the use of fixed-term contracts was eased substantially.

Fixed-term contracts increase employers' flexibility and can be a stepping stone into permanent employment (around half of all workers on fixed term contracts obtain regular contracts after the limitation period has ended [Hohendanner, 2010]). However, fixed-term employment can have adverse effects on long-run employability, especially for young workers, notably because firms are less likely to invest in their training (OECD, 2004). It also contributes to higher income inequality as fixed-term workers tend to earn less than permanent ones (Koske et al., 2012). To lower the risk of dualisation in the labour market, the protection of permanent work contracts should be lowered along the lines suggested in the previous *Survey* (OECD, 2010b), for example by moving towards a unified job contract with the degree of protection rising with tenure.

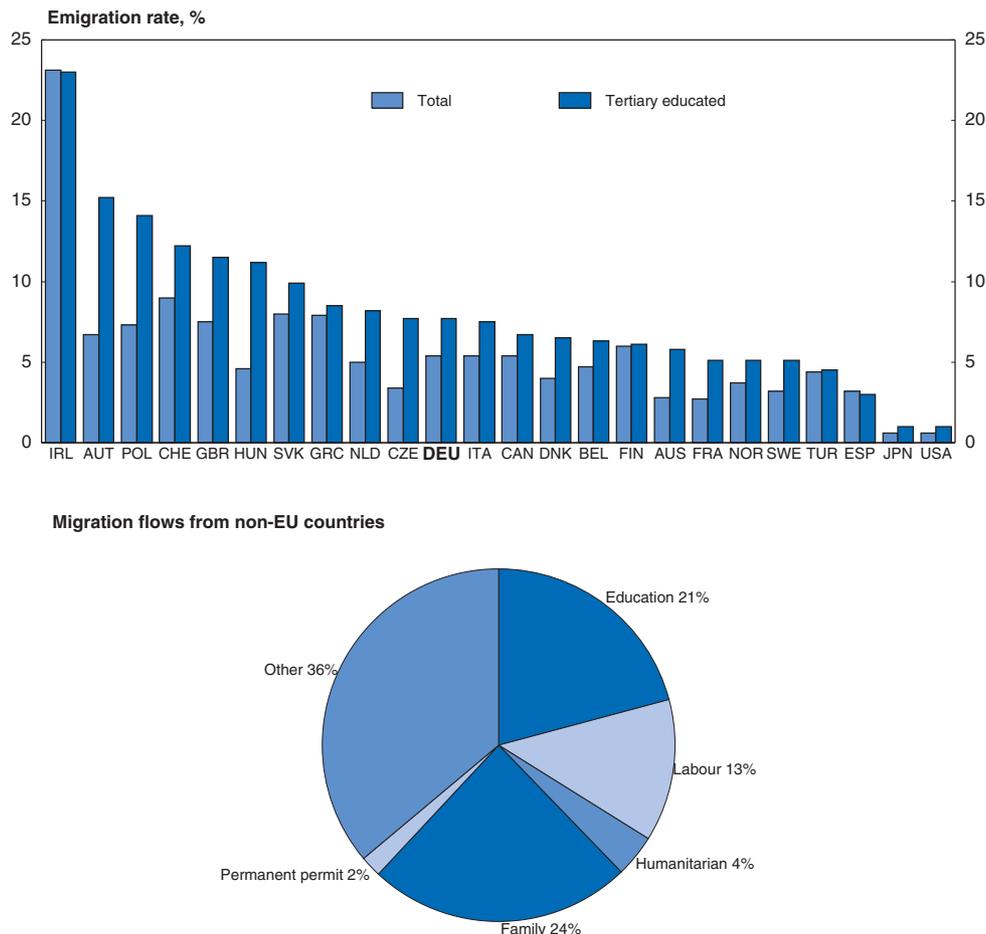
### **Adapting migration policy**

#### ***Migration flows are low and not labour-oriented***

Migration is an important part of the labour market policy toolbox as it provides direct access to labour force with specific knowledge such as language and information on foreign markets or technologies. Also, it can help to address labour shortages and Germans are increasingly supportive of migration policy to address this objective.<sup>18</sup> Last but not least, migration is an important factor to counter the decline in the labour force, notably as the pool of German native workers will not be sufficient to offset the rapid ageing of the population (IMF, 2008; Bundesministerium für Arbeit und Soziales, 2011). While it alone cannot alleviate the impact of population ageing, particularly on the financial viability of pension schemes (Coppel et al., 2001), increasing migrant inflows has a quite rapid effect on labour supply, thus mechanically increasing the productive capacities of the economy.

Current immigration to Germany does not adequately serve these purposes. Net migrations declined over the past few years, both due to an increase in emigration and a decrease in immigration. In particular, the emigration rate is high compared to other OECD countries, notably for high-skilled workers (Figure 1.12, upper panel). Moreover, by international comparison, German migration policy is not work-oriented (OECD, 2011b). Work permits account for only 13% of total migration inflows from non-EU countries (Figure 1.12, lower panel). In addition, migrants are less skilled than the native average and the share of high-skilled migrants is below the OECD average (OECD, 2010b). Recent migration flows consisted on average of better educated migrants compared to the past and also to the native-born population. This is partly due to a greater selectivity, which, however, also tends to reduce migration inflows.

Free labour mobility in the EU is likely to play only a limited role in addressing age-related labour shortages. According to surveys, EU countries are a less attractive destination for migrants than non-EU English speaking countries even for EU citizens (Chaloff et al., 2009). In addition, most EU member states face rapid ageing themselves and

Figure 1.12. **Aspects of migration to Germany**

Note: The emigration rates are percentages of the native population (total or tertiary educated) of country *i* residing abroad around 2000. Permanent permit includes permits delivered to high-skilled, who account for only 0.7% of the total. Other includes temporary authorisation to stay for migration candidates. Remaining categories are temporary residence permits.

Source: Dumont et al. (2010), "International Migrants in Developed, Emerging and Developing Countries: An Extended Profile", OECD Social, Employment and Migration Working Papers, No.114, and related database; Bundesamt für Migration und Flüchtlinge, Migrationsbericht 2009.

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are already competing for skilled workers. Finally, enlargement to eastern European countries and the recent opening of the German labour market to new EU members states is estimated to have only little impact on migration flows (Box 1.3). This suggests a need for reforming migration policy towards third country citizens.

### **Migration policy should help to address emerging and persistent labour shortages**

As stressed in the previous Survey (OECD, 2010b), migration policy should focus more on high-skilled workers, whose adaptive capacities are higher than the average and who are already and increasingly needed in the German labour market. Shortages are currently concentrated in specific high-skilled sectors, such as mechanical and electrical engineering and IT services providers. However, they are also developing in certain

### Box 1.3. What Germany can expect from opening its labour market to new EU member states

The transition period entitling older EU member states to restrict labour mobility from the countries that entered EU in 2004 (NMS-8) expired on 1st May 2011 and Germany opened its labour market to NMS-8 citizens.<sup>1</sup> According to recent studies, this removal of barriers to labour mobility may increase migrations to Germany by between 100 000 and 400 000 per year in the medium term (Schäfer, 2011).<sup>2</sup> The cautious estimates are supported by a first assessment of migrations from NMS-8 since May 2011 by the German labour office, showing only a slight increase.

The wide range of estimates is partly explained by the complexity of projecting migrations flows, as the propensity to migrate depends on numerous factors which are difficult to measure (OECD, 2009b). Economic factors such as gaps in wages and in unemployment rates play a central role in migration decisions. However, academic studies show that these factors can only partly explain migration flows and that other determinants should be taken into account (see for instance Martin, 2003; Massey *et al.*, 1993; Mayda, 2010; Zimmermann, 1995). The role of diasporas already present in the host country, the attractiveness of the language and the degree of acceptance in the host country also influence the number of migrants. In addition, and particularly in the case of EU enlargement, taking into account competition from other countries and thus their relative attractiveness is also essential.

Some of the factors determining migrations are now arguably more favourable in the case of Germany relative to earlier time periods. For example, Germany was the preferred destination country of NMS citizens for work migration in 2009 (TNS Opinion & Social, 2010). Also, while gaps in GDP per capita and average wages significantly fell during the last decade between Germany and the NMS-8, differences in unemployment rates actually widened; a tighter German labour market may now attract more migrants than in earlier periods. The share of pupils in upper secondary education learning German declined in the NMS-8, but remains higher than in other European countries and account for more than 50% for most of the NMS-8. The number of NMS-8 citizens living in Germany increased since 2000, reinforcing diasporas effects.

However, the opening should not lead to a huge increase in migration flows and thus should not significantly impact the labour market (OECD, 2011e). Indeed, most of the mobile NMS-8 citizens already immigrated to countries which removed restrictions at an early stage, thus reducing the number of candidates to migration. Inflows from NMS-8 to Germany also increased after the enlargement in 2004 and NMS-8 migrants had already the possibility to work (for instance under self-employed status).<sup>3</sup> Migration flows should also be damped in the short run as the German economy is now phasing a soft patch, limiting job opportunity for migrants.

The skill level of future migrants from NMS-8 remains broadly undetermined. On the one hand, potential migrants are younger and better educated than the average citizen in NMS-8. Also, the cohort with a high willingness to migrate (25-34 years-old) is more educated than the German average of this age in most of the NMS.<sup>4</sup> On the other hand, it is unlikely that high-skilled migrations increase dramatically since skilled workers already had the opportunity to work in Germany since the labour market was opened to tertiary graduates from NMS in January 2009. In addition, the risk that qualified migrants may be under-employed due to a lack of recognition of foreign qualifications may act as a barrier to high-skilled migration.

### Box 1.3. What Germany can expect from opening its labour market to new EU member states (cont.)

Apart from the uncertainty related to the size of migrations, the economic impact of the opening to NMS is likely to be positive. For example, the Bundesbank estimates that an increase of 100 000 migrants (per year) would increase potential GDP by 0.7% by 2013 through its positive impact on labour supply and capital stock adjustment (Bundesbank, 2011). The risk of big perturbations on the labour market is limited, as stressed by past experience of EU countries opening their labour market to NMS-8. Also, the opening may help to curb fraud (illicit uses of manpower, excessive use of subcontracting) and illegal work with a positive effect on tax revenues.

1. From 2004 to 2009, NMS citizens had to obtain a work permit as non-EU citizens. The restrictions limited migrations from NMS-8 to Germany: only 9% of migrants from NMS-8 went to Germany between 2004 and 2010 (compared to 60% expected with a total opening) (Bundesministerium für Wirtschaft und Technologie, 2007).
2. On the low side, the German government and the European Commission expect around 100 000 migrants from NMS-8 per year while the IAB (Institut für Arbeitsmarkt- und Berufsforschung) and the Ifo institute are projecting between 100 000 and 140 000 annual entries of migrants during the next 10 years (Bass and Brücker, 2011). On the high side, the Institut der deutschen Wirtschaft projects 400 000 new migrants from NMS-8 in 2011 and 2012 (Institut der deutschen Wirtschaft, 2011) and the Polish Ministry of Labour estimates that around 400 000 Poles could look for a job in Germany within 3 years. As Poland accounts for around 70% of total migrations from NMS-8, migrations to Germany according to this scenario may increase to 570 000 by 2013.
3. The number of migrants from NMS-8 will increase as those already in the country will formally register, but this will not have a major effect on labour supply.
4. Compared to Germany, the share of 25-34 years old having at least an upper secondary education level in 2008 was higher in Poland, Czech Republic, Slovakia and equivalent in Hungary.

occupations in mid- and low-skilled sectors, such as health care (DIHK, 2011; Fuchs *et al.*, 2010; Anger *et al.*, 2011). With ageing, increasing qualification levels of younger cohorts, and higher female labour participation rates, labour shortages will emerge in sectors intensive in mid-skilled labour, such as food services, construction, household production substitutions services and long term care. As some occupations are not adapted to old age work and not attractive for the native population, the domestic workforce may not be sufficient to address these needs in mid- or low-skilled workers (OECD, 2009a). The need for mid- and low skilled migration should thus be assessed when designing the migration policy.

#### *Designing a targeted migration policy*

German migration policy limits the hiring of a non-EU worker by requiring employers to prove that they cannot fill the position with a domestic worker or an EU national before recruiting him. This administrative procedure – the labour market test – is burdensome and creates uncertainty in the recruitment process. Identifying tight occupations and establishing a shortage list exempting employers from the labour market test could reduce this administrative burden and limit arbitrariness in the permit allocation.<sup>19</sup> In addition, by making the migration system more transparent, this measure would increase the attractiveness of Germany as a location country. Migration policy targeted on labour shortages should be coordinated with other related policies (such as education, training, labour market and pension policy) and be based on an objective analysis of labour market needs. In the UK, an independent consultation body (the Migration Advisory Committee) analyses labour shortages and advises the government on the list of occupations to be

opened to migrants. In 2011, Germany introduced a shortage list including a very limited number of occupations which should be revised by the Federal Labour Office on a biannual basis. Consideration should be given to establish an organ of labour market experts charged with designing and assessing labour migration policy or at least creating an independent body evaluating the existence of labour shortages as done in the UK. In the evaluation process, employers' preferences to hire specific foreign workers should receive attention.

However, past and international experiences suggest designing a shortage list will not be sufficient to attract adequate workforce. For example, the German green card initiative, facilitating the recruitment of IT specialist between 2000 and 2005, did not succeed in attracting the additional expected workers. Besides, non-English speaking countries are now investing in active migration policies to attract skilled migrants as lowering administrative barriers proved insufficient for countries with non-widely spoken language to recruit foreign skilled workers (Chaloff *et al.*, 2009). Establishing a shortage list should thus be complemented with measures to improve the visibility of the policy and the capacities of employers to recruit abroad. On the supply side, selection criteria and conditions on how to obtain a work permit should be published in a transparent way. In particular, they should be easily accessible by migration candidates and detailed on the web and in languages which are spoken by the target population. In addition, unique contact points should be created, providing all necessary information to settle in Germany. On the demand side, the development of placement services could be considered, in particular for SMEs which have more difficulties to recruit from abroad and in specific sectors such as live-in care and home care for which meeting candidates directly is crucial to ensure a good matching (OECD, 2009a). Placement services could be developed by creating a private employment agency specialised in foreign recruitment that could be jointly financed by employers and public employment services. Such services could also be developed in Public Employment Services (as it is the case in UK). Finally, as recommended in the previous *Survey* (OECD, 2010b), improving recruitment policy by developing international job fairs and multilingual job postings could also contribute to improving employers' access to the global labour market.

### **Facilitating entry for high-skilled migrants**

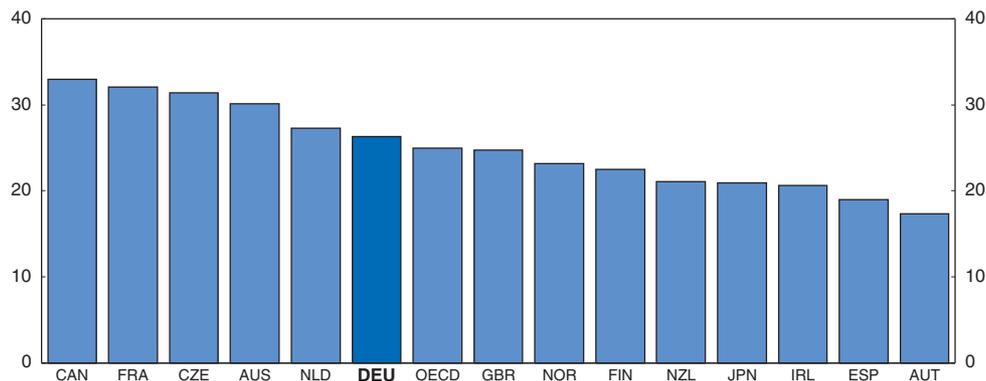
Notwithstanding some progress over the past few years, German migration policy has not succeeded in attracting high-skilled migrants. Reforms in 2005 and 2009 created several pathways for high-skilled migrants (*New Immigration Act 2005, Beitrag der Arbeitsmigration zur Sicherung der Fachkräftebasis in Deutschland 2009*). In particular, the labour market test was removed for academics, graduates from a German university during their first year of job search, for specific occupations (scientists, engineers, doctors) and for executives with annual salaries above a wage threshold of EUR 66 000.<sup>20</sup> However, these reforms have not yet led to a significant increase in high-skilled migrations. For instance, fewer than 800 high-skilled migrants entered under the income condition since 2005 (only 163 permits have been allocated in 2010; Bundesamt für Migration und Flüchtlinge, 2011). The 2009 measures are quite recent and were implemented when migration flows were significantly and internationally reduced due to the economic crisis (OECD, 2010c). Nevertheless, migration policy is still too restrictive and complex to be attractive for high-skilled migrants. In particular, as the wage threshold which allows an exemption from the labour market test is significantly higher than the average wage earned by young skilled professionals, high-skilled migrants (who tend to be young) are less likely to come to Germany.<sup>21</sup>

Migration policy towards high-skilled migrants needs to be adapted in several ways to improve the attractiveness of Germany as a migration destination. The wage threshold for getting a permanent work permit should be reduced. This could be done by applying the conditions set by the EU Directive for work permits for high-skilled non-EU citizens (“Blue Card”): possessing a tertiary diploma or by derogation having five years of experience in an occupation requiring tertiary education and having a job contract or a job offer with a gross income of at least 50% above the national average.<sup>22</sup> Making the migration system more supply-oriented would also increase the attractiveness of Germany as a location country for high-skilled migrants. As many other OECD countries, Germany should consider introducing a point system offering automatically a work permit to migration candidates if they satisfy a certain number of conditions (on occupation, work experience, education, age, language skills). This system is transparent, simple, easily adaptable in function of its outcomes and more attractive for migrants than a system based on multiple exemptions. In addition, it is better understood by the domestic population as it is based on objective selection criteria targeted to meet economic and labour market purposes. The system increased the level of qualification of migrants in the UK and in Canada, as well as their employment rate and earnings (National Audit Office, 2011; Citizenship and Immigration Canada, 2010). However, in some cases, a point system may lead to over-qualification and difficulties for migrants to integrate into the labour market, for instance when migrants are selected without having a job offer or adequate language proficiency (Chaloff *et al.*, 2009). When designing a point system, particular attention should be given to the employability of migration candidates, for instance by giving more consideration to language ability and demonstrated prior success. At the same time, the point system should relax conditions of entry for high-skilled migrants, in particular by allowing high-skilled young professionals from third countries to search for a job in Germany.

### ***Opening further the labour market for foreign graduates***

Germany should also focus on retaining non-EU graduates of German universities after the completion of their degree and attracting non-EU students who graduated in other EU universities. The number of foreign students is large in Germany compared to the OECD average (11% of foreign students in total tertiary enrolment versus 8.5% on average in the OECD). Graduates from German tertiary education institutions are already an important source of labour immigration, accounting for one third of labour immigrants in 2009. Retaining more students is feasible: while the stay rate of international students, *i.e.* the percentage of foreign students remaining in the country after graduation, is above the OECD average, it is significantly lower than in other migration countries (Figure 1.13). Germany implemented programmes to retain foreign students by removing the labour market test for foreign graduates from German universities if they take up a job in their field.<sup>23</sup> This condition could be further softened by not restricting the job field of foreign graduates but rather conditioning the labour market test only to the remuneration level (which should correspond to the average wage earned for a given qualification level) or by attributing more points to migrants with German diploma in the point system. In addition, relaxing conditions for students who graduated in other EU universities should be considered. Finally, efforts to harmonise education practice among EU and tightening links with foreign universities could also increase the attractiveness of Germany for young skilled foreigners (EU and non-EU).

Figure 1.13. **International students staying in Germany**  
% of international students not renewing their student permits who stay on



Note: The figure illustrates the stay rate which is estimated as the ratio of the number of persons who have changed status (whether for work, family or other reasons) to the number of students who have not renewed their permits; the latter are not necessarily graduates. Data for Germany is for 2008 and either 2008 or 2009 for other countries. It covers only students from outside the European Economic Area. Data for Canada includes changes from student to both permanent status and other temporary statuses. OECD is the average of country ratios in the figure.

Source: OECD, *International Migration Outlook*, 2011, SOPEMI.

StatLink  <http://dx.doi.org/10.1787/888932559980>

### **Improving Germany's attractiveness as a migration destination**

As migration policy is only one factor entering in the migration decision, improving the attractiveness of Germany for migrants necessitates a comprehensive set of measures. Pull factors for migration are complex: economic opportunities in a particular field (for the migrant and his/her family), career development, wage level, quality of life, likelihood of extending their residence permit as well as language, cultural and historic links can all play a role in attracting qualified migrants (OECD, 2009b). Structural reforms that modify the above mentioned factors would contribute to the success of targeted migration policy. For instance, policies improving working conditions and promoting domestic investment are complementing migration policy as high-skilled labour is a complementary production factor to capital and thus tends to follow investment flows (IMF, 2008). Therefore, structural reforms such as liberalising the services sector, lowering the level of labour taxation or expanding childcare supply may all be beneficial in attracting immigrants, besides their overall positive effect on potential growth.

Improving the recognition of foreign diploma would also raise the attractiveness of Germany as a host country for foreign skilled workers as it would facilitate the matching of employers' needs and migrants' skills and limits over-qualification of migrants. The foreign-born population in Germany tends to be underemployed and encounters difficulties integrating on the labour market. In 2007, the percentage of high-skilled foreign born working in low skilled occupations was four times higher than for native born (OECD, 2009c). The lack of information on foreign qualifications is an important factor in the relative over-qualification of immigrants (OECD, 2007). This could deter high-skilled migrants to work in Germany and hamper the recruitment of skilled workers by German employers. Recently, Germany passed a "Law to improve the assessment and recognition of foreign professional qualifications (Recognition Act)": regardless of their country of origin or nationality, everyone has the legal right to receive an official evaluation of their foreign qualifications and credentials. The Recognition Act applies to non-regulated vocational qualifications as well as professional qualifications regulated at the federal level (e.g. certain advanced

vocational qualifications, medical doctors, nurses). This law aims at providing employers and companies with reliable and nation-wide standardised information on the foreign qualifications which migrants have gained abroad. In addition, the government planned to provide this information online in an internet-based database. It also supports a nation-wide network of contact points and labour market-oriented advice services for the migrants seeking recognition. These measures are highly welcome but their implementation should be carefully monitored. In particular, they should not focus only on the degree level but also include an assessment of non-formal or informal qualifications.<sup>24</sup>

#### Box 1.4. Recommendations for the labour market

##### **Raising incentives for full-time female participation**

- Reduce fiscal work disincentives by reforming joint income taxation, for example by coupling individual taxation with the option to transfer a certain amount as a tax allowance from the non-working spouse to the working partner. Consider introducing mandatory health insurance premiums also for non-working spouses.
- Continue plans to expand the supply of childcare facilities and further increase the availability of full-day schooling. Refrain from subsidizing families who choose to not to use childcare facilities.

##### **Raising incentives to work longer**

- Raise pension discounts for drawing a pension before the statutory pension age towards an actuarially neutral level.
- Reduce the duration of unemployment benefits for those aged 58 and above, for example by reversing the lengthening from 18 to 24 months that was decided in 2007 or by equalizing the duration across all age groups.
- Make the pension system progressive to both avoid old-age poverty and discourage low-income workers from early retirement.
- Continue shifting from seniority towards performance remuneration in the public sector and encourage social partners to assess in how far current wage schemes inhibit older worker employability. Expand lifelong learning activities for older workers.

##### **Education**

- Monitor the effect of measures taken to reduce entry barriers of the education system and adjust measures if warranted. Continue to reduce the stratification in the school system, notably by delaying the tracking decision beyond age 10 and reducing the number of school tracks across all *Länder*. Improve the institutional setup of tertiary education, including a sufficient and diverse financing of higher education.

##### **Dual labour market**

- Lower the protection of permanent work contracts along the lines suggested in previous *Surveys*. Move towards a unified job contract with the degree of protection rising with tenure.

##### **Fostering integration and immigration**

- Consider lowering the wage threshold which exempts employers from proving that they cannot fill the position with a domestic worker or EU national before hiring a high-skilled non-EU migrant.
- Monitor whether the recent legislation to acknowledge foreign credentials effectively supports integration.
- Consider moving towards a points system.
- Consider establishing an institution tasked with designing, assessing and coordinating labour migration policy, notably including setting up shortage lists.

## Notes

1. Merkl and Wesselbaum (2011) find that since 1970 the quantitative impact of the extensive margin (i.e. hiring and firing of workers) is of similar magnitude in Germany and the US. This further underlines that the labour market reaction in the 2008-09 recession has been unusual.
2. The OECD summary measure is defined as the average of the gross unemployment benefit replacement rates for two earnings levels, three family situations and three durations of unemployment. For further details, see OECD (1994), *The OECD Jobs Study* (chapter 8) and Martin, J. (1996), "Measures of Replacement Rates for the Purpose of International Comparisons: A Note", *OECD Economic Studies*, No. 26, [www.oecd.org/els/social/workincentives](http://www.oecd.org/els/social/workincentives).
3. Generosity was increased by refunding some part of the social security contributions borne by employers for the hours not worked by the employee in the first six months of short-time work. No contributions had to be paid after six months or in case the employee was participating in a non-firm specific training measure. The maximum duration of short-time work was increased from 6 months to 24 months for all new entrants during 2009, to 18 months for new entrants during 2010 and to 12 months for entrants during 2011. Conditions for eligibility were relaxed (e.g. the rule requiring that at least a third of employees incur a 10% loss of earnings in order to introduce short-time work) and temporary work agencies were allowed to use it (OECD, 2010b).
4. The increase in short-time work at the beginning of the 1990s may not be fully comparable to today: it was then mostly used to cushion the short-time effects of the need for restructuring the east German economy after unification with most of those employees on short-time work being laid off at the end (Möller, 2010).
5. Burda and Hunt (2011) report that a November 2007 court ruling stated that an employer could not lay off a worker if any co-worker doing the same job had a surplus in her account. This may have added to the disincentive to lay off workers.
6. Maternal employment rates are 56% (OECD: 51%) for mothers with children aged < 3 years, 64% (OECD: 63%) for mothers with children aged 3-5 years and 66% (OECD: 66%) for mothers with children aged 2-14 years (*OECD Family Database*; all data refer to 2008).
7. Average taxes when moving from single- and dual-earner couples increase by between 5 and 21% in Germany. By contrast, they decrease by between 16 and 23% in the average OECD country. This simulation compares the average net payments to government of a single-earner couple with two children aged 6 and 11 earning 133% (200%) of the average wage with a dual-earner couple (where earnings are equally distributed): the net transfers of the dual-earner couple are 5% (21%) higher than in the single-earner case; by contrast, in the average OECD country net transfers decline by 23% (16%) when switching from single-earner to dual-earner couples (source: *OECD Family Database*).
8. The German constitutional court ruled in 1957 that married couples should not be disadvantaged relative to non-married couples and that an equal share of the total household earnings belongs to each person in a marriage. Before 1957, both incomes were added and taxed in the progressive system; this resulted in a tax disadvantage for married persons as both incomes would be subject to the higher marginal tax rate. Reforms led to the current joint taxation system which satisfies the constitutional court ruling requirement by allowing a notional transfer from the higher-income to the lower-income spouse (of half the difference between both incomes). However, it is not the only system that satisfies the constitutional requirement; the notional transfer notably could be smaller than currently.
9. *Sachverständigenrat* (2007) argues that in limited real income splitting the transfer from one partner to the other must be at least EUR 15 000 as this is roughly the legal support payment for divorced couples (the paying partner can deduct it from his income, the receiving partner pays taxes on it). If individual taxation is coupled with transfers lower than this amount, divorcing could become fiscally attractive which may counter the constitutional protection of marriage.
10. This difference is not offset by informal care (e.g. provided by relatives, friends, neighbours, babysitters or nannies) as such arrangements are used by only 15% of children, fewer than in most other OECD countries (*OECD Family Database*, PF3.3).
11. Wage subsidies were introduced in 2007 for older workers accepting a job which pays less than their unemployment benefits or facing the risk of being laid off unless they accept a reduction in wage resulting in a net wage below their unemployment benefits they are eligible for. The scheme is set to expire end 2011.
12. The German pension system is a point system (each year worked provides one point). The legal retirement age is progressively increased to age 67 but early retirement is possible from age

63 with 35 years of contributions with reduced benefits and from age 65 without deductions after 45 years of contributions. A 6% increment for each year of additional work is provided after the age of 67.

13. In addition to subsidies, integration vouchers have been introduced in 2008 for all older workers unemployed for at least 12 months. Wage subsidies are found to increase the likelihood of employment (IAB, 2006).
14. Graduates from secondary schools in those German *Länder* that charge tuition are no less likely to attend university than those in *Länder* which do not charge such fees (Jaeger and Heine, 2010).
15. The Higher Education Pact 2020, amounting to EUR 4.7 billion in its second phase 2011-15, is a response to the increasing demand of the labour market for high skilled persons, to the demographic development and the increase of new entrants into higher education due to the shortened duration of secondary schooling and the suspension of compulsory military service.
16. The government is considering reforming the educational system in this direction and will allocate EUR 250 million (0.01% of GDP) between 2011 and 2020 to the project "Aufstieg durch Bildung: Offene Hochschulen" ("Advancement through Education: Open Universities").
17. In 2010, 1.9% of the new tertiary students came from the vocational education system compared to 1.3% in 2009 and 0.4% in 2000. Since 2009, graduates with advanced vocational qualifications (with the Master craftsman (Meister), technician or Fachwirt titles) have full access to university. Graduates from upper secondary vocational programmes with 3 years of work experience have access to tertiary education in relevant subjects. In addition, the recognition of knowledge and skills acquired outside of the higher education system has been integrated into the higher education provisions of all *Länder*. Advanced training programmes for working adults are also implemented at the regional level.
18. A survey sponsored by the Council for Integration and Migration shows that 60% of those surveyed are in favour of more migration of skilled workers in order to overcome labour shortages.
19. Burkert et al. (2008) show evidence for discretion in permits attribution in Germany.
20. High-skilled workers still need to have a specific job offer with the same work conditions according to German standards to obtain a permit.
21. Young high-skilled can get a temporary work permit by passing the labour market test but do not benefit from this pathway, as the average starting salaries for a bachelor's degree is EUR 38 000, and less than EUR 40 000 for a Master's degree ([www.alma-mater.de/img/almamater-PDF/Unternehmen-Gehaltsstudie-2011-final.pdf](http://www.alma-mater.de/img/almamater-PDF/Unternehmen-Gehaltsstudie-2011-final.pdf)).
22. The average wage of a full-time employee in 2011q1 was around EUR 39 200, so the threshold to get a Blue Card would be EUR 58 800. However, as the Blue Card is a temporary work permit and needs to be renewed at least after four years, high-skilled workers will not benefit from a permanent permit as is currently the case for those earning more than EUR 66 000 per year.
23. In 2007, less than 50% of international students changed status for work-related reasons while it was a majority in other OECD countries (OECD, 2010c).
24. The OECD and UNESCO provide guidelines on how to facilitate the recognition of foreign qualifications and diplomas (OECD, 2005, *Guidelines to Quality Provision in Cross-border Higher Education*).

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## ANNEX 1.A1

*Estimating Okun's law for Germany*

The negative relationship between movements in the unemployment rate and real GDP is referred to as Okun's law, following Okun (1962) who originally estimated for the US that a 3 percentage points decline in output is typically associated with a 1 percentage point rise in the unemployment rate. Studies typically find that the Okun coefficient differs across countries and over time with differences and changes in labour market institutions (such as EPL) having a large influence (IMF, 2010). In general, the Okun coefficient is found to have increased over time across countries as labour markets have become more flexible.

There are several alternative ways to estimate Okun's law (Knotek, 2007): in the static difference approach, the change in unemployment is regressed on the contemporaneous change in real GDP. The dynamic approach instead takes into account the fact that unemployment tends to react with a lag to changes in output. Estimations along these lines mostly include also lags of the dependent variable in order to eliminate serial correlation in the error terms. The standard specification for this approach, which is applied here to Germany, is:

$$\Delta unr_t = \alpha + \sum_{s=0}^{\infty} \beta_s \Delta gdp_{t-s} + \sum_{i=1}^{\infty} \gamma_i \Delta unr_{t-i} + \varepsilon_t, \text{ Okun coefficient} = \frac{\sum_{s=0}^{\infty} \beta_s}{1 - \sum_{i=1}^{\infty} \gamma_i}$$

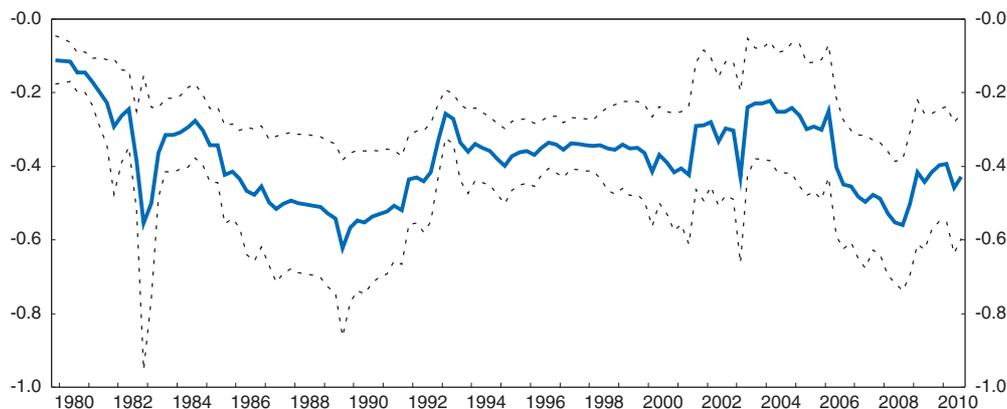
with  $unr$  being the unemployment rate and  $gdp$  the log level of real GDP.

The sample period covers 1970 to 2010 at a quarterly frequency and the optimal lag length according to the Akaike criterion for GDP was 1 and 2 for the unemployment rate, respectively. The equation contains in addition a dummy variable that takes the value of 1 in 1991q1 to account for a break in the series due to unification. When estimated over the whole sample period, the Okun coefficient is calculated at  $-0.35$ , i.e. a 1% decline in GDP growth is associated with a 0.35 percentage point increase in the unemployment rate, respectively. Applied to the latest crisis, the peak to trough output loss of 6.6% between the first quarters of 2008 and 2009 would have translated into an increase in the unemployment rate by 2.3 percentage points, compared with an actual increase of  $\frac{1}{2}$  percentage point.

This point estimate, however, masks significant changes over time in the Okun relationship. To analyse the time-variability of the Okun coefficient, rolling regressions using a ten-year window were estimated (applying the same specification as above). Results show significant fluctuations in the coefficient over time, possibly reflecting the impact of labour market reforms at different points in time (Figure 1.A1.1). The coefficient

notably decreases – that is, becomes more negative – somewhat in the years preceding the crisis; therefore, one would have expected an even stronger response of unemployment to the output loss than during the 1990s, for example.

Figure 1.A1.1. **The German Okun coefficient over time**



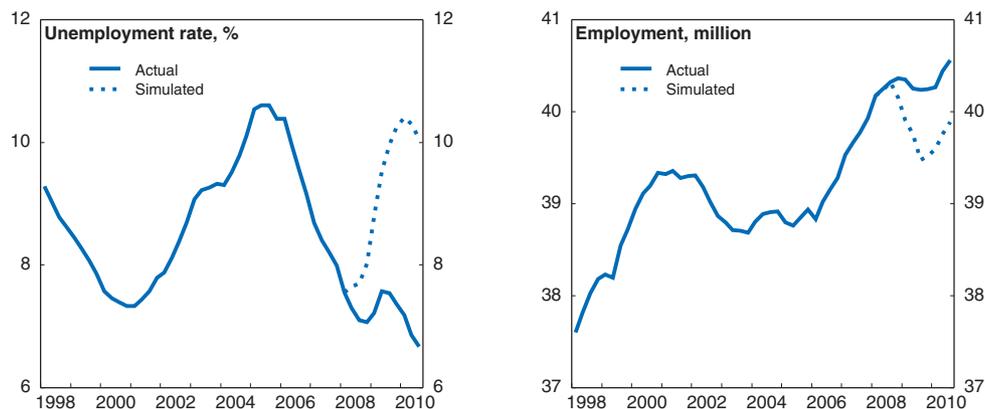
Note: Estimations were done using a 10-year rolling window with the coefficients referring to the 10-year period just prior to the date marked on the x-axis. Dotted lines denote estimated standard deviations.

Source: OECD calculations.

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Applying the Okun coefficient estimated over the 10 years up to the first quarter of 2008 to the crisis period exemplifies that such a model would have predicted a much more pronounced increase in the unemployment rate than actually happened (Figure 1.A1.2, left panel). The difference between the predicted and the actual unemployment rate increase amounts to 2.8 percentage points. A similar exercise can be done using employment instead of unemployment – thus abstracting from changes to the labour force that may impact the unemployment rate. Again estimating a relationship over the ten years preceding the crisis and on this basis simulating employment throughout the crisis would have suggested an employment decline by 2% relative to the actual outcome (equivalent to around 750 000 jobs) (Figure 1.A1.2, right panel).

Figure 1.A1.2. **Actual vs. simulated labour market outcomes**



Note: In Panel A, coefficients were estimated over the period 1998q1 to 2008q1 (using the same specification mentioned in the text) and then applied to the actual real GDP developments (inserting the fitted values for the lagged unemployment rate). In Panel B, coefficients were estimated similar to Panel A, but with log changes in total employment (instead of the unemployment rate) and contemporaneous GDP and lag 2 of GDP.

Note: OECD calculations.

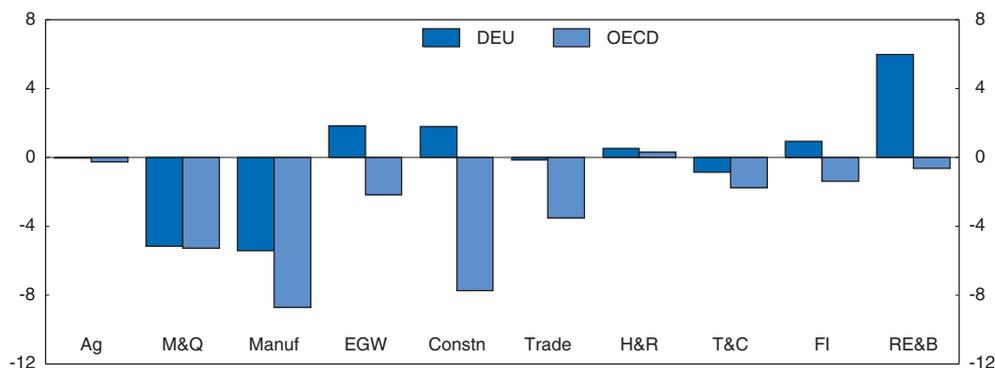
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## ANNEX 1.A2

## The impact of the sectoral composition of the recession on the unemployment response

Employment outcomes differed significantly across sectors in 2008-09: manufacturing employment declined sharply in Germany (though still less than in the average OECD country) along with the quantitatively less important mining and quarrying sector (Figure 1.A2.1). By contrast, employment increased in the labour-intensive construction, energy and services sectors, while the average OECD country registered sharp declines. Employment in wholesale/retail trade was flat, compared to sharp decreases in other countries.

Figure 1.A2.1. **Change in employment by sector**  
% change between 2008Q4 and 2009Q4



Note: OECD is EU15 (excluding Luxembourg), Australia and USA. Sectors: Ag: Agriculture, forestry and fishing; Trade: Wholesale and retail trade; vehicle repair; M&Q: Mining and quarrying; H&R: Hotels and restaurants; Manuf: Manufacturing; T&C: Transport and communication; EGW: Electricity, gas and water supply; FI: Financial intermediation; Constn: Construction; RE&B: Real estate and business activities.

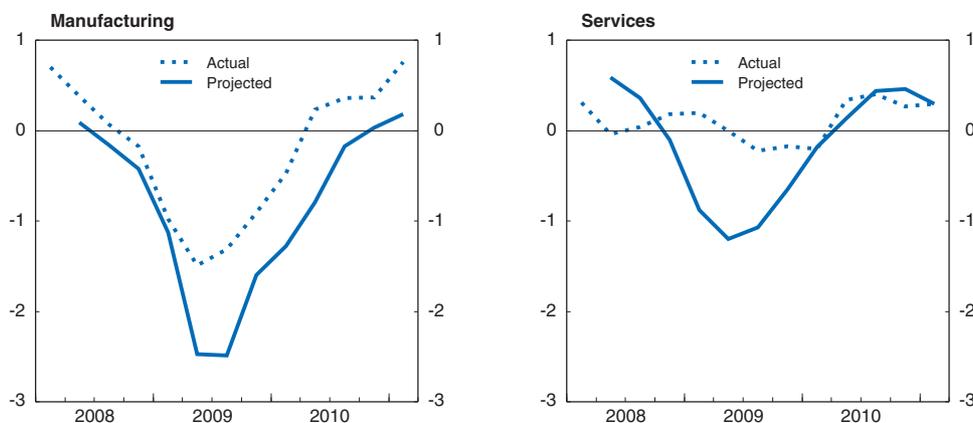
Note: OECD, *Employment Outlook 2010*.

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However, the sectoral structure of the crisis does not fully explain the overall employment reaction; this is because even within the sectors, layoffs were smaller than would have been projected based on past relationships (Figure 1.A2.2). Projected employment is simulated using coefficients from a regression of log changes in manufacturing (services) employment on its own lags and on log changes in gross value added in manufacturing (services) with the lag structure being based on the Akaike

criterion. The sample period for the estimation is 1991q2 to 2008q1. The results show that, based on past experience, the projected employment decline given the decrease in value added would have been twice as large. In the services sector, employment was broadly stable, even though past experience would have suggested a decline. This reflects notably a structural increase in public sector service employment, such as in the areas of health and education, which continued during the crisis.

Figure 1.A2.2. **Actual versus projected quarterly employment growth across sectors**



Note: Projected employment is simulated using coefficients from a regression of log changes in manufacturing (services) employment on its own lags and on log changes in gross value added in manufacturing (services) with the lag structure being based on the Akaike criterion. The sample period for the estimation is 1991q2 to 2008q1.

Source: OECD, own calculations based on national accounts data.

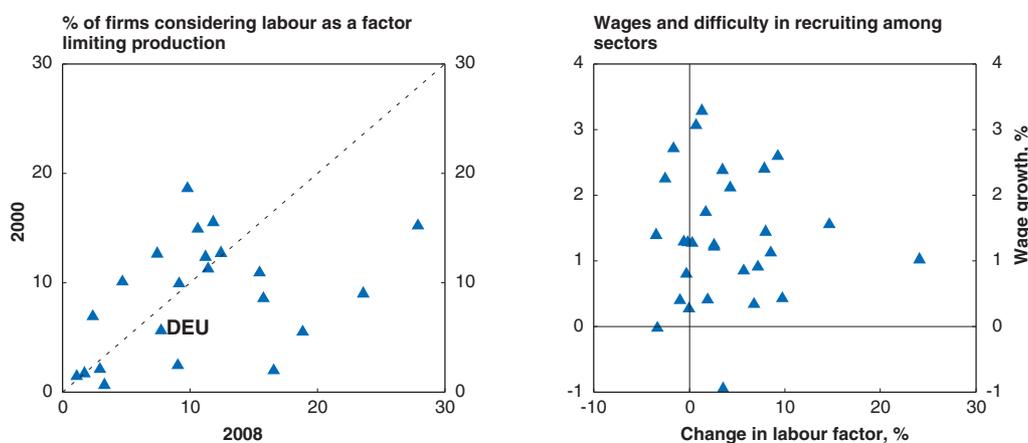
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## ANNEX 1.A3

## The impact of labour shortages on labour market outcomes

Even though German firms hit by crisis were those having a particularly high growth rate and experiencing significant labour shortages before the crisis (Möller, 2010), labour shortages were not exceptionally prevalent on an economy-wide level before the crisis. For instance, when considering the percentage of firms declaring labour as a barrier to production in the European Commission Business Survey, Germany was not particularly outstanding compared to other OECD countries with only 8% of firms seeing difficulties to recruit (close to the European average, Figure 1.A3.1, left panel). The same indicator did not show any particular trend increase. The percentage of firms having difficulty in recruiting is highly cyclical and reached a comparable level in 2000 and in 2008. Other indicators for labour market tightness, such as the number of vacancies (both compared to the number of unemployed or to the total number of jobs), had levels ahead of the crisis that were comparable to past upturns. In addition, wage developments do not support the view that labour shortages were widespread before the crisis. For example, wages did not increase more in the sectors where recruitment difficulties were rising (Figure 1.A3.1, right panel).

Figure 1.A3.1. Indicators of labour shortages



Note: Data in the left panel refer to manufacturing firms. In the right panel shows the link between the change in the share of firms considering labour as a barrier to production (labour factor) and the annual growth rate of wages by sector in Germany between 2000 and 2008 (2004/2005 to 2008 for services sectors).

Source: EC Business Climate Indicators, OECD STAN Database for Structural Analysis.

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Cross-country empirical analysis also suggests labour shortages only played a minor role in damping the unemployment response during the crisis. In theory, the importance of labour market tightness on unemployment response is uncertain. Labour shortages may limit the turn-over on the labour market and in particular increases in unemployment during downturns as employers could limit lay-offs to spare recruitment costs which are higher when shortages are prevalent (in particular, the opportunity cost of not being able to hire when the activity recovers). However, other economic mechanisms could limit its effects as a high level of labour shortages may induce a higher unemployment rate through three mechanisms. *First*, labour shortages may increase wages by developing competition between firms for labour and thus weigh on cost competitiveness. *Second*, they may encourage labour market participation.<sup>1</sup> *Third*, they lower potential growth by limiting the creation and development of new firms.<sup>2</sup>

Two approaches are used here to assess the impact of labour shortages on the unemployment response. *First*, an extended Okun's law is estimated to test whether labour shortages could partly explain the significant gap between the actual unemployment rate and the unemployment rate predicted by Okun's law (see estimates in Annex 1.A1). The level of labour shortages – approximated by the share of firms considering labour as a factor limiting production in the manufacturing sector (European Commission Business Survey) – is included in the standard specification for the Okun relationship linking the change in unemployment to the change in GDP.<sup>3</sup>

$$\Delta u_t = 0.31 \cdot \Delta u_{t-1} - 0.10 \cdot \Delta \log(gdp_t) - 0.08 \cdot \Delta \log(gdp_{t-1}) - 0.01 \cdot ls_{t-1}$$

(0.03)                      (0.01)                      (0.01)                      (0.00)

with  $u$  being the unemployment rate,  $gdp$  the level of gross domestic product (in volume),  $ls$  the percentage of firms considering labour as a barrier to production in the manufacturing sector, and standard errors in parentheses.

The second approach consists of estimating an employment equation using an Error Correction Model specification. This approach allows for testing the long- and short-run relationships between labour shortages and the employment level, partly reflecting employer's hiring decisions. The specification is derived from a CES production function, linking hourly labour productivity to labour costs, but including the proxy for labour shortages:

$$\Delta \log e_t = 0.26 \cdot \Delta \log(e_{t-1}) + 0.11 \cdot \Delta \log(gdp_t) + 0.09 \cdot \Delta \log(gdp_{t-1}) - 0.04 \cdot \Delta \log(w) + 0.01 \cdot (ls_{t-1} - ls_{t-4}) - 0.04 \cdot resid_{t-1}$$

(0.03)                      (0.01)                      (0.02)                      (0.01)                      (0.00)                      (0.01)

$$resid_t = \log(e_t) - 0.36 \cdot \log(gdp_t) + 0.52 \cdot \log(h_t) + 0.10 \cdot \log(w_t) - 0.09 \cdot ls_t + 8.60$$

(0.01)                      (0.08)                      (0.02)                      (0.03)                      (0.91)

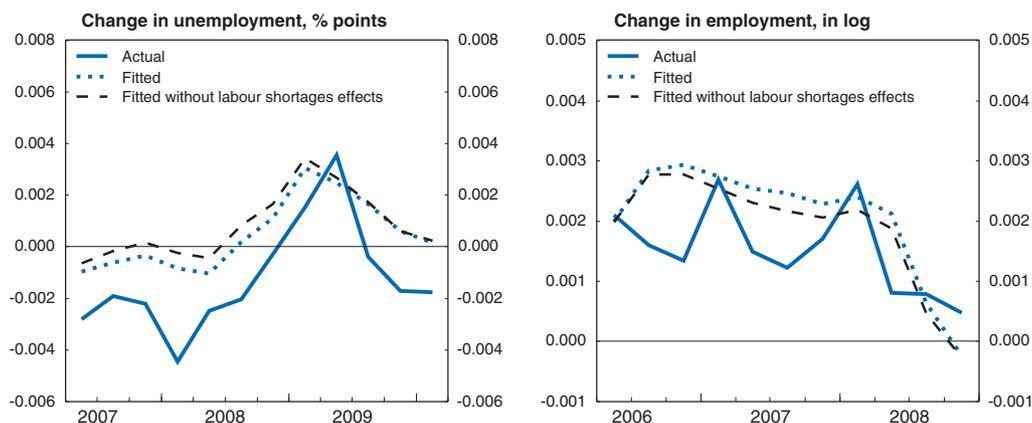
with  $e$  being the level of total employment,  $gdp$  the level of gross domestic product (volume),  $w$  the real compensation rate of the private sector,  $h$  the number of hours worked per employee,  $ls$  the percentage of firms considering labour as a barrier to production in the manufacturing sector, and standard errors in parentheses.

These equations are estimated for a sample of 21 EU countries over the period 1996q2 to 2010q1. The sample is unbalanced with quarters not covered for all countries. The equation is estimated with OLS including country fixed effects, which control for country-specific explanatory variables such as institutions and labour market policies. Other specifications have been tested. The lags of explanatory variables which were not statistically significant were removed from the final equation. Results are unchanged when extending the indicator of labour shortages to other sectors covered by the Business Survey and when taking the moving average of the indicator over one year.

While the level of labour shortages in the manufacturing sector is found to have a significant negative impact on the change in unemployment, it is rather small. A one point increase in the share of firms having difficulties to recruit reduces the quarterly growth rate of unemployment by only 0.01 percentage point. Similar results are obtained for employment, showing a small but significant positive effect of labour shortages on employment growth, suggesting that labour demand decreases less during downturns when firms had difficulties to recruit.

Neither employment growth nor the unemployment response seems to have been strongly influenced by labour shortages in Germany during the crisis. Applying the coefficients estimated to the crisis period shows that the unemployment rate would have been only slightly higher (and employment lower) without the labour shortages effect (Figure 1.A3.2). For instance, the level of labour shortages reduced quarterly unemployment growth by only 0.001 percentage point in 2008. This result is supported by other studies which find labour shortages played no, or only a minor, role in labour hoarding decisions (Klinger *et al.*, 2011).

Figure 1.A3.2. **Impact of labour shortages on unemployment and employment growth**



Note: In the left panel, fitted values correspond to quarterly change in unemployment rate (in percentage points) estimated with the first specification. In the right panel, fitted values correspond to quarterly change in employment (in logarithm) with the second specification. The dotted lines correspond to the fitted value without the contribution of the labour shortages (without the short run effect for the right panel).

Source: OECD calculations.

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## Notes

1. Labour participation may increase due to higher wage level and higher probability to be employed when the labour market is tight.
2. Labour shortages have an impact on relocation decisions and domestic investment (Marin, 2004).
3. More details on the Okun's law are available in Annex 1.A1. The vacancy rate or the labour market tightness indicators were not selected here to approximate the level of labour shortages because of endogeneity issues.



## Chapter 2

# Climate change policies: make ambition pay

*Germany reduced greenhouse gas emissions substantially but remains an important emitter. Ambitious targets for climate change mitigation have been fixed and a broad range of environmental measures are being implemented. The efficiency of these measures, as well as their coordination, should be improved though, as reaching the targets risks being costly. In particular, the early phase-out of nuclear power and the development of renewable energy sources will require high levels of investment and public financial support. Establishing a clear carbon price in all sectors of the economy and phasing out environmentally harmful subsidies would contribute to reducing the CO<sub>2</sub> abatement cost. The generosity of feed-in tariffs also needs to be carefully monitored and adjusted tightly in line with market developments to avoid deadweight losses and excessive increases in electricity prices. In addition, in order to maintain the German leadership in green sectors and preserve future sources of growth, competition in the energy sectors should be increased and eco-innovation further developed.*

Despite significant reductions in greenhouse gas (GHG) emissions over the past two decades, Germany remains one of the largest GHG emitters in the OECD, partly due to an emission-intensive energy mix. Germany has committed itself to become one of the most energy-efficient economies in the world and fixed ambitious targets for GHG abatement going beyond the EU requirements regarding climate change mitigation. On the one hand, achieving these objectives may stimulate economic growth, notably by reducing the vulnerability of the economy to energy price volatility and by fostering innovation. In particular, ambitious environmental policies may contribute to increasing the comparative advantage of the industry in green sectors, as was the case in the past. On the other hand, reaching the targets can be costly, not least with the early phase out of nuclear power which will deprive the electricity sector of low carbon generation capacities. Thus, implementing cost-efficient climate change policies and supporting competitiveness in green sectors will be crucial for Germany in order to reap the benefits from climate change mitigation.

This chapter analyses the climate change policy framework in Germany, focusing on its cost-efficiency and on the measures which will maximise the economic gains to be drawn from meeting its environmental objectives. The first section details the past performance as well as the challenges Germany is facing. The second section analyses German climate change policies and presents options for improving their cost-efficiency. The last section discusses reforms which would help Germany to further exploit environmentally friendly sources of growth.

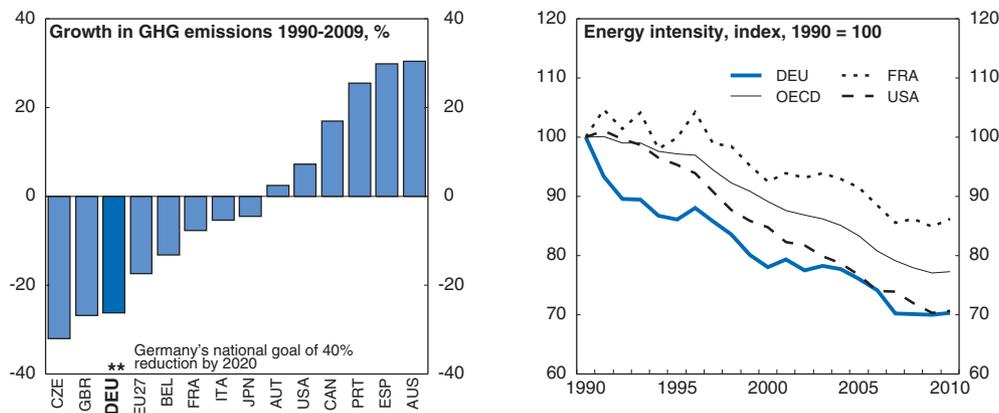
## Germany has committed itself to challenging reductions in greenhouse gas emissions

***Germany substantially reduced GHG emissions but remains an important emitter  
Germany is on track to achieve its Kyoto commitment...***

Germany is on track to achieve its Kyoto commitment for 2012 (a 21% GHG reduction from the 1990 level) as GHG emissions were 26% below the 1990 baseline already in 2009 (Figure 2.1, left panel). This is one of the best performances among high-income OECD countries and, overall, less than half of OECD countries have achieved a comparable result. The largest reductions occurred in manufacturing and in the construction sector with a decrease in emissions of more than 40%, one third higher than the average decline in the EU15. In addition, contrary to many other OECD countries, emissions were reduced in the transport sector, notably in road transportation. Mitigation was less pronounced for electricity and heat production but still slightly higher than the EU15 average and contributing strongly to the GHG abatement, given its large share of total emissions.

Germany has also decoupled energy consumption from economic growth. Despite significant GDP growth since 1990, primary energy use has been reduced by 6% and energy intensity has decreased on average by 1.7% per annum (Figure 2.1, right panel). The restructuring of the economy after reunification contributed to the decline in energy use, notably the collapse of inefficient firms in east Germany after 1990 (OECD, 2001). Carbon emissions were reduced by the switch from petrol to diesel cars and from heating oil to natural gas, which are less carbon intensive (Destatis, 2011). Higher energy prices as well as European and national environmental policies, such as the implementation of the eco tax and energy standards in the automotive sector, also played a role by creating incentives for energy savings (OECD, 2011a).

Figure 2.1. **Change in greenhouse gas emissions and energy intensity**



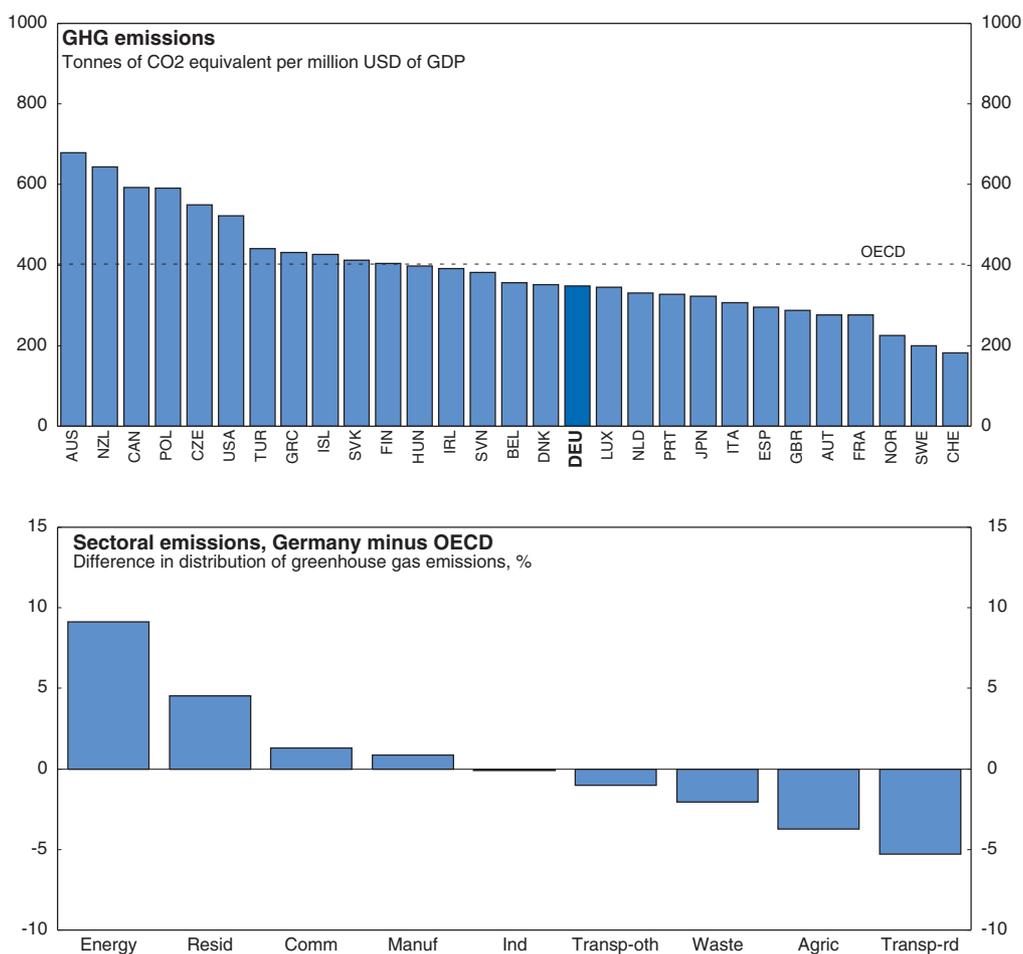
Note: Energy intensity is measured as total primary energy supply/GDP (toe per thousand USD at 2000 PPP).  
 Source: United Nations Framework Convention on Climate Change (UNFCCC); Bundesregierung(2010), "Energy Concept, For an Environmentally Sound, Reliable and Affordable Energy Supply", Berlin; IEA, *Energy Balances of OECD Countries*, 2011 edition.

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### ... but remains one of the main GHG emitters in the OECD...

Germany produced roughly 20% of total EU27 CO<sub>2</sub> emissions in 2009 (with around 920 Mt CO<sub>2</sub> equivalent) making it the largest national emitter in the European Union and the third largest in the OECD after the United States and Japan. In terms of emissions per capita or relative to the GDP level, Germany is below the OECD average but above the EU27 average (Figure 2.2, upper panel and Table 2.1). GHG emissions are particularly concentrated in the energy sector: electricity and heat production accounted for 37% of total emissions in 2009, one third higher than the OECD average (Figure 2.2, lower panel), with around 4 tonnes CO<sub>2</sub> equivalent emitted per capita compared to 3 tonnes on average in the OECD. When excluding emissions from electricity and heat production, Germany is the third lowest emitter in the OECD on a per GDP unit basis.

Figure 2.2. **Greenhouse gas emissions: international comparison and sectoral distribution, 2009**



Note: GDP used is in 2005 constant prices at purchasing power parity. OECD is the average of countries in the top panel. Sectors in the second panel are: Energy, Resid: Residential, Comm: Commercial/Institutional, Manuf: Manufacturing/Construction, Ind: Industrial Processes, Transp-rd: Road Transportation, Transp-oth: Other transports, Waste: Waste, Agric: Agriculture.

Source: United Nations Framework Convention on Climate Change (UNFCCC); OECD, National Accounts Database.

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### ... not least due to an emission-intensive energy mix

The relatively high emission intensity of the German economy is not due to a high level of energy consumption but rather to a carbon intensive energy mix. Despite a relatively high share of energy-intensive industries (Figure 2.3, upper panel), energy intensity is not particularly high in Germany by international comparison (Table 2.1). However, GHG emissions per unit of energy consumption stand slightly above the EU27 average (Table 2.1). In particular, the CO<sub>2</sub> content of electricity production is quite high by international standards: with 0.6 CO<sub>2</sub> tonnes per MWh produced, electricity production in Germany is over six times more carbon intensive than in France and two times more than in Belgium (Egert, 2011). This is due to a relatively high share of fossil fuels, and in

Table 2.1. **Decomposition of GHG emission levels in 2009**

	GHG/Population	GHG/GDP	GHG/Energy	Energy/GDP
Sweden	6.5	0.20	1.9	0.11
Spain	8.3	0.30	4.0	0.07
Italy	8.3	0.31	3.9	0.08
France	8.4	0.28	3.3	0.08
United Kingdom	9.2	0.29	4.3	0.07
<b>European Union 27</b>	<b>9.3</b>	<b>0.34</b>	<b>4.0</b>	<b>0.09</b>
Japan	9.5	0.32	3.9	0.08
Austria	9.6	0.28	3.0	0.09
Norway	10.8	0.23	2.6	0.09
Greece	10.9	0.43	6.0	0.07
<b>Germany</b>	<b>11.1</b>	<b>0.35</b>	<b>4.1</b>	<b>0.08</b>
Denmark	11.4	0.35	4.4	0.08
Finland	12.5	0.40	2.7	0.15
<b>OECD total</b>	<b>13.4</b>	<b>0.42</b>	<b>4.3</b>	<b>0.10</b>
Ireland	14.5	0.39	5.5	0.07
Canada	20.7	0.59	3.6	0.17
United States	21.5	0.52	4.5	0.12

Note: OECD total refers to the OECD countries except Chile, Israel, Korea, and Mexico. GHG refers to GHG emissions in tonnes of CO<sub>2</sub> equivalent, GDP refers to GDP in thousand USD using PPP exchange rates for the year 2005, and energy refers to total final energy consumption in ktoe.

Source: UNFCCC; IEA Energy Balances of OECD Countries, 2011 edition; OECD Population Statistics and National Accounts Database.

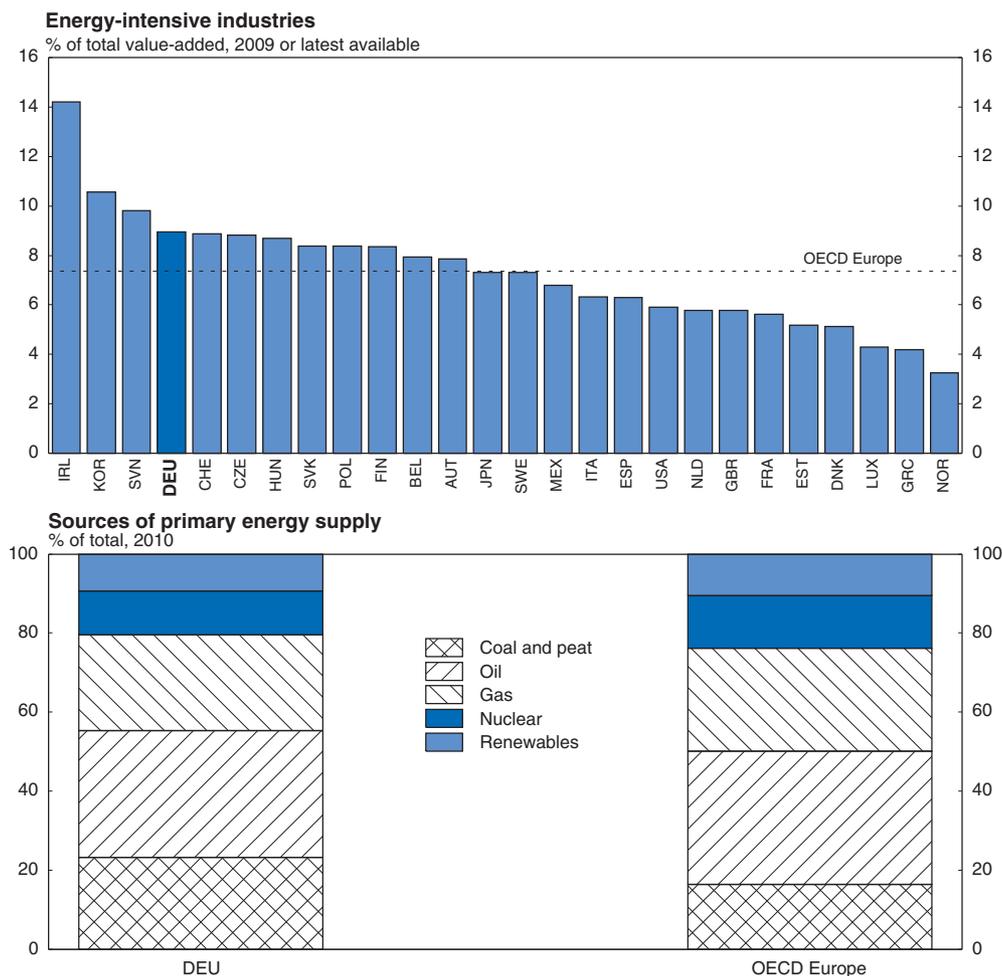
particular coal, in the energy mix (Figure 2.3, lower panel). Around 23% of the energy supply is composed of coal and peat, seven percentage points more than in the European OECD countries.<sup>1</sup> In addition, while the share of renewable energy sources increased significantly since 2000, thereby contributing to the reduction of CO<sub>2</sub> emissions in the energy sector, the share of hard coal in primary energy supply decreased only slightly (from 25% in 2000 to 23% in 2010). This suggests Germany has room to reduce emissions in the energy sector at a relatively low marginal abatement cost, notably by replacing polluting coal-fired power plants with low-carbon electricity generation.

### **Germany has fixed ambitious targets for 2020**

#### **Germany has committed itself to significantly reduce GHG emissions by 2020...**

Germany has set itself ambitious targets for GHG emissions, energy efficiency, and renewable energy sources, confirming its leadership role in promoting ambitious climate policy (Weidner and Mez, 2008). In the framework of the EU effort-sharing under the Kyoto Protocol, Germany has committed itself to cutting its emissions of climate-damaging gases by a total of 21% in the period 2008 to 2012 compared with 1990, taking a large share of the total 8% target of emission reductions set by the EU. More recently, the two main programmes defining the climate change and energy strategies – the Integrated Energy and Climate Program (2007) and the Energy Concept (Bundesregierung, 2010) – set national targets going even beyond the EU requirements to reduce GHG:

- The EU commitment for Germany is a 14% reduction by 2020 compared to 2005 levels in the sectors not covered by the EU Emissions Trading Scheme (EU ETS). The EU also set a 21% reduction of emissions in the sectors covered by the EU ETS compared to 2005 at the EU level. Germany has pledged to reduce its overall domestic GHG emissions by 40% by 2020 compared with 1990 and by 80% in 2050.

Figure 2.3. **A carbon intensive energy mix and an energy intensive industry**

Note: Energy-intensive activities refer to pulp/paper, chemicals, minerals and metals (ISIC Revision 3 codes 21 to 28). Data refers to 2008 for France, Germany and Switzerland and 2007 for Poland and the United Kingdom. Renewables are hydro, geothermal, solar/wind/other and combustible renewables and waste. Total excludes electricity and heat. Data for 2010 are estimates.

Source: IEA, *Energy Balances of OECD countries*, 2011 edition; OECD STAN Database.

StatLink <http://dx.doi.org/10.1787/888932560151>

- The EU also set a 2020 target of reducing primary energy use by 20% compared to 2007. Germany goes further by committing itself to reduce primary energy consumption by 20% by 2020 and by 50% by 2050 compared with 2008.
- The share of renewable energy sources (RES) in final energy consumption should increase to 20% in 2020 at the EU level. For Germany, the EU commitment is 18% of final energy consumption from RES by 2020 (from 5.8% in 2005). The government fixed a 35% target for electricity consumption by 2020 (50% by 2030 and 80% by 2050) and a 30% target for final energy consumption by 2030 (60% by 2050).

### ***The targets may create inefficiencies at the EU level...***

Defining national targets for GHG abatement that go beyond EU requirements may create some inefficiency: they may not contribute to higher climate change mitigation at the EU level but instead risk increasing its cost. Trying to over-achieve the targets fixed by

EU commitments is inefficient if it requires reducing emissions in those sectors that are already covered by the EU ETS on top of the abatement induced by the ETS allowance price (OECD, 2011b). As emissions are capped under the scheme, such a policy would not have any impact on total GHG emissions at the EU level, as lower German emissions create room under the cap for higher emissions elsewhere. The overall CO<sub>2</sub> abatement cost in the EU could rise as the cost of cutting emissions in Germany rose above those in other European countries. To achieve more GHG emission reductions under the EU ETS, options for Germany would be to buy permits with a strong commitment not to use them or to push for a tighter cap at the EU level. For the moment, these options are not considered by the government and it is not clear in which sectors emissions will be reduced.

In addition, having both a target for renewable energy sources and for GHG emissions puts constraints on the way emissions are reduced and increases the abatement cost in consequence. In particular, support for the expansion of renewable energy sources will reduce emissions in the EU ETS sectors beyond the CO<sub>2</sub> price effect, damping the net efficiency of the scheme (Traber and Kemfert [2009] estimate that the feed-in tariffs supporting the development of RES in Germany reduce the EU ETS allowance price by 15%). The ETS and the renewable energy support policies are, however, complementing each other as the price mechanism of the ETS is favouring least-cost options of CO<sub>2</sub> abatement while renewable energy policies are pushing new low carbon technologies that are essential for cost effective abatement in the long term.

### ***... but are supported by national objectives***

Such an overlap in targets and in instruments may also be justifiable as the objective of climate mitigation policies (including energy policy) goes beyond GHG abatement. For instance, the aim of the strategy set by the government in its Energy Concept is to make Germany “one of the most energy-efficient and greenest economies in the world while enjoying competitive energy prices and a high level of prosperity” (Bundesregierung, 2010). This includes providing a reliable, secure and affordable energy supply, maintaining Germany’s competitiveness in energy technologies and developing new comparative advantages through innovation as well as signalling the political will of the government and providing certainty to producers and consumers on future environmental policies. Such an objective also reflects national preferences for the level of emissions and pollution more broadly as well as a political choice regarding the energy mix.

The implementation of ambitious climate change mitigation policies is strongly supported by public opinion. According to a recent survey on environmental awareness in the German population, Germans consider climate change as the third most important policy area, after labour market and fiscal policy, and are convinced that more action against climate change is needed (UBA, 2010a). In particular, around 75% of the population expect the government to implement more stringent laws and the withdrawal of environmentally harmful subsidies. In addition, according to Gallup, almost 60% of Germans support efforts to preserve the environment, compared to an OECD average of 50%. One factor behind the high public support may be knowledge of the costs of non-action, which DIW (2008) estimates to reach around EUR 800 billion by 2050 (more than 30% of GDP). The conviction that climate change policies generate new sources of growth also plays a major role in public acceptance.

### ***The target is ambitious given the slowdown in GHG emissions reduction***

Achieving the targets will be challenging as Germany may not benefit further from one-off reductions as in the past. While climate change mitigation policies contributed to reducing GHG emissions, a significant share of past abatement was due to specific events and structural changes. During the 1990s, 50% of the reduction of CO<sub>2</sub> emissions occurred thanks to the restructuring of the east German economy following reunification (Eichhammer *et al.*, 2001; Weidner and Mez, 2008). Inefficient heavy industries located in the new *Länder* collapsed, inducing a reduction by 44% of CO<sub>2</sub> emissions in that region (OECD, 2001). Outsourcing of manufacturing industries to eastern European countries as well as an increasing import penetration probably also contributed. As a result, emissions were already reduced by 16% in 1999 with a significant drop of 8% between 1990 and 1992. Over the past decade, the main reduction occurred during the recession in 2008-09, with a 9% decline between 2007 and 2009. Between 2000 and 2007, emissions were only reduced by 6% as they stabilised in many sectors or even increased in a few others (for instance in the chemicals industry).

Given the importance of these special factors, Germany may not be able to meet its commitments without an acceleration of GHG abatement in the coming years. Reducing emissions by 40% by 2020 would require increasing the annual pace of reduction to 2% (from 1.5% per year between 1990 and 2009). Furthermore, with the economic recovery and in the absence of additional policy actions, emissions have increased. According to current estimates, while remaining below their 2008 level, CO<sub>2</sub> emissions in Germany rose in 2010. In addition, the package of measures defined in the Integrated Energy and Climate Programme and in the Energy Concept may not be sufficient to reach the targets.<sup>2</sup> Finally, the recent decision of an accelerated phase-out of nuclear power will add in a constraint on GHG abatement.

### ***... and the early phase-out of nuclear power***

After the Japanese nuclear catastrophe in March 2011, the government decided to accelerate the phase-out of nuclear power, reversing its 2010 decision to increase the lifespan of nuclear power plants. This plan is broadly in line with the initial one decided ten years earlier (Box 2.1). The definitive closure of seven old reactors, accounting for around 8% of power generation capacities, created some tensions in European electricity networks, as German electricity imports increased significantly to compensate for the losses in generation capacities. Therefore, the nuclear phase-out will make the management of European electricity networks more challenging, especially in the coming winters when demand will peak, and thus weigh on electricity prices. In the longer term, the impact on prices is quite uncertain but should be limited. Studies suggest the increases in electricity prices will be weak as imported electricity is less expensive than domestic electricity and as wholesale prices account for only a low share in consumer prices (Samadi *et al.*, 2011). According to DIW estimates, the consumer price should increase only by 1.5% in 2011 and by 5% with the complete phase out of nuclear power (DIW, 2011). The main uncertainty comes from the cost of the investment needed to ensure a secure energy supply, which is difficult to assess.

Overall, the phase-out of nuclear power means that Germany will have to adjust its energy policies to compensate for the loss of a low carbon energy source and ensure a reliable energy supply. The government plans to accelerate the expansion of RES and to foster energy efficiency gains. The accelerated development of RES requires anticipating investments in infrastructure, in particular for the adaptation and the extension of the

### Box 2.1. **Germany and nuclear power: strong public opposition and a political seesaw**

The decision to phase out nuclear power in Germany dates back to the red-green coalition government in 1999. An agreement in 2000 between the German government and energy utilities (*Atomkonsens*) as well as resulting amendments to the Nuclear Power Act in 2002 set out the terms of this phase out. These included time limits for commercial electricity generation for each existing power station based on an average 32-year lifetime (BMU, 2000). The first nuclear power station was shut down already in 2003 and the last one would have been most likely out of service by 2021 (BMU, 2008a). In October 2010, however, the conservative-liberal government altered the plans of the nuclear phase-out by extending the time limits by an average of twelve years. As a result of the Fukushima nuclear power plant accident in Japan, the nuclear law was changed again. After a three months moratorium in March 2011, including an immediate shutdown of eight nuclear power plants and a security check of each nuclear power plant, the German parliament enacted in July 2011 a definitive nuclear phase out by 2022. This plan is broadly in line with the initial one decided ten years earlier.

Public opposition to nuclear power was always pronounced in Germany, with origins dating back to the student protests of 1968. Public protests against the building of new nuclear power plants date back to the 1970s, culminating in protests with tens of thousands participants at the Whyl plant in 1975, at Brokdorf in 1976, and especially after the nuclear accident in Three Miles Island in the United States in 1979 (Kriehner, 2011). In the 1980s, these protests continued with efforts focused on preventing the construction of reprocessing plants in Wackersdorf and Gorleben. With the foundation of the Green Party in 1980, the anti-nuclear movement had a political platform and public opposition was boosted by the Chernobyl accident in 1986 (Kriehner, 2011). In the 1990s, protests continued with demonstrations against the transportation of nuclear waste to Gorleben (so called *Castor-Transporte*). With the decision in 2002 by the government of the nuclear phase out, the movement seemed to have achieved its targets. However, protests increased rapidly after the government's decision to prolong the reliance on nuclear power in 2010 and especially in the aftermath of the Fukushima accident in 2011.

electrical grid. On the one hand, this will encourage innovation and the development of more advanced technologies in particular because the government will reinforce support to energy research, and thus this may create a “first mover” advantage for Germany. On the other hand, as the technological progress may take time to appear and to adapt to specific needs, anticipating investment also risks deterring the use of more advanced and more efficient technologies (IEA, 2007). This may also force the use of still costly energy sources. In particular, investments in additional fossil fuel power plants will be needed to complement the intermittent energy production from RES. These investments will have to be supported as they may not be profitable in the long run. Contrary to RES, fossil fuel power plants do not have priority access to the electricity grid and would only sell their production at the margin when RES will not be sufficient to satisfy demand. This is creating uncertainty about the production level and about the benefits in investing in these activities. As a result, Germany is envisaging supporting the construction of highly efficient fossil fuel fired power plants which will add to the cost of GHG mitigation.

The early phase-out of nuclear power may increase GHG emissions in Germany, thus raising the gap to reach the 40% emission reduction target by 2020. In the short run, GHG emissions are expected to increase between 9% and 13% in the electricity sector (DIW, 2011; CDC, 2011) as the closure of eight reactors requires increased use of fossil fuel fired power plants, at least temporarily. Also over the longer run, accelerating the phase out of nuclear may increase GHG emissions. By 2020, and in absence of a fundamental technological break-through, doubling of the electricity production from RES and reducing electricity consumption by 10% will not be sufficient to compensate the loss of nuclear capacities, thus additional fossil fuel fired power plants will be required. In addition, balancing and reserve capacities will be needed to complement intermittent and unpredictable renewable energy supply. Furthermore, sufficient energy efficiency gains – which will be essential to limit the recourse to carbon-intensive energy sources – may not be feasible (ZEW, 2011). Indeed, electricity consumption per GDP unit has decreased less than energy intensity and even increased per capita over the past two decades. In addition, technologies used to reduce GHG emissions will increase electricity demand (*e.g.* electric cars, heat pumps, use of IT). According to CDC estimates (2011), the phase out of nuclear may increase emissions in the electricity sector from 4% to 13% in 2020 compared to 2010 depending on the technologies replacing the lost capacities (gas, coal) and assuming that the most efficient technologies available on the market are used (*i.e.* assuming no technological improvement by 2020) (CDC, 2011).

## Climate change policies need to become more cost-efficient

### ***Achieving the targets may be costly for Germany***

Achieving the targets for climate change mitigation and RES development may induce substantive costs in the absence of substantial technological progress in particular because marginal abatement costs rise quickly once the cheapest options are exploited. Theoretical analyses and international experience suggest that despite strong policy commitment, moving away from fossil fuels without nuclear power is costly, not least because other available low-carbon technologies are not yet competitive (OECD, 2009). The public investment needed to reach the targets is estimated at around 1% of GDP per year (KfW, 2011). When assessing CO<sub>2</sub> abatement cost in Germany, evaluations differ significantly. Reducing emissions by 35% by 2020 is estimated to cost on average from EUR –38/t CO<sub>2</sub> to more than EUR 80/t CO<sub>2</sub> (BMU, 2008b; McKinsey, 2007). The differences in estimates are mainly due to assumptions about the technological changes to be expected by 2020 which determine the cost of investment in low-carbon technologies and their performance in energy savings. These results point to the need for implementing cost-efficient policies leading to a reduction of emissions in sectors where marginal abatement costs are the lowest.

### ***Improving the framework of climate change policies***

#### ***Limiting overlaps in instruments***

German policymakers have used a vast panel of instruments to prevent climate change, ranging from industrial agreements to environmental taxes. This accumulation of instruments risks creating inefficiencies. For instance, as mentioned earlier, instruments may overlap as it is the case for the EU ETS and the support for RES development which are both reducing emissions in the energy sector. Complementing instruments may be justified as some instruments are not dedicated to only one objective, such as the RES policy which also aims at technology promotion. Overlaps may, however, also reflect that policy objectives are not clearly defined, reducing the efficiency of the respective

instruments. In addition, instruments do not cover all sectors of the economy. Some sectors do not have any incentives in reducing emissions, despite a large abatement potential (e.g. some export-oriented sectors in agriculture and manufacturing) (OECD, 2011a). Germany should consider further simplifying its climate change policy by first listing instruments used, identifying the externalities they are targeting, assessing whether they are cost-effective in addressing those externalities and identifying potential overlaps and loopholes. When designing the policy, the cost and benefits of the measures envisaged against the objectives they are supposed to serve should be carefully assessed. Particular attention should be given to the interaction with the EU ETS to limit overlaps.

### ***Improving the decision making and evaluation process***

The evaluation and decision making process of climate change policies could be made more transparent and pragmatic (OECD, 2011a). For example, the criteria used to select the abatement measures could be made clearer, as evaluations show that options which are cheaper than those considered in the Integrated Energy and Climate Programme exist (such as the replacement of three to four low efficiency lignite fired-power plants) (BMU, 2008b). Decisions should rely more on analysis, including the calculation of CO<sub>2</sub> abatement costs, to identify the least costly options for mitigation and to target measures accordingly. In addition, evaluations of different programmes were initially not designed to strongly influence decisions on environmental policies as the monitoring process did not rely on interim targets and indicators which would facilitate continued assessment of the impact of policies. Thus, the recent decision to evaluate the implementation of the Energy Concept every year, based on selected indicators in order to make rapid adjustments to the policies possible is a step in the right direction.

### ***Putting a price on GHG emissions***

Putting a single clear price on GHG emissions is a cost-efficient way to encourage emission reductions, as it prices negative externalities related to GHG emissions, encourages polluters to search and adopt less costly abatement options and generates public revenues (de Serres et al., 2010). While Germany uses some market-based instruments for reducing emissions, a clear carbon price is still lacking. The carbon price set by the EU ETS may be too low to encourage abatement in the sectors covered by the scheme. In the other sectors, the Integrated Energy and Climate Programme and the Energy Concept include only few measures aiming at pricing carbon. In addition, Germany still has environmentally harmful policies which blur the price signal. As a result, existing cheap options for CO<sub>2</sub> abatement have not yet been exploited to a sufficient extent.

### ***Industrial self regulation was inefficient***

Germany has used industrial self regulation which had not been successful in reducing GHG emissions but later facilitated the introduction of market-oriented instruments in climate change policy. In the 1990s, the government negotiated agreements with industrial federations on carbon emission and cogeneration development (combined heat and power installations). Industry formally agreed to reduce CO<sub>2</sub> emissions by 8% by 2005 and 35% by 2012 if no carbon tax was introduced (OECD, 2001; Weidner and Mez, 2008). However, industry did not comply with these commitments, thus supporting international evidence that such voluntary approaches are less effective than other instruments (OECD, 2003). Nevertheless, these agreements facilitated negotiations on EU ETS implementation, partly because they underlined the necessity of carbon pricing.

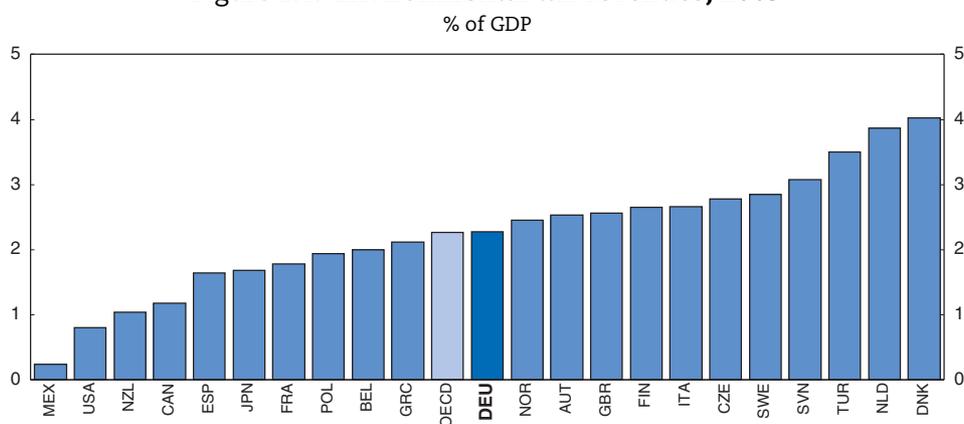
### Improving the impact of the EU ETS

Germany has participated in the EU ETS since its beginning in 2005, but this instrument barely contributed to GHG mitigation. Partly due to the over-allocation of allowances, the implicit carbon price was too low to encourage a significant reduction in emissions during the first phases of the scheme. The price of allowances has also been highly volatile (in particular during the economic crisis when prices fell by 70% between July 2008 and February 2009). In the third phase of the EU ETS (2013-20), the scheme should become more efficient as the cap for emissions will be defined at the EU level and progressively reduced. In addition, an increasing share of allowances will be auctioned. However, despite these improvements, there is a risk that the carbon price remains too volatile to provide sufficient incentives for long term investment in low carbon technologies (HM Treasury, 2010). Indeed, in cap-and-trade schemes, volatility is usually high as quotas are fixed and thus shifts in demand translate into prices (Metcalf, 2009). In addition, the timing, the amount and the method of tightening of the EU cap remain unclear, thus providing uncertainty about the future carbon price and about the profitability of risky and long-term abatement options (OECD, 2011a). Consideration should be given to implement measures to increase the stability of the carbon price in the sectors covered by the EU ETS at the EU level.<sup>3</sup> Germany should thus contribute to discussions about possible measures to maintain an effective carbon price signal in the EU ETS in line with overall medium and long-term EU emission reduction targets.

### Creating a clear carbon price signal in the sectors not covered by the EU ETS

Reduction of GHG emissions in the sectors not covered by the EU ETS, such as transports, households and services, have been encouraged by the introduction of environment-related taxes. Most of these taxes are based on energy consumption: 73% of tax revenues come from an oil duty, 15% from the motor vehicle tax and 11% from the electricity tax. With the sharp decline in energy intensity since 1990 and the increase in energy prices, environmental taxes declined as a share of GDP and are now standing close to the OECD average (Figure 2.4). In 2009, environmental tax revenues accounted for 2.3% of GDP and 6% of total tax revenues.

Figure 2.4. **Environmental tax revenues, 2009**



Note: OECD is the arithmetic average of ratios of member countries. Environmentally related taxes include taxes on energy products (for transport and stationary purposes including electricity, petrol, diesel and fossil fuels), motor vehicles and transport (one-off import or sales taxes, recurrent taxes on registration or road use, other transport taxes), waste management (final disposal, packaging, other waste-related product taxes), ozone-depleting substances and other environmentally related taxes.

Source: OECD/EEA, *Database on Instruments for Environmental Policies*.

StatLink  <http://dx.doi.org/10.1787/888932560170>

While no tax is really dedicated to reducing CO<sub>2</sub> emissions in Germany, some apply to emission-intensive products. For example, an eco tax was implemented in 1999, taxing electricity consumption and increasing the energy tax on fossil fuels with tax rates varying across fuels, although not based on their CO<sub>2</sub> content. Estimates suggest that it decreased CO<sub>2</sub> emissions by 2-3% between 2003 and 2010 in Germany and contributed to improving the market penetration of green technologies without major adverse effects on economic growth (Knigge and Görlach, 2005). The tax revenues are earmarked for reducing social contributions and to a lesser extent for funding RES development, thus contributing to increasing growth and employment and not significantly weighing on the energy intensive sectors (Andersen *et al.*, 2007). In the transport sector, the eco tax is complemented by other measures, such as an environmental road toll for heavy duty vehicles based on the driving distance, number of vehicle axles, and emission category; it was amended in 2009 to make it more dependent on the actual emission level and investment in less polluting trucks increased consequently (BMVBS, 2011). The motor vehicle tax (tax on vehicle ownership) has also been reformed in 2009 to include CO<sub>2</sub> components in the tax base (*e.g.* cars emitting less than 120 g/km are exempted). Finally, a tax on air traffic has been introduced in 2011.

While these measures create incentives to reduce energy consumption, they are not providing a clear carbon price signal. In particular, the eco tax is not based on the CO<sub>2</sub> content of the tax bases and thus does not target the most carbon-intensive sources. In addition, these taxes address several externalities related to fuel consumption and transportation activities (*e.g.* air pollution, accident costs, road wear, noise and congestion) but are not designed to do so which makes their signal unclear and measuring outcomes difficult. One tax could be dedicated to different objectives but in this case the transparency of the tax rates should be increased so as to clearly signal what externality it addresses. One part of the rate should depend on the pollution content of the tax base as it was done for instance for the motor vehicle tax. As suggested in the Energy Concept, eco tax rates should rely more on the CO<sub>2</sub> content of the taxed fuel. Germany should also support the European Commission initiative regarding the EU Directive on energy taxation, which recommends splitting energy taxes into two components so as to make the CO<sub>2</sub> tax explicit and introducing a minimum CO<sub>2</sub> tax rate. However, as taxing fuel would not be enough to encourage a sufficient change in consumption behaviour at least in the short run (OECD, 2011d) and is not addressing all externalities related to fuel consumption, other instruments should be used, as, for instance, the motor vehicle tax to encourage the adoption of energy efficient cars. A road toll could be used to finance road infrastructures, as road wear related costs directly depend on the use of roads. It could also address congestion issues by extending it to congested roads or making it dependent on traffic volumes. In addition, to avoid distortions in the transport sector, extending the toll to all vehicles as planned in the Netherlands, or at least to all trucks should be considered.

### ***Revising environmentally harmful policies***

Despite strong environmental commitments, Germany still spends large amounts on environmentally harmful support measures. The Federal Environment Agency estimates that in 2008 around EUR 48 billion (1.9% of GDP) in subsidies could be considered as environmentally harmful (UBA, 2011b). According to OECD estimates, support to fossil fuels, *i.e.* any measure encouraging fossil fuel consumption, amounted to around EUR 7.5 billion in 2010 (0.3% of GDP) (OECD, 2011e). A large share of this support is targeted

to energy-intensive sectors, with around 65% allocated to coal, the most polluting energy source. Such measures encourage energy consumption and exempt polluting sources from paying for negative externalities they generate. In particular, they reduce incentives for energy-intensive firms to reduce GHG emissions and delay the adoption of energy efficient technologies. In line with G20 commitments, Germany should eliminate the support measures to fossil fuels and if needed replace them by environment-neutral measures.

Around 65% of the support to fossil fuels consists of tax expenditures, mainly exemptions from the eco tax, which amounted to 0.2% of GDP in 2010 (OECD, 2011e). Within the fuel consumption tax structure, tax rates vary according to fuels, users and purposes, suggesting taxation is not systematically related to the level of negative externalities. For instance, tax rates are reduced for heating fuels and are quasi null for coal. Diesel is taxed less than petrol, contributing to a lower diesel price in Germany compared to other OECD countries. Also, many exemptions are targeted to energy intensive sectors and sectors exposed to international competition. For example, the eco tax is not applied to energy intensive industries and is refunded to export manufacturing firms under a peak equalisation scheme which guarantees a refund of 90% of eco tax payments exceeding the relief on social contributions. Such tax exemptions aim at limiting the negative impact of the tax on firms' competitiveness. While concerns about international competitiveness are legitimate, the risk of competitiveness losses in some exempted enterprises is likely to be overstated (Thöne *et al.*, 2010). Also, competitiveness concerns need to be addressed in a way so that the incentives for emission reduction are maintained (such as through a lump-sum refund, not related to the level of energy consumption). By contrast, exemptions or reduced tax rates should only be implemented to avoid a double taxation. For instance in the sectors covered by the EU ETS, carbon emissions are already priced through the scheme and thus should not be eligible for the carbon tax. However, sectors covered by the EU ETS should not be totally exempted from the eco tax which covers other externalities than those related to CO<sub>2</sub> emissions. Some tax exemptions have recently been made less generous and relief for energy intensive firms will be conditioned on energy savings from 2013 onwards following European Commission requirements.<sup>4</sup> Nevertheless, exemptions and reduced tax rates should be further phased out except when they are implemented to avoid a double taxation. If needed, they could be replaced by better targeted public support, ideally conditioned to energy savings.

The production of coal is supported through direct subsidies covering the difference between production costs and the world market price of coal exports (IEEP *et al.*, 2007). Following the 1997 decision to gradually phase out this support until 2018 in accordance with the EU regulation, subsidies have been significantly reduced and in 2010 they amounted to EUR 1.7 billion (0.1% of GDP) (OECD, 2011e). Nevertheless, the coal mining industry continues to be a major receiver of direct financial subsidies from the government. Germany should consider accelerating the phasing out of coal subsidies. Coal subsidies have negative environmental consequences in terms of GHG emissions, but also air pollution, soil degradation, toxic waste and water pollution. In addition, maintaining subsidies cannot solve the structural problem facing the German coal mining industry, namely its low cost competitiveness. While subsidies should be eliminated, active labour market policies should be used to facilitate labour mobility and promote employment in the regions affected by the waning mining sector.

Other environmentally harmful expenditures include the tax treatment of personal road transports, which fosters the use of cars over public transportation. For example, company cars used for private purposes are taxed at a flat and low rate (1%), encouraging

employers to pay their employees partly in a form of a car. As a result, 30% of cars registered in Germany are company cars. This tax treatment should be made less advantageous. Distance-based income tax deductions for commuters also promote use of cars and encourage workers to live further away from their place of work. They are estimated to cost around 0.2% of GDP and to account for 2 million tonnes of CO<sub>2</sub> emissions by 2015 (UBA, 2011b). Consequently, they should be rethought in light of their environmental impact.

### ***Fostering energy savings and renewable energy sources***

In some cases, pricing carbon is not sufficient to reduce emissions and change consumption behaviour. For instance, in the residential sector, split incentives, lack of information or weak access to finance hamper the implementation of energy savings and emission abatement. The development of RES also necessitates public support as barriers, such as network effects or limited access to credit undermine investment in these technologies. Such market failures thus require the implementation of non market based measures. Germany implements several of those, but they could be made more cost-efficient.

### ***Measures to raise energy efficiency should be better targeted***

The residential sector has a significant potential to reduce GHG emissions in Germany. Many measures improving energy efficiency in the building sector have a negative CO<sub>2</sub> abatement cost, meaning that their implementation is profitable even in the absence of a carbon price (McKinsey, 2007). For instance, energy efficient renovations may lead to energy savings exceeding the initial investment cost. However, a lack of information on the profitability of investments, split incentives between landlords and tenants, a too long payback period or credit constraints may hamper investment in this area. In Germany, the building stock is already relatively energy efficient, not least due to relatively strict building norms (IEA, 2007). In addition, energy efficiency gains have been substantial over the past decade: energy consumption for heating per square meter was reduced by 25% between 2000 and 2009. However, there is still room for improvement. The share of total energy used in the residential sector is 1.5 times higher than in the average OECD country. Emissions in the residential sector are also quite high by international comparisons, with 1.3 tonne per capita vs. 0.8 tonne on average in the OECD. Energy performance could be further improved by increasing the rate of renovation of the building stock and indeed the government plans to encourage further energy-efficient building refurbishments (IEA, 2009).

A vast range of measures have been implemented to stimulate energy savings in the residential sector. These measures are welcome as they could usefully complement the price signal of a carbon tax.

- Germany advertises potential energy savings and available technologies, for instance by providing audits on energy efficiency options.
- Strict standards for the energy performance of new buildings and existing buildings that undergo major renovation are set at the national level. The 2002/2007 Energy Saving Ordinance has been amended to introduce stricter norms in 2009 (energy performance increased by 30%) and made energy certification of buildings compulsory when they are constructed, sold, leased or rented out (in line with the EU Energy Performance of Buildings Directive).
- The Building Rehabilitation Programme and the Energy Efficient Construction Programme offer low-interest loans and grants for energy performance improvements in the residential sector. These subsidies are provided on a first-come-first-serve principle,

suggesting high deadweight losses. Given that available resources are limited, such subsidies, in particular grants, should be targeted to low income households and credit constrained firms, which otherwise may not have the capacity to finance profitable energy-efficient investment. To avoid that this measure leads to low cost investments which induce low energy savings, the provision of the grants could also be conditioned to energy efficiency gains.

Nevertheless, these measures may not be sufficient to induce high renovation rates in the rental housing sector as split incentives between landlords and tenants may hamper renovation activity (de Serres et al., 2010). The payback period is usually too long for a tenant to invest in renovations and owners do not have adequate incentives to improve the performance of their building. Landlords are not benefiting from the induced energy savings as German tenancy law limits increases in rents following an improvement in the energy performance of the dwellings.<sup>5</sup> This is particularly problematic in view of the high share of rental housing in Germany. The government is considering allocating tax incentives for energy efficient renovations. If implemented, this subsidy should depend on the income level of eligible households and should not overlap with the allocation of grants in the Building Rehabilitation Programme and the Energy Efficient Construction Programme. The priority is to revise rental market legislation as considered in the Energy Concept. Rents should also be made more flexible to ensure landlords can benefit from renovation investments; one option would be the introduction of an energy-efficiency rental index. Amendments of rent regulation aiming at better distributing the cost of renovations between the landlord and the tenant are currently discussed. Proposed changes in rent regulation which can further remove obstacles to energy savings investments in rental housing should be swiftly implemented.

### ***RES development needs to become more cost-efficient***

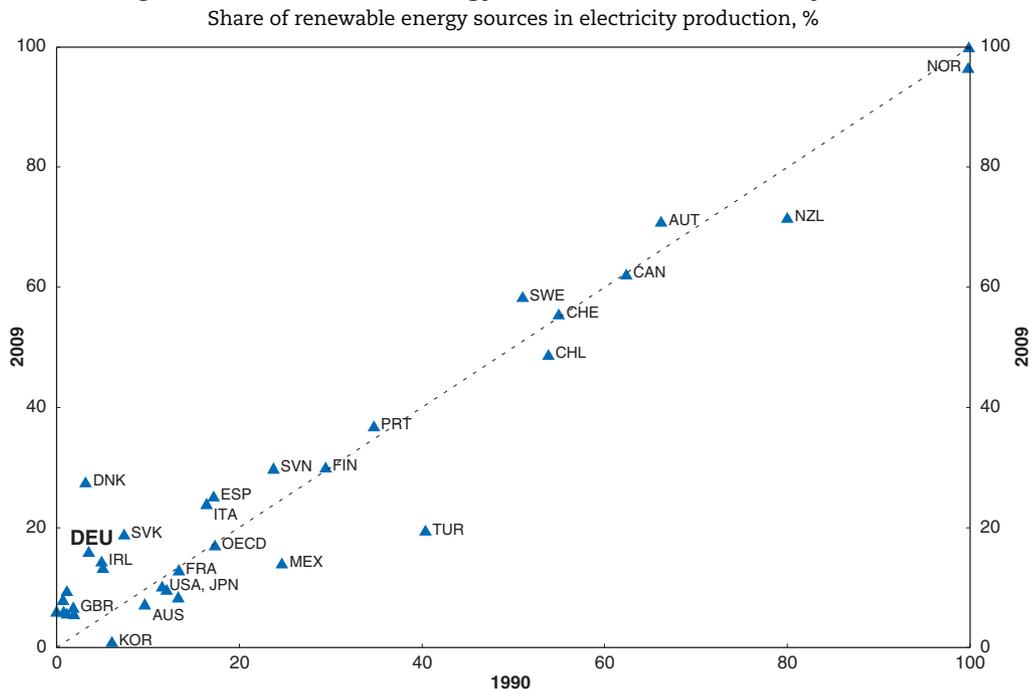
RES development will be necessary to reduce GHG emissions to the level targeted in the Energy Concept. To reach the government's objective in terms of RES expansion, financial support beyond the incentives generated by carbon pricing will be required as some technologies are not competitive compared to conventional energy sources even with a carbon price. This may be due to the low performance of certain technologies, lack of energy sources (such as sun and water in Germany) but also to market imperfections. For instance, learning and demonstration effects as well as access to finance are hampering the penetration of RES. In particular, there is evidence of risk premium and thus additional financial cost for RES relative to conventional energy projects limiting the profitability of investment in these technologies (Kalamova et al., 2011).

The CO<sub>2</sub> abatement cost related to RES is on average lower in Germany than in many other OECD countries but is still relatively high for certain energy sources. As the energy mix is emission-intensive in Germany, notably because of the nuclear phase-out, abatement costs in the energy sector are low by international comparison (Egert, 2011). Developing RES is thus relatively less costly than for countries like France for instance, which would need to replace low carbon electricity production by RES. However, the abatement cost related to non-mature or low-performing technologies may still remain high. For instance, abatement costs implied by feed-in tariffs for biomass and wind power were around EUR 40 to 90/t CO<sub>2</sub>, while abatement cost for photovoltaic largely exceeded EUR 200/t CO<sub>2</sub> in 2009-10 (Egert, 2011).

A vast range of measures has been implemented to encourage RES development. The main measure was the introduction of feed-in tariffs guaranteeing the sale price of electricity produced from RES, jointly with a preferential access to the grid. RES production rose after the implementation of the feed-in tariffs scheme in 1991 and even more so after 2000 with the passing of the RES Act (*Erneuerbare Energien Gesetz, EEG*) and its following amendments in 2004, 2008, 2010 and 2011. In particular, the RES Act introduced cost-based tariffs, which significantly increased the level of remuneration, and imposed the obligation to purchase renewable energy electricity to grid operators and energy suppliers (IEA, 2004). These measures have been complemented by investment support through capital grants and low interest loans, provided by the state-owned KfW bank. In particular, capital costs were reduced for firms investing in wind and solar energy. Reduced tax rates for electricity and heat produced from RES, support to biofuels (tax exemptions and quotas), and financial incentives for heating installations and renovation of buildings have also contributed to RES development. In 2009, the Act on the Promotion of Renewable Energies in the Heat Sector increases the compulsory share of RES in final energy consumption for heating and air conditioning in new buildings (from 6% in 2009 to 14% by 2020). Finally, to limit competition coming from nuclear power and to internalise decommissioning costs of nuclear power plants, a nuclear fuel tax was introduced in 2010. The revenues were earmarked to support RES development.

As a result, RES developed at a strong pace. Since 1990, renewable energy consumption increased more than two fold and accounted for 11% of total energy consumption in 2010. RES have been the fastest growing source of electricity in Germany. Between 1990 and 2010, RES electricity production growth was ten times higher than in the OECD and the share of RES in electricity production almost reached the OECD average (Figure 2.5). Even though 17% of electricity consumption was from RES in 2010 (and has increased further in 2011),

Figure 2.5. **Renewable energy sources in the electricity sector**



Source: IEA, *Energy Balances of OECD countries*, 2011 edition.

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this share is still low compared to some other OECD countries (Figure 2.5). This is partly explained by the availability of renewable energy sources which is high for instance in Nordic countries, benefiting from large hydroelectric capacities. In Germany, wind and biomass account for two thirds of the RES electricity production, while hydropower and solar remain limited (20% and 7%).

The high predictability of the German policy in terms of RES development, and the implementation of feed-in tariffs in particular, contributed significantly to reducing the barriers to RES expansion. Uncertainty regarding environmental policies hampered the development of RES in other OECD countries (OECD, 2011a). Some studies also show that feed-in tariffs were more efficient than other policies in increasing RES penetration. Butler and Neuhoff (2008) and Mitchell *et al.* (2006) find that Germany's feed-in tariffs scheme was more likely to foster investment in RES and less costly compared to the UK Renewables Obligation. Overall, German feed-in tariffs are better designed than in most OECD countries implementing such a system. They broadly respect the conditions for an effective policy aiming at increasing the penetration of RES on the electricity market (IEA, 2008).

- The support is predictable and transparent enough to encourage long term investment. As returns depend on the policy implemented (in particular the internalisation of negative externalities), improving transparency, predictability and longevity of government programmes is necessary to reduce financing costs for firms investing in RES (or even give them access to finance). In Germany, feed-in tariffs are guaranteed for 20 years and revised every four years (except for photovoltaics, see below), which ensure a high stability for investors.
- RES have priority access to the grid and to the electricity market, ensuring a certain rate of return to investors (as they can sell their entire production at a guaranteed price).
- Feed-in tariffs are designed to ensure the diversity in the technologies used. In Germany, the feed-in tariffs vary with the technology used and the capacity generation, to foster the development of non-mature but promising technologies (Table 2.2). Tariffs are fixed to equalise the cost for producers and ensure that no specific technology is privileged. This strategy, while not being the most cost efficient, ensures that complementary energy sources develop. Given the intermittence and the unpredictability of the energy supply from RES, it is worth having a diversified RES energy mix. In addition, due to learning cost effects, promising technologies could be excluded from the market. Nevertheless, differentiating between technologies also has drawbacks. First, it requires picking winners at some stage and the accuracy of the administration to choose the most promising technologies may be questionable. Second, due to asymmetric information, determining the adequate level of feed-in tariffs is difficult. Regular evaluations and adjustments help to overcome these challenges.
- Feed-in tariffs are reduced each year according to a predetermined rate of depreciation to encourage innovation and efficiency gains (except for photovoltaics, see below). While encouraging investors to choose more efficient technologies, this prevents excessive rents of RES producers as the cost of equipment declines with the adoption of technologies at a large scale.

While the feed-in tariffs system is broadly well designed, it is nevertheless relatively costly. Subsidies to RES, measured as the difference between the feed-in tariffs and the electricity market price multiplied by the level of RES production as a share of GDP, are

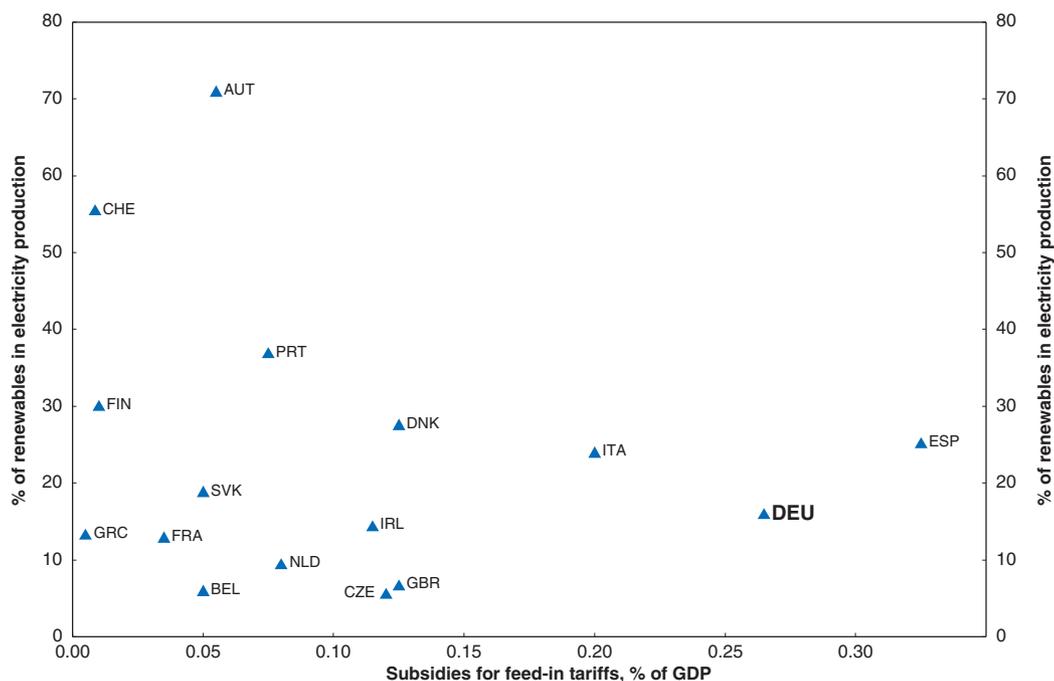
**Table 2.2. Feed-in tariffs in Germany**  
Range of rates offered in EUR cents per kWh

Energy source	2009	2012
Biomass	7.79-11.67	6-14.3
Solar	31.94-43.01	21.11-28.74
Geothermal	10.5-16	25
Biogas	6.16-11.67	6-8.6
Offshore wind	3.5-13	3.5-19
Onshore wind	5.02-9.2	4.87-8.93
Hydro	3.5-12.67	3.4-12.7

Source: Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, RES Legal. The figures refer to basic tariffs without bonuses.

among the highest among OECD countries with similar programmes (Figure 2.6). Between 2000 and 2010, the total support of the RES Act amounted to EUR 61.7 billion, far exceeding prior government expectations and increasing sharply over the past few years. In 2010, feed-in tariffs amounted to around EUR 13.2 billion (0.5% of GDP). This is notably due to the strong development of photovoltaics, boosted by generous feed-in tariffs and a sharp decline in costs. Indeed, feed-in tariffs in photovoltaics induced negative private abatement costs, thus explaining the huge increase in solar energy installations (McKinsey, 2007).

**Figure 2.6. Renewable energy sources and feed-in tariffs, 2009**



Note: Renewables in electricity production are hydro, geothermal, solar/wind/sea, biofuels and waste are excluded. Subsidies are calculated by Egert (2011) as the lower and upper-bound feed-in tariffs in excess of the market prices multiplied by electricity production from a given energy source in 2009. The graph shows the midpoint where a range of tariffs exists.

Source: IEA, *Energy Balances of OECD countries*, 2011 edition; Egert, B. (2011), "France's Environmental Policies: Internalising Global and Local Externalities", OECD Economics Department Working Papers, No. 859.

StatLink  <http://dx.doi.org/10.1787/888932560208>

While, as mentioned earlier, support for RES has a limited impact on emissions at the EU level, estimates found that RES may have avoided 72 million tonnes of CO<sub>2</sub> emissions in 2009 in the German electricity sector (BMU, 2010). Thus the absolute CO<sub>2</sub> abatement cost of RES was around EUR 74/tCO<sub>2</sub> in 2009, more than six times the carbon price in the EU ETS. Feed-in-tariffs are financed by a fee included in the electricity price (the “EEG surcharge”) and this fee nearly trebled between 2009 and 2011 (from 1.2 cents per kWh to 3.5 cents). The EEG surcharge accounted for 9.6% of the electricity price in 2010. By increasing electricity prices feed-in tariffs encourage energy savings and thus emission abatement in Germany.

Going forward, pursuing the feed-in tariffs policy may be not sustainable considering the scale and the timeframe of RES expansion by 2020. According to the government, the EEG surcharge should remain unchanged at around 3.5 cent per kWh: the expected decline in investment costs and increase in energy prices should improve the profitability of RES and reduce the need for subsidies to ensure their developments. However, these developments are uncertain and other evaluations project significant increases in prices. The Germany Energy Agency (Dena) estimates that the expansion of renewable energies would lead to electricity prices going up by around EUR 2 Ct/kWh, increasing the electricity bill of households by around 10% (Dena, 2011). These estimates do not include the cost induced by the necessary extension of the grid to ensure the integration of the RES on the electricity network.<sup>6</sup> In addition, the recent revision of the Renewable Energy Act to be implemented from January 2012 increases feed-in tariffs for some technologies, thus raising the cost related to the feed-in tariffs system. As the revision of tariffs is not retroactive, the overall cost of the RES policy may increase sharply in the coming years. The German economy is more electricity intensive than the OECD average and thus may be more vulnerable to an increase in electricity prices. Energy intensive firms are exempted from the EEG surcharge thus are protected from the increasing cost of electricity. However, these exemptions increase the weight of the RES support on private consumers and other sectors of the economy, thus creating distortions. In Germany, a 10% increase in energy prices over three years is estimated to reduce GDP by 0.4%, more than in most of the euro area members, mainly due to a higher impact of energy price increases on private consumption (ECB, 2010).

A revision of the feed-in tariffs system would contribute to damping the increasing cost of the RES expansion. First, tariffs should be lowered as carbon prices on the EU ETS should increase creating additional incentives on the energy market to develop low carbon power sources. Second, some flaws should be corrected to maintain abatement costs related to feed-in tariffs at reasonable levels:

- The CO<sub>2</sub> abatement cost for certain technologies reached extraordinary levels in the past and are still high despite recent revisions of the feed-in tariffs system. In Germany, the feed-in tariff for photovoltaics was eight to ten times higher than the electricity price and more than three times the feed-in tariff paid to wind in 2009. Significant reductions have been implemented over the past two years but tariffs remain considerably higher for solar compared to wind or hydro power. Very high abatement costs may reflect that technologies are not yet competitive because of their low performance and not because of market failures, in which case their exploitation is inefficient. Other technologies, such as offshore wind, require the development of specific infrastructure on the electricity network, adding to the cost of feed-in tariffs in the wind sector. When determining the level of feed-in tariffs, higher subsidies should be restricted to

promising technologies. To assess the profitability of a technology, cost benefit analysis should be implemented, including the total cost of its integration into the energy system and taking interactions with the EU ETS cap into account (OECD, 2011b).

- Feed-in tariffs are not flexible enough to adapt to market developments. In Germany, the tariffs and the degression rates are usually revised every four years but some additional adjustments are possible and have been recently used for photovoltaics. In response to the increasingly rapid deployment of solar power, the government introduced a volume responsive degression system in 2009 for photovoltaics.<sup>7</sup> The system was revised in 2010 and in 2011 as solar generation capacities continue to expand at a high pace. It should be monitored whether this system sufficiently controls the development of photovoltaics. The degression system could be made more efficient by basing it on an analysis of price elasticities. More broadly, all feed-in tariffs could be made dependent on market developments to better control the increase in cost. This would limit the recourse to unpredictable adjustments undermining the stability and the transparency of the system which may deter investment. Besides, as suggested in the Energy Concept, other forms of incentives could be considered for large scale projects, such as offshore wind power capacity expansion: feed-in tariffs could be determined by issuing tenders, granting licenses to those producers who propose the lowest tariffs for a certain amount of electricity production. In addition, the planned introduction of a “market premium” for renewable producers who opt to sell electricity at the market price and thus do not benefit from feed-in tariffs should be carefully designed so that it effectively reduces the cost of the RES development. Finally, Germany should continue monitoring the generosity of the feed-in tariffs and ensure they are removed when technologies become profitable.

### Continuing the green growth success story

In the past, Germany was successful in turning environmental challenges into a source of growth. Benefiting from its first mover position and from high innovative capacities, it is now a leader in green technologies. To keep the lead and create new sources of growth from the challenging targets it set on climate change mitigation, Germany should ensure an adequate investment level in the energy sector and in eco-innovation. Doing so will require policy adjustments.

#### **Germany is a leader in green technologies...**

Germany benefited from being a leader in environmental policy making, as policies implemented to reduce air pollution, save energy and develop RES created new markets for the domestic industry and fostered innovation. By increasing the price of pollution and energy, environmental policies fostered demand for green products and technologies. As a result, Germany is one of the largest markets for environmental goods. For example, Germany had the largest installed solar photovoltaic capacity and the second largest installed wind capacity in the world in 2008 (OECD, 2011a). The net impact of environmental policies on growth is ambiguous, though. On the negative side, strong environmental constraints impose costs on production and in the case of climate change policies induce carbon leakage (outsourcing of carbon-intensive activities). In addition, the demand for green products and technologies created could be addressed by foreign suppliers, increasing dependency on imports and limiting the positive impact of environmental policies on the domestic economy. On the positive side, by developing incentives to innovate and increasing energy efficiency, these policies may create

competitive advantages. The net impact will thus strongly depend on the cost-efficiency of the measures implemented and their impact on firms' competitiveness. For instance, the positive impact of the RES policy on the economy has been limited not least because of the increase in electricity prices it induced (Box 2.2). However, Germany benefited from being a first mover and managed to develop an innovative industry. Overall, green technologies accounted for 8% of GDP in 2007, a share that could increase to 14% by 2020 (BMU, 2009). According to some estimates, environmental protection employs 1.8 million workers and emission-reducing investment amounts to 5% of GDP (BMU, 2008b). In addition, a relatively high share of the value added in the green sectors is produced in Germany, suggesting these sectors are more employment-intensive than on average in the economy.<sup>8</sup>

Green sectors boomed over the past few years (Occampo, 2010). This trend is likely to continue with global markets for solar thermal energy, photovoltaic and wind power projected to grow by 20% per year until 2020 (BMU, 2009). Being among the largest producers of environmental goods and services, with the second largest share in global trade of climate protection related products amounting to more than 12%, Germany benefits substantially from this development (BMU, 2012). Germany is a leader in the wind and the photovoltaic sectors with respectively two and three firms among the ten main producers of wind turbines and solar panels worldwide.

However, competition is developing quickly on the environmental good and services market. With an export share of RES equipment of around 80%, Germany is highly exposed to this competition and firms have difficulty preserving their markets. For instance, the export market share of Germany in photovoltaics decreased from 77% in 2004 to 31% in 2009 (PRTM Management Consulting, 2010). In 2009, more than 70% of photovoltaic equipment was imported from Japan, China and Spain. The situation is less dramatic for wind where three quarters of equipment bought in Germany is produced by German manufacturers.

### ***... and this competitive advantage should be maintained***

Maintaining the competitive advantage in an ever more competitive environment will require reducing the costs related to climate change policies and creating or exploiting new markets in environmental areas. Implementing cost-efficient climate change policies will not be sufficient to maintain the leadership on green markets. Ensuring adequate development of infrastructure, improving competition in energy sectors, and investing further in eco-innovation would help Germany to further exploit environment friendly sources of growth.

### ***Investing in adequate infrastructure***

Investment in infrastructure is an important factor when changing the energy mix as envisaged in the Energy Concept. Integration of RES into the electricity system requires the expansion of the electricity transmission and distribution network as the national grid is not suited to transport electricity from decentralised sources which are not located close to demand (*e.g.* offshore wind). In addition, the network needs to be adapted to intermittent energy supply. Overall, up to 0.2% of GDP will need to be invested annually by 2020 to adapt the network infrastructure to RES development (Dena, 2010). The government identified the expansion and improvement of the networks as a key priority, by developing a strategic plan for grid extension and – in line with the recent revision of the Energy Act – establishing ten-year-plans for grid extension which are coordinated amongst operators

### Box 2.2. Evaluation of the impact of RES policy on employment and growth

Evaluations generally conclude that the development of RES in Germany had a positive impact on growth and employment, even though estimates vary significantly. For instance, DIW found that increasing the share of RES to 30% of the total energy consumption by 2030 could lead to an increase in the level of GDP varying between 1% and 3% by 2030 and create between 15 000 and 166 000 jobs depending on the assumptions used in the evaluation (DIW, 2010). Overall, the total impact on the economy is assessed to be weak in absence of productivity gains in the RES sector and of improved competitiveness on the world markets.

The support to RES stimulates the economy by boosting investment spending and creating demand for green technologies. In particular, in the electricity sector, it induces the production of new power generation and storage capacities but also the development of network infrastructure. In 2010, investment in renewable facilities accounted for EUR 26.6 billion (0.1% of GDP), 2.6 higher than in 2005 (a 21% annual increase). Employment in RES sectors has also increased sharply over the past two decades, with more than 370 000 persons employed in 2010, three times more than in 2002 (BMU, 2011).

In addition, increasing the share of RES contributes to reducing Germany's energy dependency which is high by international comparison. In 2009, German produced only 40% of its total energy supply – less than half the OECD average. RES expansion is estimated to reduce energy imports by 20% until 2020 and 60% by 2050 (BMU, 2011). By developing non fossil fuel domestic energy sources, Germany reduced the vulnerability of its economy to energy price volatility. Besides, RES exert downward pressure on electricity prices on the spot market due to the “merit order effect” (BMU, 2010). During peak demand, feed-in tariffs may be below the market price and as they have priority dispatch, RES may substitute inefficient fossil fuel-fired generation with higher marginal costs (like diesel generators).

However, the cost of RES development and its impact on other sectors of the economy may limit its positive effects on growth. Indeed, it induces losses in conventional energy sectors and may hamper investment in other activities, notably by increasing competition for credit. The financing of the RES policy is also weighing on activity. By increasing electricity prices, the feed-in tariffs system weighs on households' disposal income and dampens domestic consumption. While some energy intensive firms are exempted from the EEG surcharge, it also raises the production costs of non energy intensive firms and may deteriorate their price competitiveness. Most studies assume the cost of RES support will decrease significantly, due to increasing productivity and technological learning effects in the RES sector. By contrast, Frondel *et al.* (2010) conclude that the impact on growth should be weak when only taking into account the negative impact of increasing electricity prices on the economy. This suggests that in absence of technological progress and productivity gains, RES may not be a new source of growth for Germany because of its cost. The final impact on growth will also depend on the price developments in the energy sectors as well as on the net effect of the “merit order effect” and of the EEG surcharge on electricity prices.

The performance of German firms on green markets will also be decisive. With growing demand of foreign markets for RES technologies, maintaining a first-mover advantage and a technology leadership would ensure Germany will reap the benefits of its investment in RES. The Ministry of Environment estimates the worldwide investment in RES should be multiplied by five from EUR 122 billion in 2005 to EUR 590 billion in 2030. Depending on the assumptions made on German export market shares, the estimated impact on GDP of the RES policy varied by 20% and the impact on employment by one third (BMU, 2011).

on a national basis. This initiative is welcome as it ensures the coordination of the projects and may create synergies, increases transparency and enhances participation of all relevant stakeholders. Also, while it will not reduce the need for grid expansion, smartening the grid could help managing unpredictable energy sources and generating efficiency gains as it improves demand side management. Smart metering systems, i.e. systems which provide information on the energy consumption and its cost in real time and allow the introduction of peak-load pricing, could contribute to reducing peaks in demand. Overall, while ensuring the adequate development of infrastructures, Germany should ensure that the most efficient technologies are used on the electricity network.

However, despite the urgency of further development, investment in grid extension is stagnating and many of the projects planned are experiencing delays (Bundesnetzagentur, 2010). In 2009, less than 40% of the investment in grid extension initially planned materialised. According to the Federal Network Agency, the reasons behind these delays relate to public opposition at the local level (e.g. with respect to overhead power lines), fractured responsibilities for site approval and in some cases changing procedures. To address inter alia the lack of public acceptance, discussion platforms bringing together the main stakeholders involved in grid expansion were established in February 2011 to generate an active follow up and engagement of the different stakeholders. In addition, the “Grid Development Act” of 2009 facilitates the planning and authorisation process for 24 strategic grid expansion projects. More recently the “Grid Expansion Acceleration Act” of 2011 is assigning part of the consenting approval process at the federal level. Decisions on the construction of some high voltage lines are now taken by the Federal Network Agency, which is a first step towards harmonised approval procedures for infrastructure planning.<sup>9</sup> The new “Energy Act” and the new “Grid Expansion Acceleration Act” also further improve the transparency and public involvement in the decision process to ensure the completion of the planned projects. These measures would be usefully complemented by additional improvements of the investment framework. In particular, procedures for authorisation could be further harmonised and streamlined and a point of single contact for all investment projects could be established.

In addition, the risk of underinvestment in the electricity transmission sector remains. The transmission and distribution market is monopolistic by nature and the lack of competition among transmission systems operators (TSO) and distribution system operators (DSO) could lead to restriction of capacities. As a consequence, the network markets are highly regulated to ensure TSOs and DSOs provide reliable services to electricity producers and consumers. Prices for access to the grid as well as investments in grid extension are regulated by the Federal Network Agency. Since 2009, incentive-based regulation has been implemented. While maintaining security of supply, the regulation aims at cost-efficiency via benchmarking, and cost reduction by setting a cap on TSO and DSO revenues. Regarding investments in most grid expansion or restructuring projects, the TSOs and in some cases DSOs, submit investment budgets to the regulator for approval. Projects are evaluated according to a cost-benefit assessment, encouraging the use of the most efficient technologies. The “Smart grid initiative” recently launched by the government should lead to a change in these regulatory practices. Incentives for choosing the most efficient technologies and integrating smart technologies in the market should be implemented on a cost and benefit basis.

### Improving the competition framework in the energy sectors

In many ways, a high level of competition in energy markets would contribute to reducing the cost of climate change mitigation in Germany. In particular, at the generation level, it would limit the cost induced by the intermittent nature of the RES. For instance, by lowering the price of gas, more competition in the gas market could support the development of energy efficient peak-load gas power plants able to supplement renewable energy supply and could thus facilitate the replacement of polluting coal power plants. In addition, increased liquidity on the spot markets would reduce the rise in electricity prices during peaks in demand and ease adjustments to fluctuations (IEA, 2011). Finally, developing connections with external energy markets could extend storage capacities (in particular, by using foreign pumped storage plants).

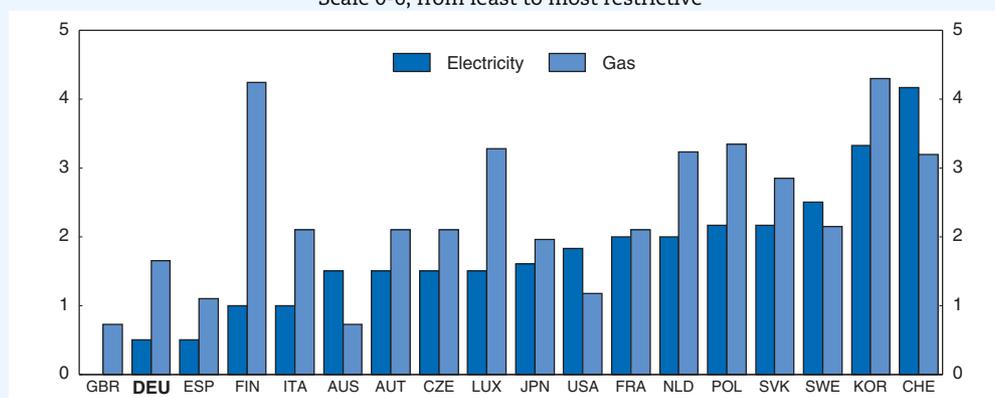
Despite some progress over the past few years, the competition level in energy sectors in Germany remains low (Box 2.3). Markets are concentrated at the regional level and a large share of energy is traded under long-term contracts. In addition, while Germany stands above the 10% target for interconnection capacity set at the EU level, integration with the European energy market is limited, in particular given the needs for interconnected networks created by the RES development (European Commission, 2011). In Denmark, where wind represents 20% of annual electricity production, interconnection capacity is equivalent to 80% of total peak demand and has a major role in providing flexibility to the electricity system (IEA, 2011). By comparison, interconnection capacity in Germany was around 23% of 2009 peak demand.

#### Box 2.3. Competition in the German energy sectors

While the regulatory environment in the energy sectors improved significantly in Germany during the last decades with product market regulation now lower than in most other OECD countries (Figure 2.7), the level of competition remains weak in both electricity and gas markets (European Commission, 2010; Monopolkommission, 2011).

Figure 2.7. Regulation in the electricity and gas sectors, 2007

Scale 0-6, from least to most restrictive



Source: OECD Product market regulation indicators Database.

StatLink  <http://dx.doi.org/10.1787/888932560227>

The electricity market at the generation level is still concentrated. In 2010, four companies accounted for a market share of nearly 80% and most of the electricity is traded under long-term contracts (Bundesnetzagentur, 2010). Nevertheless, there has been some

**Box 2.3. Competition in the German energy sectors (cont.)**

improvement over the past years. Since 2007, the unbundling process and the appointment of an independent regulator (*Bundesnetzagentur*) contributed to a fall in the market share of the big four from 85% to 79%. In addition, integration with the EU energy market progressed. Germany now participates in four of a total of seven regional initiatives for the integration of European power markets. Since May 2010, market coupling between the German and the Nordic electricity markets has developed. Germany is also part of the Central Western European Market and signed a “Memorandum of Understanding regarding the Central Eastern European Forum for Electricity Market Integration” as well as another “Memorandum of Understanding on the Baltic Energy Market Interconnection Plan”. At the retail level, while the number of electricity providers increased significantly, competition is still limited (Frontier Economics, 2010). The switching rate of consumer is low by international comparison (4.75% in 2008 while it is around 11% in Sweden and 9% in Netherlands), in particular for SMEs and households (4.7% vs. 17.4% in large industry). Even though consumers can achieve substantial savings by switching suppliers (EUR 160 per year), most of them do not make use of this possibility (*Bundesnetzagentur*, 2010). In addition, around half of consumers switching supplier went to one of the big four.

Competition is also underdeveloped in the natural gas market. The market is quite concentrated as gas is supplied by four principal market entities (E.ON Ruhrgas, Verbundnetz Gas, Wingas and RWE) and Germany is still divided in six markets areas. The natural gas market also lacks liquidity due to long-term supply contracts. Competition has improved as the number of suppliers has increased over the past few years. The number of market areas with only 1 to 5 suppliers was five times lower in 2009 compared to 2008. Furthermore, the system of long-term capacity booking was reformed in 2010 with an amendment of the Gas Network Access Ordinance. Under the former system, capacities were booked for two years according to a first come, first serve basis. The booked capacities were generally not used while not being available to other market entities (in three-quarters of the cases by distributors affiliated with the network operator) thus excluding small market entities from the market and permitting the network affiliates to maintain a dominant position in their traditional supply areas (*Bundesnetzagentur*, 2010). Now capacities are auctioned, thus removing barriers to grid access and simplifying the booking process. However, as on the electricity market, a majority of consumers are not benefiting from savings they could get from provider switching (*Bundesnetzagentur*, 2010).

Recent initiatives to increase liquidity and transparency on the spot market and to improve access to the gas network should contribute to raising the competition level (Box 2.3). The implementation of the third EU Energy Package – a set of measures promoting increased competition in EU gas and electricity markets – was also a step in the right direction. Unbundling rules will be tightened and the rights of consumers will be strengthened by increasing transparency of energy bills and creating a special body for out-of-court dispute settlement. However, additional measures should be considered to speed-up competition developments. The establishment of a new market monitoring body in charge of guaranteeing market transparency in the wholesale trade of gas and electricity as planned in the Energy Concept is welcome. Integration with the European energy market should also be accelerated.

Competition could also stimulate efficiency gains and eco-innovation as firms on contestable markets are encouraged to exploit new technologies to gain market share and as most radical innovations are performed by new firms (de Serres *et al.*, 2010). In particular,

empirical evidence suggests that eco-innovation is fostered by a higher probability of customer switching electricity suppliers (Jamassb and Pollitt, 2008). In this regard, it is unfortunate that consumer switching is low in Germany, thus making it difficult for new entrants to gain customers (Box 2.3). Providing information about switching possibilities, which is now an obligation defined in the third EU package, contributes to a proper development of competition at the distributional level. Initiatives from the Federal Network Agency to encourage consumers to find out about switching suppliers should be thus continued.

### **Investing further in eco-innovation**

Eco-innovation – defined as the implementation of new, or significantly improved, products (goods and services), processes, marketing methods, organisational structures and institutional arrangements which leads to environmental improvements compared to relevant alternatives – is needed to reach the 2020 targets and would reduce significantly the cost of their achievement. In addition, eco-innovation could also generate additional growth, thereby offsetting some of the adverse effects of emission reduction policies (OECD, 2011f).

Despite strong technological development over the past few decades, technologies and processes needed to significantly reduce emissions (“backstop” technologies) are still lacking (OECD, 2010b; Aghion *et al.*, 2009). In addition, the potential impact of technological development on CO<sub>2</sub> abatement cost is huge: OECD simulations show that the cost of climate change mitigation could be halved (from 4% of world GDP to 2% in 2050) if renewable technologies would be made competitive in the electricity and non-electricity sectors (OECD, 2011f). Given the ambitious targets both in terms of emission reduction and RES deployment and their associated costs, eco-innovation is required in many areas in Germany (Box 2.4). In particular, technological development and increased efficiency of the

#### **Box 2.4. Options for eco-innovation**

Eco-innovation could facilitate the achievement of the Energy Concept targets by addressing central challenges such as dealing with the intermittent nature of RES, for instance:

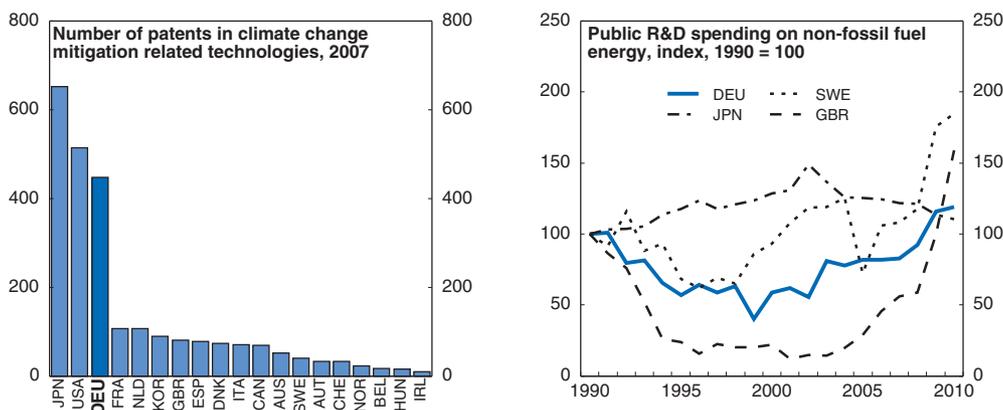
- Storage capacities for electricity are needed to deal with the variability of the RES supply. Available pumped-hydro capacities are limited in Germany and other technologies such as compressed air and hydrogen storage are not yet mature enough for industrial use. The use of smart charging stations for electrical cars is an example of innovative storage options that is now experimented within Berlin.
- Limiting peaks in energy consumption could facilitate the management of energy production. Demand side management technologies could limit the peak load requirement from fossil fuel fired power plants and reduce the cost of power generation by 0.02% of GDP by 2020 (Dena, 2010). For instance, smart electric meters – allowing consumers to get information on his/her energy consumption and its related cost and allowing suppliers to implementing peak load pricing – would contribute to reducing and smoothing energy consumption.
- Innovation will also be needed to improve the environmental performance of conventional power plants, as they will be necessary to complement the intermittent RES. The efficiency and the emission-intensity of fossil fuel power plants should be improved, for example by developing efficient cogeneration of heat and power stations.
- Carbon capture and storage technologies, whereby CO<sub>2</sub> is liquefied and pumped into underground cavities, should also be explored. A law allowing tests with an opt-out clause for those *Länder* where opposition to this technology is too high is currently discussed.

grid management can both play a central role in the adaptation to higher RES supply. It will determine at which cost and under what conditions investments will be done, which will be crucial not least from a cost-efficiency point of view, but also for public acceptance.

With strong innovative capacities and a broad industrial base, Germany has a long experience of policy-induced environmental innovation (OECD, 2011a). For example, regulation of air pollution in the 1970s and on waste in the 1980s triggered innovation in these sectors (Popp, 2004). New standards in the automotive sector and increasing fuel prices also led to a sharp increase in innovative solutions for limiting motor vehicle emissions (OECD, 2011a). Patenting activities in RES also accelerated after the introduction of feed-in tariffs, in particular in solar technologies after the implementation of the EEG Act in 2000. Overall, environmental policies were one of the main drivers of innovation in green technologies as they created a need for abatement solutions and market opportunities for innovative firms. Also the diffusion and adoption of these technologies benefitted from the implemented policies, in particular for RES (Johnstone *et al.*, 2010; Popp *et al.*, 2011).

Germany's innovation performance is in the upper range of OECD countries (OECD, 2010a), in particular in environmental technologies. Patenting activity in general environmental management activities constantly increased since 1980. In 2007, Germany was the third main producer of triadic patents in RES (OECD, 2011h). It also ranks third regarding the number of patent applications in technologies related to climate change mitigation (Figure 2.8, left panel). Regarding the number of patent applications per capita, Germany remains in third place after Denmark and the Netherlands.

Figure 2.8. **R&D spending and innovation in environmental areas**



Note: R&D spending on non fossil fuel energy refers to spending in the following areas: energy efficiency, renewable energy source, nuclear, hydrogen and fuel cells, other power and storage technologies and other cross-cutting techs/research. Patents in climate change mitigation related technologies refer to patent applications filed under the Patent Co-operation Treaty (PCT), by priority date and inventor's country of residence in renewable energy, electric and hybrid vehicles and energy-efficient buildings and lighting.

Source: IEA Database, Energy Technology R&D Statistics; OECD, Patent Database.

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Improving the climate change policy framework could further support eco-innovation in Germany. Uncertainty on the carbon market development and about future climate change mitigation policies make private returns of eco-innovation unpredictable. According to a recent Eurobarometer survey on "Attitudes of European entrepreneurs towards eco-innovation", more than 50% of firms state that uncertainty about the return on

investment, a too long payback period, or a too uncertain market demand are the main barriers for innovation. This suggests environmental policies should be highly predictable and credible to foster investment in green technologies. Thus, Germany should make clearer the measures that will be implemented to reach the targets fixed in the Energy Concept. When defining its climate change mitigation policies, the impact of the measure on innovation should be considered. In particular, the establishment of a credible, transparent, predictable carbon price would support the development of greener production processes, product and technologies (OECD, 2011g). Compared to “command and control” measures, pricing pollution provides greater incentive for innovation as it rewards for continual improvements (OECD, 2011h). In addition, while feed-in tariffs could have had a positive impact on innovation during the creation of the RES market, this effect may decline as technologies become profitable under the current scheme. Incentives included in the system (i.e. the degression rates which encourage efficient gains) may not be sufficient to foster innovation. Thus, strengthening incentives in the RES sector by conditioning the feed-in tariffs to the use of the most advanced technologies or to the performance level should be considered.

However, environmental policies alone may be not sufficient to trigger radical innovations which often are too far from the market to be developed by the private sector. A broad R&D support is thus needed to develop breakthrough technologies which require basic research with long-term and uncertain payoffs. In addition, in certain areas, including energy and environment, learning cost and scale effects may constitute entry barriers to new technologies (in particular in network industries such as the energy sector), thus necessitating government support. Germany is providing such a support, by offering a favourable innovation framework as well as targeted measures encouraging technology development in the energy and the environmental fields (in particular, with the recent 6th Energy Research Programme).

In addition to environmental policies, a favourable innovation framework with strong public support of R&D (beyond green sectors) and a good protection of intellectual property rights contributed to developing eco-innovation in Germany.<sup>10</sup> The level of total R&D spending is above the OECD average, accounting for around 2.6% of GDP in 2010. Both public and private spending are high by international comparison, with 67% of R&D expenditures funded by industry (versus 64% on average in the OECD) and government spending amounting to 0.76% of GDP (vs. 0.65% in the average OECD country). In particular, public R&D spending in the environment and energy sectors was slightly above the OECD average at around 0.06% of GDP in 2010. As in other OECD countries, public spending in non fossil fuel energy increased significantly over the past decade (Figure 2.8, right panel). The targeted support has progressively switched from nuclear and fossil fuels to RES and other non-fossil technologies (e.g. storage), encouraging patenting activities in these technologies (OECD, 2011a). In addition, collaboration between private and public spheres is well developed. Innovation policy involves many public and private actors, notably through the development of innovation alliances to coordinate and support joint research. The share of government expenditure on R&D financed by industry was more than twice the OECD average (9.3% vs. 3.8%) and the same holds for higher education expenditure on R&D (15.1% vs. 6.4%).

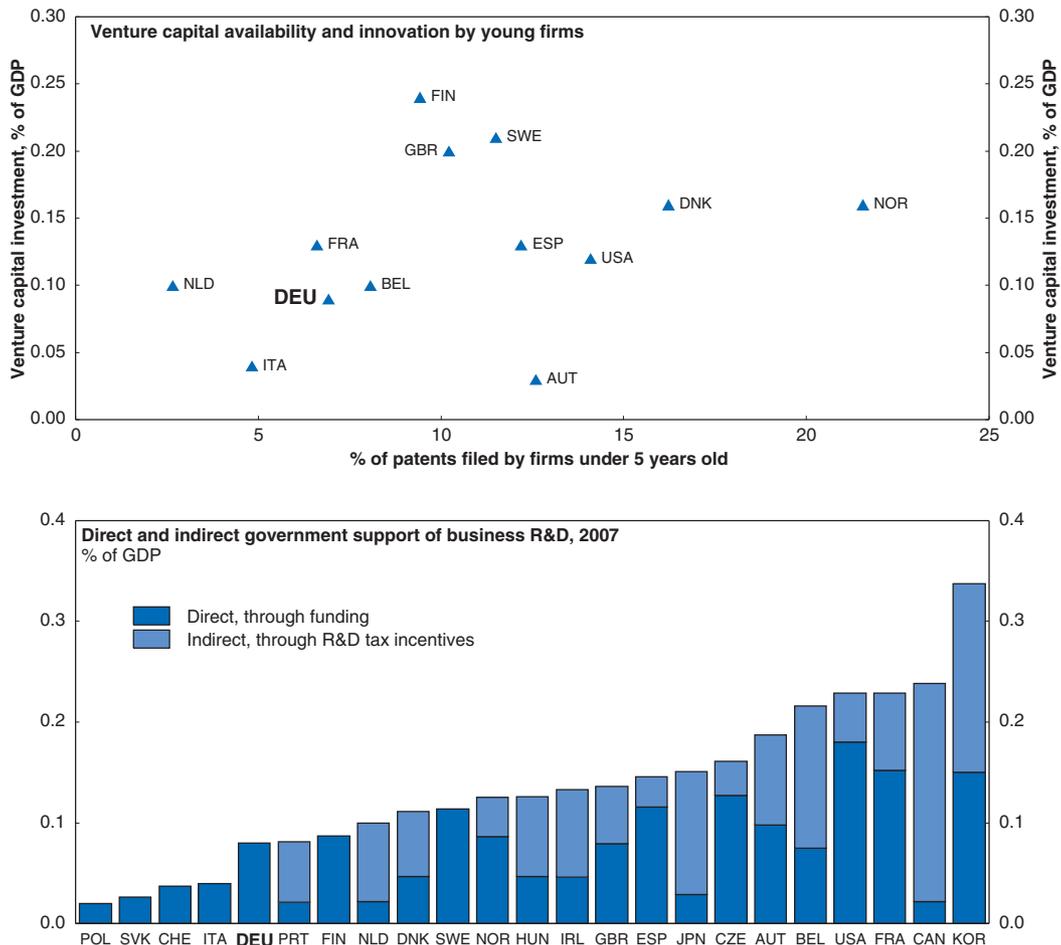
Innovation policy also includes measures to encourage the development, diffusion, and adoption of more mature technologies (e.g. zero emission buildings, efficient coal and gas fired power plants). For instance, the German Environmental Innovation Programme supports large scale demonstration projects in the heat and electricity sectors by providing soft loans. To improve the efficiency of these measures, coordination of support to

eco-innovation intensified recently. In 2008, Germany established the Master Plan on Environmental Technologies (included in the Hi-Tech Strategy 2020) – a horizontal project aiming at fostering eco-innovation – providing targeted R&D public funding and developing partnerships between the academic and the business spheres in environmental areas. In addition, the government plans to increase its financial support to R&D in the coming years. The Cabinet recently adopted the 6th Energy Research Programme providing EUR 3.5 billion (0.1% of GDP) for energy research on the period 2011-14, a 75% increase compared to 2006-09. Maintaining a high level of public funding in R&D is welcome, not least because direct public support proved being efficient: national grants leads to higher innovation input and better outcomes (Czarnitzki and Lopes Bento, 2011). In addition, foreign competition on eco-innovation is developing, with most of OECD countries increasing their R&D budgets.

However, despite this strong public support to innovation and R&D, indicators for innovation performance show a decline in German's innovative outcomes over the past few years, with a decrease in the number of triadic patents per capita produced and in the share of innovative firms (OECD, 2010a). Furthermore, innovation activities are concentrated in incumbents and large firms while SMEs and new firms are lagging behind. The share of patents filed by young firms is quite low compared to other innovative countries: only 7% of patents are filed by firms less than 5 years old, half of the US share and one third of Norway (OECD, 2010b). This is unfortunate as radical innovations are often performed by small firms.

As stressed in the previous *Survey* (OECD, 2010a), limited access to finance for start-ups is a major obstacle to innovative activities. As the return to investment in green technologies is highly uncertain, this barrier is likely to be even higher in environmental areas. Young high-tech firms in Germany are mainly financed with cash flows and own resources, as venture-capital financing is underdeveloped, in particular for the start-up phases (Commission of Experts for Research and Innovation, 2011). This is unfortunate as venture capital provides not only funds but also knowledge about the markets, entrepreneurial competences and networks of contacts supporting the creation and the development of start-ups. Cross-country evidence also suggests that the availability of venture capital is positively correlated with the patenting activity of young firms (Figure 2.9, upper panel). While some measures have been implemented recently, such as the Act on the *Modernization of Framework Conditions for Venture Capital and Equity Investments* (MoRaGK) in 2008 and the establishment of start-up funds (included in the High Tech Strategy), more needs to be done to mobilise venture capital in Germany. The government appropriately plans to improve the framework conditions for venture capital when implementing the EU Directive on Alternative Investment Fund Managers (AIFM) in national legislation. At this occasion, and as discussed in the previous *Survey* (OECD, 2010a), measures should be taken to reduce the strictness of the existing regulation, improve the transparency of the supervision system defined in the MoRaGK and provide venture capitalists with appropriate exit possibilities. In addition, Germany should consider accelerating the implementation of the AIFM Directive which is due until mid-2013.

Access to finance could also be improved by introducing indirect R&D support through the tax system as is the case in many other OECD countries. Government R&D support currently relies on direct government subsidies and does not include tax incentives, contrary to the majority of the OECD countries (Figure 2.9, lower panel). While the outcome of indirect R&D support depends significantly on its design and on country specificities, empirical studies indicate that tax incentives have a positive and relatively higher impact on private innovation compared with direct funding (OECD, 2010a). Indeed, they may be

Figure 2.9. **Financing innovation: venture capital and government support of business R&D**

Note: Venture capital investment is defined here as the sum of investments in “seed/start-up stages” and “early development and expansion stages” and refers to 2008. Patents filed refer to patent application filed under the Patent Co-operation Treaty in 2005-07. The R&D tax expenditures estimates do not cover sub-national R&D tax incentives. Austria estimate covers the refundable research premium but excludes other R&D allowances. The United States estimate covers the research tax credit but excludes the expensing of R&D. Data refers to 2008 for several countries. Source: OECD (2010b), *Measuring innovation*.

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more efficient than direct government support as they avoid “picking winners” and as there are deadweight losses related to the asymmetry of information on the market value of innovation. Implementing tax credits also tends to stimulate venture capital for young companies (Commission of Experts for Research and Innovation, 2011). It also tends to be more beneficial for smaller companies, as they have fewer resources to deal with the heavy administrative workload often related with applications for direct government support. Finally, tax incentives would make Germany more attractive as a location for research as most of other OECD countries already provide this support (Ernst and Spengel, 2011). Thus, as recommended in the previous *Survey* (OECD, 2010a), consideration should be given to complementing the direct support with tax incentives. Particular attention should be given to the design of such instrument to maximise the impact of the policy while minimizing deadweight losses. The features of the tax incentives – including the level, the form (*e.g.* tax

deferrals, tax allowances or tax credits), the base (*e.g.* level or increment of R&D expenditures) and the coverage (*e.g.* total or partial with targeted support) – should be carefully determined in function of Germany’s specific needs.<sup>11</sup> Only a very small percentage of green technology patents between 2000 and 2007 draw on environmental or energy R&D (OECD, 2011f). Tax incentives should thus not be targeted to environmental outcomes but rather encourage innovation on a broader base. Finally, as tax incentives tend to encourage mainly marketable innovations rather than projects with a high social value, Germany should maintain direct research funding, notably by using public tenders.

Finally, shortages of skilled workers risk undermining eco-innovation in the near future. As pointed out in the previous chapter, ageing combined with a low level of tertiary education attainment will create significant shortages on the labour market limiting the development of new activities while reducing Germany’s attractiveness as an investment location. In addition, shortages of high-skilled workers reduce the innovative and absorptive capacity of the economy which significantly relies on the quality of human capital formation. Job creation in green technologies could also be limited by labour shortages as the development of green sectors necessitates skilled workers which are already lacking on the German labour market (Michaels and Murphy, 2009). Indeed, a green economy is high-skill-intensive: 30% of employees in green sectors are tertiary graduates compared to 20% in other sectors, suggesting the lack of tertiary graduates could limit the creation and diffusion of green technologies (BMU, 2009). Shortfalls in adequate labour force are already visible: compared to the EU average, German firms more frequently identify the lack of qualified personnel as a barrier to eco-innovation. A study from the Federal Environment Agency also shows that energy efficient renovations in the building sector are already hampered by lack of qualified workers (UBA, 2011c). Thus, in addition to reforms Germany should implement to address labour shortages and to improve the qualification level of the population (Chapter 1), it should make sure sufficient training is provided to meet greening labour market needs.

#### Box 2.5. Recommendations for climate change mitigation and green growth policy

##### Climate change mitigation

- Contribute to discussions at EU level about possible measures to maintain an effective carbon price signal in the EU ETS in line with overall medium and long-term EU emission reduction targets. Consider creating an effective carbon tax in the sectors not covered by the EU ETS and ensure that other, non-carbon related, externalities are adequately priced.
- Eliminate exemptions and reduced energy tax rates (except if they are designed to avoid double taxation, notably in sectors covered by the EU ETS) and accelerate the removal of coal subsidies. Revise environmentally harmful tax expenditures.
- Restrict subsidised loans to low income households or credit constrained firms and implement proposed changes in rent regulation which can further remove obstacles to energy savings investments in rental housing.
- Continue to monitor the generosity of feed-in tariffs and adjust them in line with market developments. In addition, implicit CO<sub>2</sub> abatement costs related to feed-in tariffs should be maintained at reasonable levels.

**Box 2.5. Recommendations for climate change mitigation and green growth policy (cont.)**

**Green growth**

- Provide adequate incentives for the transmission systems operators to invest in the most efficient technologies while extending the grid. Further implement measures which aim at more transparency and public involvement in the decision process of grid extension.
- Improve competition on the electricity and gas markets by raising further the interconnection capacity of the electricity grid and the awareness for consumers about the option to switch their energy supplier.
- Maintain public support for basic research activities, consider implementing an R&D tax credit for innovative firms and raise the availability of risk financing.

**Notes**

1. While considered as the most climate-unfriendly energy source, coal is still extensively used for electricity generation. Coal and peat account for 44% of the electricity production in Germany, almost double the OECD average in Europe (23%).
2. A recent study from the Federal Environment Agency indicates that the measures defined in the Integrated Energy and Climate Program in 2007 will only result in an emissions reduction of 30-33% compared to 1990 (UBA, 2011a).
3. One option would be to extend the energy tax in the sectors covered by the EU ETS at a flexible rate, thereby ensuring a certain level for the carbon price as proposed in the UK (OECD, 2011c).
4. The German fiscal consolidation package from 2011 to 2014 includes the removal of some eco tax and energy tax exemptions. From 2011, the tax reduction for industry and agriculture has been limited from 40% to 25%, the minimum tax payments raised from around EUR 500 to EUR 1 000 and the peak equalisation scheme reduced from 95% of the tax payment exceeding the relief of social contributions to 90%.
5. Following energy efficient renovation, the landlords can increase the rent by 11% annually until the costs have been compensated. However, the rent cannot increase above a certain percentage of the local comparative rent, which might not take into account energy efficiency aspects.
6. Dena (2011) estimates the total cost of the German energy policy at around EUR 4-5 Ct/kWh. This evaluation includes the cost of grid extension that would have occurred even without the RES development.
7. In 2009, Germany was the largest world market for solar equipment with 53% of newly installed capacities (OECD, 2011a). Feed-in tariffs decline as a function of the amount of capacity installed. Each GW installed in excess of the baseline would result in an additional 1% degression (up to 13% in 2011 and 3% in 2012 (up to 21%). Since 2011, the degression rates are revised twice a year to smooth adjustments.
8. 65% of the value added in green sectors is produced domestically; this compares with 22% in the automotive sector.
9. The Federal Network Agency is responsible for the two first steps of consenting process, the justification of each project and the geographical route, for trans-national and trans-regional high voltage lines and for new projects above or equal to 110 kV. Local authorities are still in charge of the final site approval.
10. The protection of intellectual property rights is within the OECD average (Park and Lippoldt, 2008). By ensuring inventors that their invention will not be used without compensation and guaranteeing they will get the full returns on their investment, the protection of property rights is a crucial factor for a high level of patenting activities.
11. An overview of issues to be considered when designing fiscal support for business R&D is available in OECD (2011j).

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Please cite this publication as:

OECD (2012), *OECD Economic Surveys: Germany 2012*, OECD Publishing.

[http://dx.doi.org/10.1787/eco\\_surveys-deu-2012-en](http://dx.doi.org/10.1787/eco_surveys-deu-2012-en)

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**Volume 2012/4**  
**February 2012**

**OECD** publishing  
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ISSN 0376-6438  
2012 SUBSCRIPTION (18 ISSUES)  
ISSN 1995-3194  
SUBSCRIPTION BY COUNTRY

ISBN 978-92-64-12706-7  
10 2012 02 1 P 9



789264 127067