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Germany's Growth  
Potential, Structural  
Reforms and Global  
Imbalances

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**GERMANY'S GROWTH POTENTIAL, STRUCTURAL REFORMS AND GLOBAL IMBALANCES**

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**By Isabell Koske and Andreas Wörgötter**

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## SUMMARY/RESUME

**Germany's growth potential, structural reforms and global imbalances**

The potential growth rate of the economy has been low for a long time and the crisis has had a further adverse impact. The meagre growth performance mainly reflects low growth in a number of services sectors; most manufacturing sectors, by contrast, expanded at a rapid pace in the years preceding the recent crisis, on the back of robust foreign demand. The challenge is to consolidate the past success of the export sector and to broaden it to the whole economy by making the policy framework more conducive to innovation and structural change. Specifically, product market regulation needs to be eased to prevent it from sheltering uncompetitive industries; the framework conditions for innovation need to be improved; the education system needs to be reformed further to supply a sufficiently large pool of highly qualified labour; and immigration policy needs to become more favourable to the immigration of high-skilled. Strengthening Germany's attractiveness as a location for investment would contribute to a higher trend growth rate through lifting barriers to higher growth, which are particularly binding in the non-traded goods sector. This would reduce Germany's current account surplus and make a contribution to reduce global imbalances. This paper relates to the *2010 OECD Economic Survey of Germany* ([www.oecd.org/eco/surveys/germany](http://www.oecd.org/eco/surveys/germany)).

*JEL Classification:* D24, F16, K2, N3

*Keywords:* Germany; potential growth; global imbalances; structural reforms; product market regulation; innovation; education; migration

\* \* \* \* \*

**La croissance potentielle de l'Allemagne, des réformes structurelles et les déséquilibres mondiaux**

Le taux de croissance potentiel, faible depuis longtemps, a encore fléchi sous l'effet de la crise. Cette faiblesse tient surtout au manque de dynamisme d'un certain nombre de secteurs de services ; la plupart des branches manufacturières, en revanche, ont connu une expansion rapide au cours des années qui ont précédé la crise, grâce à une demande extérieure soutenue. Il s'agit aujourd'hui de consolider les résultats enregistrés jusqu'ici par les secteurs exportateurs et de faire en sorte que l'économie tout entière suive la même voie, en rendant les politiques publiques plus propices à l'innovation et au changement structurel. En particulier, il faut assouplir la réglementation des marchés des produits afin d'éviter qu'elle ne protège les activités non compétitives, améliorer les conditions cadres de l'innovation, réformer le système éducatif de manière à former un nombre suffisant de travailleurs très qualifiés, et faire en sorte que la politique d'immigration facilite davantage l'entrée de travailleurs hautement qualifiés. Renforcer l'attractivité de l'Allemagne en tant que lieu d'investissement contribuerait à augmenter son taux de croissance potentiel en éliminant les obstacles à la croissance, qui sont particulièrement contraignants dans les secteurs de biens non échangeables. Ceci pourrait réduire l'excédent du compte courant de l'Allemagne et contribuer à réduire les déséquilibres mondiaux. Ce document se rapporte à *l'Étude économique de l'Allemagne de l'OCDE, 2010*, ([www.oecd.org/eco/etudes/allemande](http://www.oecd.org/eco/etudes/allemande)).

*JEL Classification:* D24, F16, K2, N3

*Mots clés:* Allemagne ; croissance potentielle ; déséquilibre mondiaux ; réformes structurelles ; réglementation des marchés des produits ; innovation ; éducation ; migration

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## GERMANY'S GROWTH POTENTIAL, STRUCTURAL REFORMS AND GLOBAL IMBALANCES

by Isabell Koske and Andreas Wörgötter<sup>1</sup>

### Considerable scope remains to lift potential growth

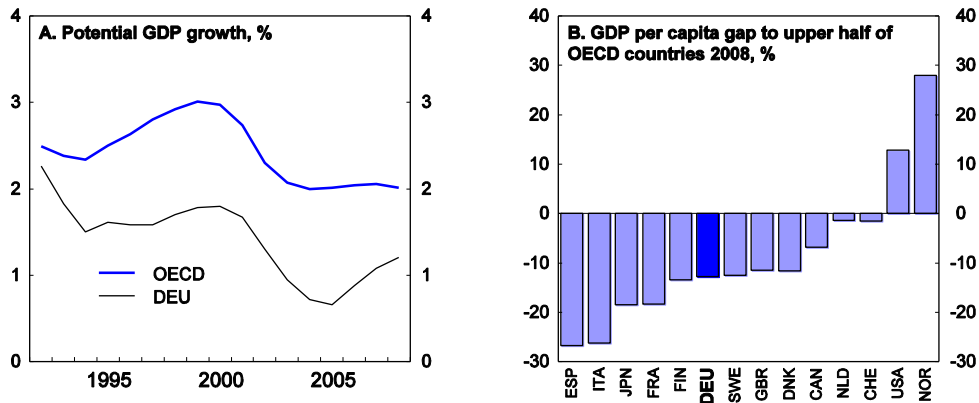
Although the volatility of GDP growth over the last years - the strong upswing in 2006/07 followed by the harsh downturn in 2008/09 - has drawn attention away from the dismal underlying growth performance, the low potential growth rate of the economy remains a fundamental reason for concern. Between 2000 and 2008, potential growth averaged around 1.1%, more than 1 percentage point below the OECD average (Figure 1, panel A). Even though several reforms have helped push up potential growth in recent years (for example, the *Hartz* reforms contributed to an increase in labour utilisation), the room for improvement remains large. The country's GDP *per capita* gap *vis-à-vis* the upper half of OECD countries also widened further over the past decade. In 2008, the GDP *per capita* level stood at 86% of the average of the upper half of OECD countries, placing the country 14th in the OECD (Figure 1, panel B). Simultaneously Germany's current account surplus widened to 7.9% in 2007 after having been slightly negative during the post-unification boom at the beginning of the nineties.

### *Growth has been particularly slow in a number of services sectors...*

Growth has been particularly weak in several services sectors (Table 1). Overall, value added growth in market services<sup>2</sup> over the period 2000-07 was 2.2% per year, considerably lower than the 3.4% rate achieved by the United States or the 4.2% rate achieved by the United Kingdom and also much lower than the OECD average of 3.1%. The difference with the OECD average was particularly marked for wholesale and retail trade, where growth was more than 1½ percentage points lower in Germany (though it has to be acknowledged that in some countries growth in this sector prior to the recent crisis was overstated by cyclical developments and that value added in wholesaling has picked up in Germany in recent years with average annual growth over 2005-07 exceeding the OECD average by around ½ percentage point). Other sectors with below-average growth include business services, education, and personal services such as culture and sports. The special situation of services sectors is also reflected in the composition of value added (Figure 2). Market services account for about 46½ per cent of total value added, which is the second lowest share among the G7 economies (after Japan).

- 
1. OECD Economics Department. This paper builds on Chapter 5 of the *2010 OECD Economic Survey of Germany*. The authors would like to thank Felix Huefner, Bob Ford, Andrew Dean for valuable comments on earlier drafts. Excellent research assistance from Margaret Morgan and secretarial assistance from Josiane Gutierrez is gratefully acknowledged.
  2. Wholesale and retail trade, restaurants and hotels; transport, storage and communications; finance, insurance, real estate and business services.

Figure 1. Potential growth and living standards



Note: In panel B, percentage gap with respect to the simple average of the upper half of OECD countries in terms of GDP *per capita* in constant 2005 PPPs.

Source: OECD, Economic Outlook and National Accounts Databases.

Table 1. Value added growth by sector

Annual average 2000-07, %

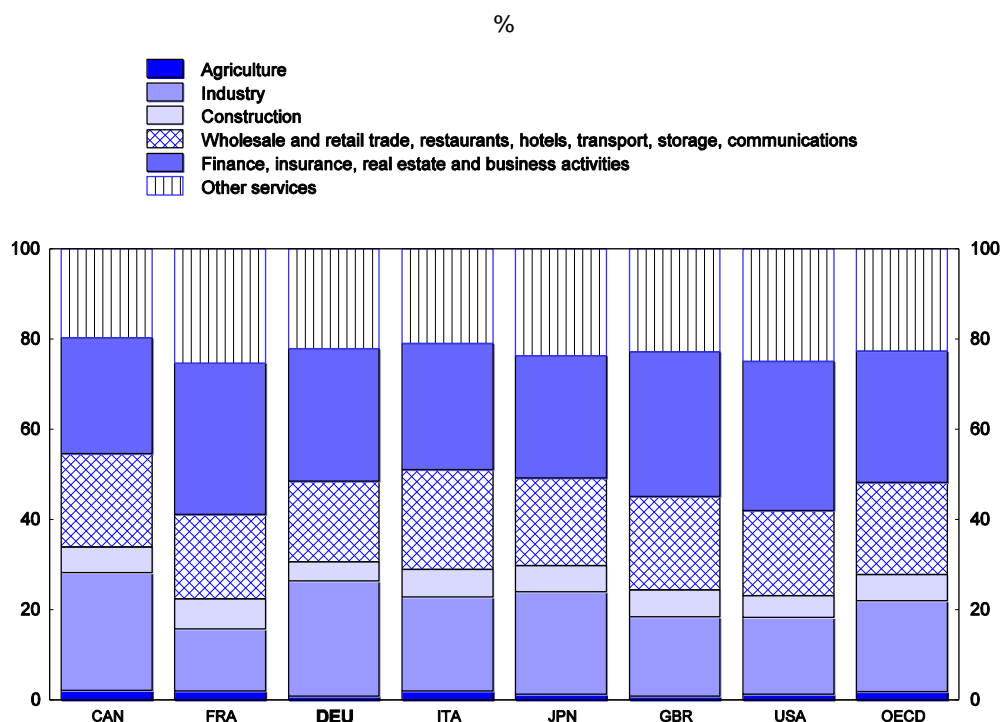
	DEU	OECD <sup>1,2</sup>	FRA	ITA	JPN <sup>1</sup>	GBR	USA
Total	1.7	2.4	2.1	1.5	1.4	2.7	2.5
Agriculture, hunting, forestry and fishing	0.4	1.4	-0.3	-0.7	-0.9	0.9	4.5
Mining and quarrying	-5.0	-1.5	-	-0.8	1.7	-4.8	-1.5
Manufacturing	2.7	2.4	1.4	0.7	2.7	0.4	2.4
Electricity, gas and water supply	0.7	1.9	2.7	1.2	2.0	1.2	1.8
Construction	-3.3	0.1	2.1	2.5	-2.2	2.6	-2.3
Market services	2.2	3.1	2.8	2.0	1.4	4.2	3.4
Wholesale and retail trade, restaurants and hotels	1.5	2.5	1.7	1.0	0.0	3.1	3.3
Transport, storage and communications	3.2	3.8	4.0	3.7	1.4	3.8	4.1
Finance, insurance, real estate and business services	2.3	3.2	3.0	2.3	2.4	4.8	3.3
Community, social and personal services	1.1	1.8	1.1	1.1	1.6	1.8	1.8

1. 2000-06.

2. Weighted average of 27 OECD countries (mining and quarrying: 24 OECD countries), using real GDP in 2005 purchasing power parities as weights.

Source: OECD (2009), STAN Database for Structural Analysis.

Figure 2. Composition of value added



Note: OECD refers to the average of shares of value added of 27 member countries using as weights 2005 GDP in 2005 USD PPPs. Shares refer to 2007 for Japan, USA and OECD, 2004 for Canada and 2008 otherwise.

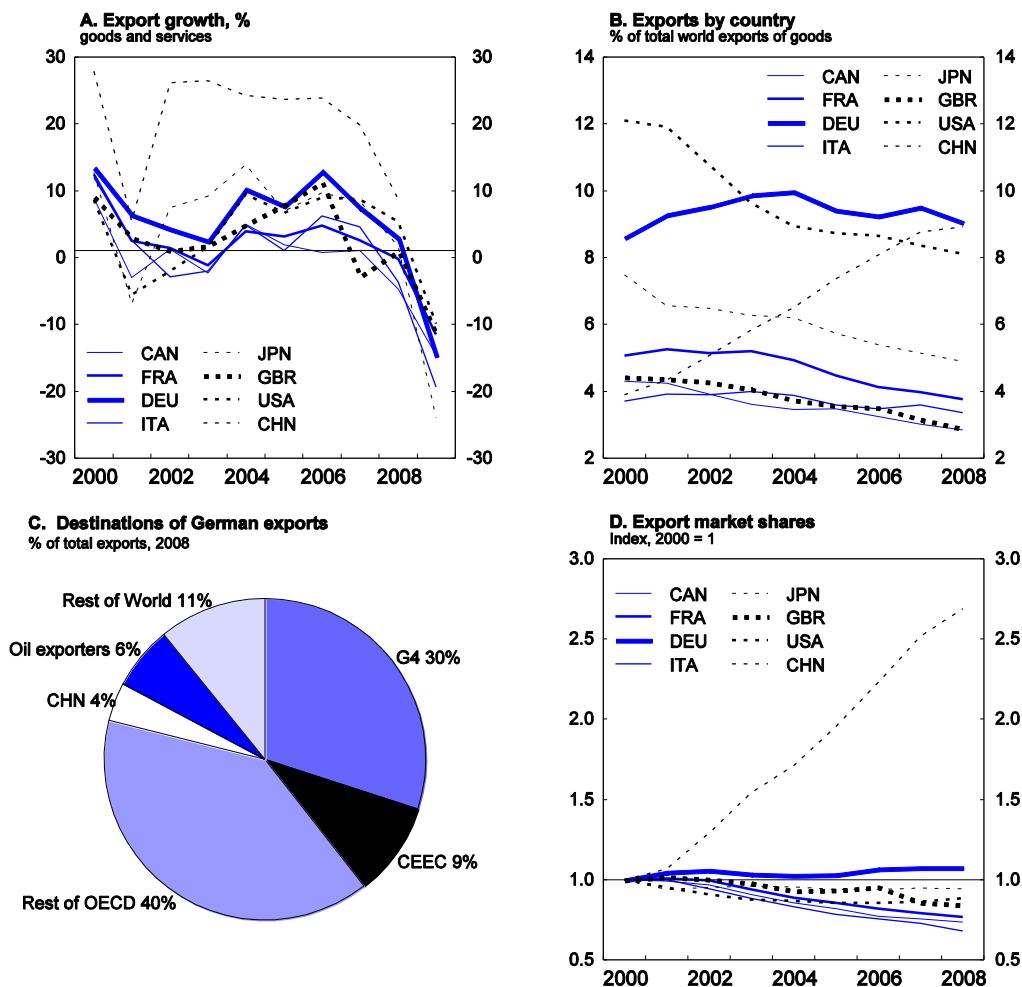
Source: OECD, National Accounts Database.

### *...whereas most export-oriented manufacturing sectors expanded rapidly*

In contrast to services sectors, most manufacturing sectors expanded rapidly prior to the recent crisis, helped by robust foreign demand. Growth was particularly strong in the machinery and equipment sector as well as in the transport equipment sector, with average annual growth of around 5% between 2000 and 2007. The robust growth in manufacturing sectors was mirrored in a surge in exports (Figure 3, panel A). Even though the export boom became most visible during the last recovery, which especially at the beginning had relied exclusively on foreign demand, export growth had been strong also in earlier years. Between 1995 and 2007 real exports increased by 8% per year on average. Germany was recently overtaken by China as the world's largest exporter (at current exchange rates), but still accounts for about one-tenth of total world exports (Figure 3, panel B). The strong increase in both imports and exports during past years led to the emergence of the bazaar theory, according to which Germany is merely a trading floor for goods and services (Box 1).



Figure 3. Some stylized facts about foreign trade



Note: In panel A, data for 2009 for CAN, ITA, GBR refer to averages based on Q1 to Q3. G4 refers to France, Italy, United Kingdom and United States. CEEC refers to Czech Republic, Hungary, Poland and Slovak Republic. In panel D, export market shares are calculated as the ratio between the volume of exported goods and services and a measure of export market, where the latter is calculated using the methodology outlined in Box A of Pain, N., A. Mourougane, F. Sédillot, and L. Le Fouler (2005), "The new international trade model", *OECD Economics Department Working Papers*, No. 440.

Source: OECD (2009), *Economic Outlook*, No. 86; IMF (2009), *Direction of Trade Statistics*; and OECD National Accounts Database.

### Box 1. The bazaar theory debate

The bazaar economy theory developed by Sinn (2006) stipulates that high and rigid domestic wages caused German companies to respond to growing competition from low-wage countries by shifting domestic value added towards physical and human capital intensive downstream activities, while outsourcing and/or offshoring upstream activities, which make greater use of unskilled labour, to foreign countries (central and eastern Europe in the automobile industry, Asia for computer components). These upstream activities are then re-imported as intermediate goods. To some extent, such a shift is in line with the international division of labour – and thus welcome – as Germany is capital rich. However, Sinn argues that wage rigidities in Germany prevented factor price equalisation and thus led to excessive outsourcing/offshoring by firms. As a consequence, Germany moved away from producing goods towards merely trading them. This bazaar effect is reflected in an increase in FDI outflows, an increase in exports (as the internationalisation of supply chains helped German firms to improve their cost competitiveness), an increase in the import share of exports, and a decline in the depth of domestic production. Moreover, as the shrinking labour intensive sectors set free more workers than the expanding capital intensive sectors could absorb, unemployment increased. According to the argument, if wages had been allowed to decline, large parts of labour intensive industries would have survived and industries would have been induced to choose less capital intensive production processes.

The bazaar theory has caused much dispute in the German economic debate over the past years. In a recent paper, Snower *et al.* (2009) argue that the globalisation process that started in the mid-1990s is not characterized by a specialization of developed countries on skilled labour and capital intensive products as stipulated by Sinn (2006), but rather by a geographic decomposition of value chains with workers, performing similar tasks in different countries, competing with each other. The implications of Sinn's theory were also challenged empirically. For example, Moser *et al.* (2009) cannot find any evidence that offshoring reduces the depth of domestic production as implied by the bazaar theory. Instead, offshoring plants increase their domestic and foreign market share against firms that do not offshore, thanks to productivity improvements.\* Similarly, Bundesbank (2006a) shows that outward German FDI has a neutral effect on domestic business investment in the short run, while raising it in the long-run.

Nonetheless, offshoring might be associated with a decline in domestic labour demand if the gains that are associated with the improvements in international cost competitiveness do not outweigh the losses that stem from the relocation of jobs to foreign countries (see also Sachverständigenrat, 2004). Empirical studies for Germany yield mixed results on this issue. Using micro data, Moser *et al.* (2009) find that the downsizing effect on labour demand outweighs the productivity effect. In line with this, Becker *et al.* (2005) find that a 1% larger wage gap between Germany and central and eastern European host countries is associated with 0.05% smaller employment in German multinational parents. Geishecker (2006) shows that international outsourcing is an important explanatory factor for the observed decline in relative demand for manual workers in German manufacturing sectors during the 1990s. In a later study he finds that international outsourcing markedly reduces individual employment security with the effect roughly equal across different skill levels (Geishecker, 2008). Bachmann and Braun (2008) by contrast cannot find any significant impact of international outsourcing on overall job stability in the manufacturing sector (in the service sector job stability even rises), though the authors acknowledge that unemployment risk increases for some groups of manufacturing workers, notably the medium-skilled and the elderly. A similar result is obtained by Molnar *et al.* (2008), showing that an expansion of employment in the foreign affiliates of German-owned companies does not have any significant impact on domestic employment. A number of studies even point to positive domestic employment effects of offshoring activities (e.g. Klodt, 2004; Kreditanstalt für Wiederaufbau, 2004).

\* Empirical evidence on the link between international outsourcing and productivity is also presented by Amity and Wei (2006); Egger and Egger (2006); and Görg *et al.* (2008).

One factor behind the strong growth in exports was a rapid expansion of global economic growth and thereby Germany's potential export market. Between 2000 and 2007, the size of the potential export market (measured as the weighted sum of goods and services imports by Germany's trading partners) increased by more than 50%. Despite the rising importance of non-OECD economies (in particular, China and oil-exporting countries) as a destination for German exports, the OECD still purchases around 80% of

goods shipped abroad (down from 85% in 2000).<sup>3</sup> Among OECD countries, the central and eastern European countries (*i.e.* the Czech Republic, Hungary, Poland, and the Slovak Republic) saw the strongest increase in their demand for German goods (Figure 3, panel C). However, despite similar increases in their potential export markets, most other OECD countries did not experience an export boom of a magnitude comparable to that of Germany.<sup>4</sup> What set German companies apart from their competitors in other OECD countries was their ability to gain market share at a time when low-cost emerging countries were entering the global economy. Whilst many OECD countries suffered market share losses during recent years to the benefit of emerging economies from Asia and central and eastern Europe, German exporters were able to even slightly expand their market share (Figure 3, panel D).

Empirical evidence indicates that the market-share gains resulted to a large extent from improvements in the price competitiveness of German products (Box 2). Nominal wages grew at very low rates, especially from the 2002/03 recession onwards, pushing down unit labour costs. Indeed, in 2008, the level of real wages (deflated with the GDP deflator) was virtually the same as in 2001. German companies also benefited from cost reductions by offshoring and/or outsourcing parts of their supply chains to lower-cost countries in central and eastern Europe (Box 1).<sup>5</sup> Marin (2004) estimates that unit labour costs can be reduced by around 72% through such offshoring activities. Non-price factors, which were mostly behind the export gains observed during the 1990s, seem to have played only a minor role in the pre-crisis surge in exports.

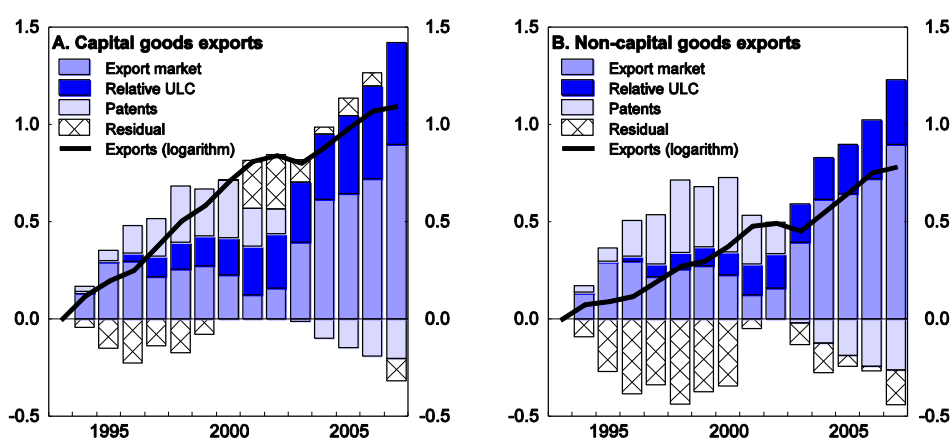
#### **Box 2. What drove the German export boom?**

A number of empirical studies have investigated the reasons behind the strong increase in German exports. Allard *et al.* (2005) show that an increase in foreign demand was the main factor behind the growth of goods exports between 2001 and 2004, whereas much of the increase in services exports is explained by a time trend (an increase in foreign demand played a somewhat smaller role). An appreciation of the unit labour cost based real effective exchange rate made a negative contribution to export growth, though the size of the effect is relatively small in the case of goods exports. Danninger and Joutz (2007) explore the relevance of four potential explanations: ties to fast growing trading partners, improvements in cost competitiveness through offshoring, improvements in cost competitiveness through wage moderation, and specialisation on capital goods. The authors find that the first two factors account for about 60% of the faster increase of German exports between 2000 and 2005 *vis-à-vis* other industrial countries, whereas relative declines in unit labour costs contributed relatively little. Regarding the role of Germany's specialisation on capital goods, the authors do not obtain conclusive results. A similar conclusion is drawn by Stahn (2006) who regresses exports on real demand in export markets and a measure of price competitiveness (deflator of total sales relative to competitor countries). The influence of economic activity in trading partner countries is found to have outweighed the effect of price competitiveness over the period 1993 to 2004. Bundesbank (2006c) also takes into account the role of non-price competitiveness, measured as the level of German inward and outward direct investment relative to global direct investment stocks. The study finds that improvements in price competitiveness were the main factor behind the market share gains between 1995 and 2005 with improvements in non-price competitiveness (though statistically significant) playing a negligible role.

3. This comparison does not take into account that some of the goods exported to other OECD countries are (perhaps after some further processing) re-exported to non-OECD countries or *vice versa*.
4. Only Korea and the four central and eastern European OECD countries recorded an even larger increase in their exports than Germany over the period 2000 to 2007. Germany's export performance therefore sticks out among larger, more developed economies.
5. These outsourcing and offshoring activities can also explain the above mentioned surge in German exports to these countries as the foreign-based subsidiaries or contracting firms are likely to have been equipped at least in part with capital goods produced in Germany and are sourcing intermediate inputs from there (Bundesbank, 2006b). Similarly, the strong increase in imports from central and eastern Europe might be explained by subsidiaries or contracting firms supplying intermediate goods or finished products to the group's parent company.

To further explore the reasons behind the strong increase in German exports a number of equations are estimated relating the volume of exports to a measure of export market, and measures of price and non-price competitiveness (see Appendix A1 for details on methodology and dataset). The equations are estimated separately for capital and non-capital goods to explore whether the importance of explanatory variables differs across the two types of goods. The estimation results indicate that the strong growth in capital goods exports observed during the 1990s was to a large extent caused by improvements in the non-price competitiveness of German exports (Figure 4, panel A). The increase in the number of triadic patents per million population filed each year at the European Patent Office, the Japan Patent Office and the US Patent and Trademark Office relative to the number of patents of competitor countries explains two-fifths of the increase in capital exports observed between 1993 and 2000. From 2000 onwards, changes in the non-price competitiveness did not contribute much to the surge in capital goods exports, a finding that is consistent with Bundesbank (2006c). From 2003 onwards the variable even contributed to a decline in capital goods exports as the number of patents grew more slowly in Germany than in its competitor countries. By contrast, export growth was supported by improvements in the price-competitiveness of German products. From 2000 to 2007, German unit labour costs declined by 1¾ per cent whereas they increased by 16½ per cent (on a trade weighted basis) in competitor countries. The picture looks fairly similar for non-capital goods exports (Figure 4, panel B). Improvements in the cost-competitiveness of German firms contributed to growing exports in recent years, which was more than offset by losses in non-price-competitiveness. The growth in non-capital goods exports was thus solely due to an expansion of the size of Germany's export market, while market share was lost.

Figure 4. Determinants of capital and non-capital goods exports



Source: OECD estimates.

The export boom was suddenly stopped by the global economic crisis. In the second quarter of 2009, German exports were about 18½ per cent lower than a year before, the sharpest decline in post-war history. Although Germany was not an outlier in this respect – the majority of OECD countries recorded unprecedented declines in their export volumes during this period – it was harder hit than many others. The reason for this lies in the composition of German exports, which are heavily skewed towards those sectors that were most affected by the crisis. Machinery and transport equipment is the leading export sector, accounting for around two-fifths of total exports. Exports of this sector dropped by around a third between the second quarter of 2008 and the second quarter 2009, with particularly pronounced declines for vehicles and vehicle components, which have the highest weight within the machinery and transport equipment sector.<sup>6</sup>

6. See OECD (2009a) for a discussion of the impact of the crisis on the automotive industry.

### **Economic dynamism needs to be consolidated in export sectors and broadened elsewhere ...**

The collapse in exports fuelled concerns among some commentators about an over-reliance on exports as the main source of economic growth. However, the setback faced by export industries will most likely be a temporary phenomenon with export growth expected to recover alongside a recovery of world GDP. The real policy challenge therefore lies elsewhere. *Firstly*, the past success of the export sector needs to be broadened to the whole economy. To the extent that the expansion of certain sectors – notably services sectors – is held back by policy (*e.g.* in form of industrial policy or regulation favouring specific sectors), such policy has to be changed to allow these sector to flourish and make use of the opportunities offered by globalization.

*Secondly*, policymakers need to ensure that there are no structural impediments that could hinder firms from maintaining and/or expanding their competitive edge. Globalisation means that firms are heavily exposed to foreign competition, a fact that does not only apply to manufacturing firms but more and more also to services firms given that many services are nowadays also traded internationally. The rising integration of emerging countries in the global economy challenges the existing comparative advantages of firms in OECD countries.<sup>7</sup> Relying primarily on cost cutting in order to stay competitive as happened during the export boom years of 2004–07 does not appear to be a sustainable business model for them in the medium to long run due to the large pool of cheap labour that is available in emerging markets, most notably China and India. Instead, they need to rely more on improvements in the quality and variety of products and services as happened during the 1990s (Box 2) and focus more on knowledge-intensive, high value-added activities (OECD, 2007a). Although Germany appears to be reasonably well positioned in terms of the knowledge intensity of its products (Box 3) there is a risk that this advantage will not last as emerging markets are likely to enter those activities in which German companies are currently strong.

Improving economic dynamism and increasing the attractiveness of Germany as a location for investment through structural reforms would also contribute to a reduction of external imbalances. As discussed in Chapter 1 of OECD (2010a), the decline in domestic investment by the corporate sector in the first half of the 2000s contributed significantly to the increase in the current account surplus. This decline in domestic business investment was reflected in net capital outflows, which partly took the form of foreign direct investment with firms attempting to benefit from the more favourable business environment particularly in eastern Europe, and partly in the form of foreign net lending by banks. Structural reforms could reverse this trend by encouraging firms to invest more heavily within Germany as opposed to abroad, which would also translate into higher bank lending to the domestic corporate sector.

#### **Box 3. The knowledge intensity of German products**

The rising trade integration of emerging economies requires companies in OECD countries to move up the value chain in order to keep their competitive edge. The share of high- and medium-high-technology manufacturing in OECD value added has been declining over the past decade, reflecting the continuing global shift of such activities towards non-OECD countries (OECD, 2007a). Of the larger OECD countries, only Germany, Japan and Korea have maintained a strong and persistent presence in high and medium-high-technology manufacturing. The share of knowledge-intensive market services, by contrast, has steadily risen, now accounting for more than one-fifth of OECD value added.

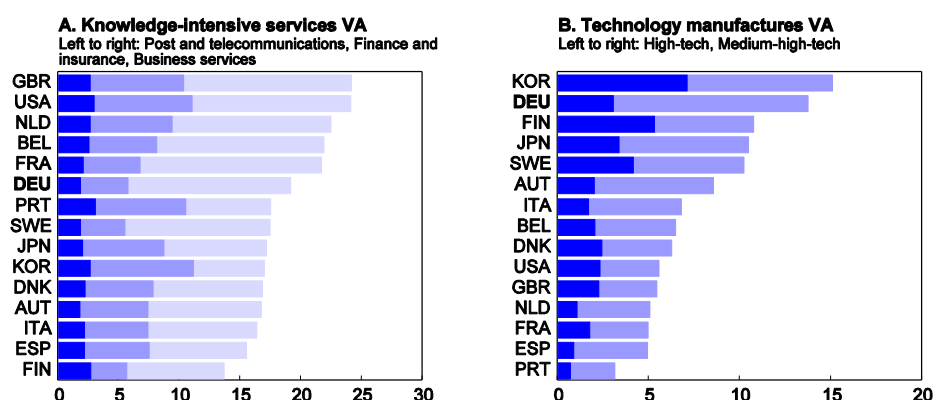
In Germany, knowledge-based market services account for 19½ per cent of value added, which is just slightly below the OECD average (Figure 5, panel A). Within this category, business activities (*e.g.* legal and accounting activities, consultancy) have the highest weight, whereas financial and insurance services play a more

7. As argued by Snower *et al.* (2009), new advances in information and telecommunication technologies enable companies to decompose their various stages of production geographically into clusters of tasks, locating each cluster in the country and region where it is the most profitable.

moderate role. At the same time, Germany is the largest producer of medium-high-technology manufacturing goods (Figure 5, panel B), with machinery and equipment and transport vehicles accounting for the lion's share. The share of high-technology manufactures in total value added is about the OECD average with medical, precision and optical instruments being relatively overrepresented and radio, television and communication equipment being relatively underrepresented. The composition of Germany's value added is mirrored in its trade structure. Looking at net exports (which allows a better assessment of a country's strengths and weaknesses than simply looking at exports since the rising importance of global value chains makes exports heavily dependent on imports in the same industry) shows that Germany specializes in medium-high-technology products, where it has a trade surplus of around 7%.<sup>1</sup>

**Figure 5. Technology manufactures and knowledge-intensive market services**

% of total gross value-added (VA), 2007 or 2006



Note: Data refer to 2007 for Austria, Belgium, Denmark, Finland, France, Germany, Italy and Spain and 2006 otherwise. For a technology classification of manufacturing industries see OECD (2007), *Science, Technology and Industry Scoreboard*, Annex 1.

Source: OECD (2009), STAN Database for Structural Analysis.

Despite a somewhat lower share of high-technology products compared with other OECD countries, Germany appears to be reasonably well positioned in terms of its sectoral specialization. Nonetheless there is a risk that this advantage will not last. Emerging economies currently still tend to focus on labour-intensive products (China may be exporting high technology products such as ICT equipment, but nevertheless focuses on the labour intensive stages of the production process such as assembly, importing the sophisticated parts and components), but it is very likely that in future phases of their development they will target some of the sectors where Germany is presently dominant such as the automotive industry (Denis *et al.*, 2006; Egelin *et al.*, 2007).<sup>2</sup> Some indicative evidence that this is already happening is provided by OECD (2007b), showing that although the correlation between Germany's revealed comparative advantages and that of dynamic Asian economies is still negative, it is rising faster than for any other OECD economy covered in the study.<sup>3</sup> At the same time, the number of enterprise creations in knowledge intensive and high-technology sectors is declining (Niefert *et al.*, 2006), which may point to a gradual weakening of Germany's position in these industries.

1. The country has trade deficits in high-technology, medium-low-technology and low-technology products.
2. Although China has registered strong growth in its patenting activity since 1995, its share in triadic patents (patents issued at the US Patent and Trademark Office, the Japan Patent Office and the European Patent Office) is still small. In 2006, China accounted for 1% of all patent applications compared with a share of 12% for Germany and 97% for the OECD.
3. Comparative advantage is not directly observable but Balassa (1965) argued that it can be revealed through actual trade patterns. He proposed an index of revealed comparative advantage, which measures a country's export share of each commodity relative to the world export shares of that commodity. See Rae and Sollie (2007) for a further discussion.

### ... by making framework conditions more conducive to innovation and structural change

The two challenges discussed above – the lack of dynamic growth in a number of sectors (mostly services sectors) and the rising competition from emerging markets – have a similar policy implication, namely that framework conditions need to become more conducive to innovation and structural change. Despite some considerable progress made in this area in recent years, a number of concerns remain:

- Even though anti-competitive *product market regulation* (PMR) has been considerably reduced in recent years, Germany remains more heavily regulated than many other OECD countries, which may hamper structural change by sheltering uncompetitive industries. Arnold *et al.* (2009) estimate that aligning PMR with the most advanced economies in the OECD would potentially free an extra one percentage point growth in labour productivity over a period of 10 years.
- *Investment in R&D* is crucial for firms to stay competitive, especially in knowledge intensive industries. As a share of GDP, Germany spends more on R&D than most other OECD economies. Whereas R&D expenditure is concentrated in medium-high technology manufacturing sectors, high-technology sectors and in particular services sectors receive a below-average share of the total funds spent on R&D activities.
- Globalisation and technological progress increase the relative demand for high-skilled labour as well as the need for a more flexible workforce that is able to retrain easily in response to changing economic conditions. Recent reforms notwithstanding, more needs to be done to prepare the German *education system* to deal with these challenges.
- Germany lacks a comprehensive *immigration policy* that would allow the country to attract highly skilled foreign workers (including also foreign graduates having successfully studied in Germany) who will be necessary to prevent the emergence of skilled labour shortages (especially in the short- to medium run given the long impact lag of education reform). In this context an emerging brain drain has also to be mentioned as a concern.
- *Employment protection legislation* for regular jobs remains strict by OECD standards which risks slowing down structural change by reducing job turnover and labour mobility and may inhibit growth in (labour intensive) services sectors. In addition, a further expansion of active labour market policies could help reduce the negative impact of structural change on workers by allowing a smoother transition between jobs. A detailed discussion of these issues is beyond the scope of this paper; the reader is instead referred to Chapter 2 of OECD (2010a).

### Product market regulation needs to become more competition-friendly

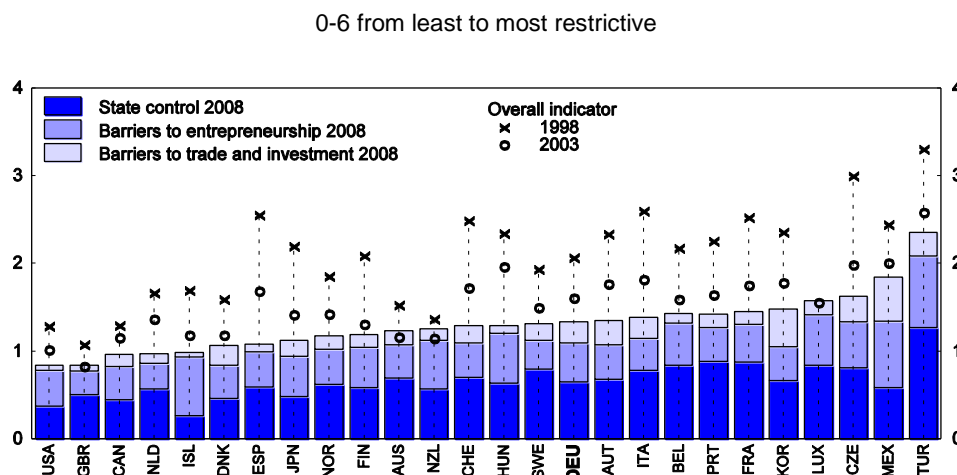
Despite some considerable progress in reducing anti-competitive product market regulation, Germany remains more heavily regulated than many other OECD countries.<sup>8</sup> On the OECD's economy-wide PMR indicator Germany ranks 14th out of 28 countries on state control, 16th on barriers to entrepreneurship and 20th on barriers to trade and investment (Figure 6). The picture is confirmed by the 2010 edition of the World Bank's *Doing Business* survey which also ranks Germany only in the middle range of all OECD countries. As coping with globalization is essentially about coping with change, the still relatively high barriers to competition in certain sectors are a reason for concern. By slowing down the pace at which firms react to changing market conditions and adjust their business strategies, they reduce the economy's

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8. Some of this progress was related to the implementation of the EU Services Directive, which was adopted by the European Council and the European Parliament in 2006 and had to be fully transposed by member states into their national systems by end-2009.

capability to deal with the challenges of globalization.<sup>9</sup> Especially for countries at the technology frontier, competition is conducive to more innovation.

**Figure 6. Economy-wide product market regulations**



Source: OECD (2009), International Product Market Regulation Database, [www.oecd.org/eco/pmr](http://www.oecd.org/eco/pmr).

### ***Removing remaining obstacles to the entry and exit of firms will facilitate change***

Germany has taken important steps towards removing barriers to entrepreneurship in recent years. Since 2003 the country has moved up 6 positions in this subcategory of the OECD's PMR indicator. The administrative burden for corporations was eased significantly (the country moved from number 17 in the OECD to number 2 on this indicator) by reducing the number of mandatory procedures that entrepreneurs have to complete in order to register a company as well as the number of public and private bodies that they need to contact (for example, single points of contact were introduced in line with the EU Services Directive). These reforms have considerably reduced the time and cost of starting up a business. Nonetheless, a number of issues remain that need to be addressed. Most notably, the license and permit system remains more cumbersome than those in many other OECD countries (Germany ranks 23rd out of 27 countries on this indicator). In addition, entry barriers remain high in several service sectors as discussed below.

Besides the creation of new businesses, the closure of failing ones is also often regarded as a source of economic dynamism. Closing a business appears to be more burdensome in Germany than in many other OECD countries. The latest *Doing Business* survey places the country 21st in the OECD on this indicator due to the high costs involved – in terms of both money and time. A major reform of insolvency legislation was enacted in 1999 which shifted the focus from a liquidation of distressed companies towards their orderly restructuring akin to the provisions of Chapter XI of the US insolvency law. The possibility for restructuring is however rarely used, despite several recent attempts to simplify procedures. Obstacles include stringent conditions on the sale of insolvent companies (for example, layoffs due to a change in ownership are illegal) and procedures which are still too complex. To encourage a wider use of the possibility for restructuring and to facilitate the closure of those companies that cannot be rescued, it is important that the existing insolvency legislation is refined and developed further.

9. Empirical evidence that anti-competitive product market regulation reduces an economy's adjustment capacity is provided by Duval *et al.* (2007).



***Strict regulation of professional services hampers competition***

While the overall regulatory framework has become more conducive to competition in recent years, additional effort is needed to improve sector-specific regulation. Two areas that stand out are professional services (*e.g.* accounting and legal advice) as well as network industries.<sup>10</sup> As professional services are used as intermediate inputs by enterprises, a lack of competition in these sectors not only hampers the expansion of these sectors themselves but also imposes costs throughout the economy. In most OECD countries, professional services are subject to a broad range of regulations such as the duration of compulsory practice for recognition as a full member, the passing of mandatory professional exams, restrictions on the cooperation between professions, and rules concerning the tasks that the professional can perform. These regulatory barriers, which may be imposed either by the government or by the professional chambers themselves, are generally motivated by market failures due to information asymmetries between the professional and the consumer. However, the considerable cross-country variation in the restrictiveness of such regulation suggests that in some countries the rules go beyond what is necessary to assure a sufficient quality of the service. There appears to be a tendency, particularly in the case of self-regulation, to impose overly strict rules in order to exploit economic rents (OECD, 2007c). At the same time, empirical studies show that the economic outcomes of professional services in countries with lower degrees of regulation are comparable with those in more highly regulated countries so that the restrictions could be eased, at least to the level of peer countries (Paterson *et al.*, 2007).

While Germany has made some progress in the past in rendering the regulatory framework of professional services more competition-friendly (for example, education requirements and restrictions on the form of business were relaxed in several professions), not much has happened in recent years (Figure 7).<sup>11</sup> In the latest PMR indicator Germany scored 22nd out of 27, with both conduct and entry regulation on professional services more restrictive than in other countries. Despite the difficulties associated with such reforms in face of the long-entrenched rents, further effort should be devoted to easing conduct regulation. Options include further reducing remaining restrictions on the cooperation between professions (*e.g.* accountants, architects and lawyers/notaries are only allowed to cooperate with comparable professions), while maintaining high quality standards, further liberalizing prices (*e.g.* certain services by engineers, architects and lawyers/notaries are still subject to minimum prices determined by legally set price schedules) as well as reassessing the need for remaining restrictions on advertising (while most OECD countries still regulate or prohibit advertisement in legal professions, Germany also regulates advertisement by architects which is rare among OECD countries). The conditions of entry should be simplified by rethinking compulsory chamber membership, while maintaining necessary standards for professional qualification in order to protect consumers. At the very least, the number of activities over which certain professions have exclusive rights should be further reduced and the requirements for full chamber membership should be lowered further (for example, for many professions the duration of compulsory practice is still above the OECD average).

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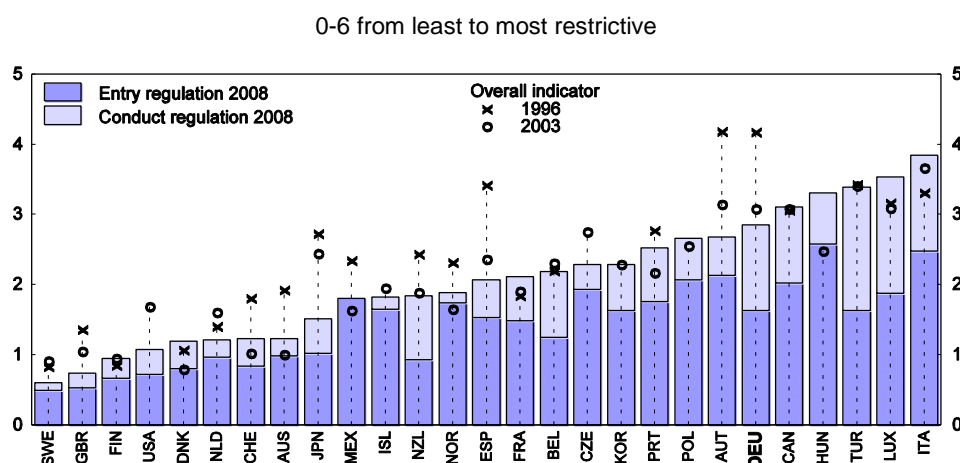
10. The growth inhibiting impact of uncompetitive network industries was the focus of Chapter 5 of OECD (2008).

11. Two recent legislative changes (introduced in respectively November 2008 and April 2009) concern the services provided by chimney sweepers, several of which were opened up for competition, and consulting services by architects and engineers, for which price setting was liberalized.

## Innovation should become less dependent on currently strong sectors

Country rankings of innovation performance show Germany in the middle to upper range of OECD countries.<sup>12</sup> In general, Germany tends to perform fairly well on output indicators. For example, German companies file the third most PCT<sup>13</sup> patents (per million workers) in medium-high and medium-low-technology sectors (after Switzerland and Sweden), and in high-technology sectors they rank eighth. Triadic patent families show a similar picture with Germany scoring third after Japan and Sweden.<sup>14</sup> Germany performs somewhat worse on the input side. While the strength of intellectual property rights is similar to other OECD countries, indicators of the availability of finance for innovation projects, government support for innovation activities and the quality of human capital are just about or even below average. These weaknesses on the input side give reason for concern as they could endanger the country's advantageous position in the long run. Indeed, some indications suggest that Germany's lead in innovation performance is already shrinking. For example, while the number of patents filed each year was still growing by 4.8 patents per million workers in the 1990s, growth dropped to just 1 patent per 4 million workers during 2000-06. Similarly, the share of innovative companies peaked at the end of the 1990s and since then has been declining (Egelin *et al.*, 2007). In line with this, the number of new company foundations in high- and medium-high-technology sectors was 40% lower in 2006 than in 1995 and company foundations in knowledge intensive service sectors were 15% lower (Gottschalk *et al.*, 2007).

Figure 7. Regulation in professional services



Source: OECD (2009), International Product Market Regulation Database, [www.oecd.org/eco/pmr](http://www.oecd.org/eco/pmr).

12. The *Synthetic Innovation Indicator* by Rae and Sollie (2007) ranks Germany 11th out of 27 OECD countries and the country scores 9th out of 29 OECD countries in the *Global Innovation Scoreboard* produced by the European Commission (European Communities, 2009), 7th out of 16 OECD countries in the *Innovation Benchmarking* by the IW Köln (Hülkamp and Koppel, 2005) and 9th out of 17 OECD countries in the *Innovation Indicator* by the DIW Berlin (Von Hirschhausen *et al.*, 2009). All three rankings are produced by compiling information on a wide range of indicators that capture a country's performance both on the output and input side of innovation.
13. The Patent Cooperation Treaty (PCT) procedure provides the possibility to seek patent rights in a large number of countries by filing a single international application with a single patent office.
14. A triadic patent family is a set of patent applications filed at the European Patent Office, the Japan Patent Office and the US Patent and Trademark Office. While PCT applications have an advantage in terms of timeliness (they are published 18 months after the first application of the patent worldwide), triadic patent families have an advantage in terms of quality (inventions of high value aiming to cover main international markets). See OECD (2009b) for further details.

Another reason for concern is the composition of business R&D expenditure, which is heavily skewed towards manufacturing sectors. In 2006 services sectors received less than 10% of total business R&D, compared with 25% for the average OECD country. Within manufacturing, medium-high-technology sectors receive a relatively large share of R&D expenditure (60% of total manufacturing R&D *vis-à-vis* 36% for the average OECD country), whereas high-technology sectors receive relatively little (34% *versus* 49% for the average OECD country).

### ***Young enterprises suffer from a lack of financing***

Insufficient financing is a major obstacle to start-ups in technology and knowledge intensive sectors. In a survey conducted by the Centre for European Economic Research (the so-called *Mannheim Enterprise Panel*) 34% of all surveyed companies cite the lack of available financing as a very important constraint on their business, with another 26% considering this factor as of medium importance (Niefert *et al.*, 2006).<sup>15</sup> High collateral requirements and the risk aversion of banks are listed as the two most important barriers for obtaining external financing. The situation is unlikely to have improved since then; if anything, the financial crisis has further intensified the problem. In particular, R&D intensive companies appear to have troubles finding external investors. This might be related to the larger proportion of intangible assets involved in innovation which aggravate the information asymmetries between the company and a potential investor. For example, a provider of external financing typically finds it much harder to assess the market potential of a new-to-market product innovation than the innovator himself, prompting the investor to raise loan standards. Moreover, expenses for innovations are often not associated with the purchase of capital goods that could be used as collateral.

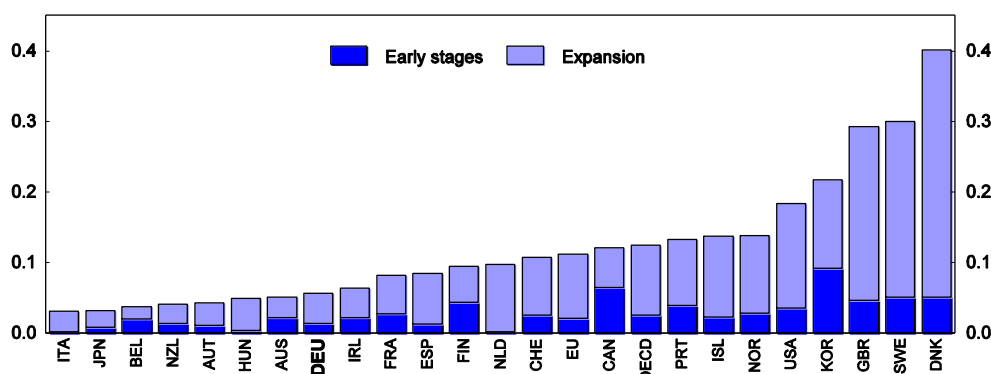
Against this background it is not surprising that cash flows and own resources of the founder are the two most important sources of financing for young high-tech firms, even several years after the formation of the company (Gottschalk *et al.*, 2007). Venture capital provided by dedicated venture capital funds or business angels (which in contrast to banks often provide management services to the firms as well in order to reduce information asymmetries) play only a negligible role, with less than 5% of all surveyed firms obtaining funds from these sources. The Commission of Experts for Research and Innovation estimates that there are about 33 to 41 business angels per million inhabitants in Germany, compared with 850 in the United States (Expertenkommission Forschung und Innovation, 2009). The importance of business angels is the highest in the early stages of a company's development (they mainly provide seed-financing) whereas venture capitalists tend to step in a few years after the company is established (see also Fryges *et al.*, 2007). The small scale of venture capital financing is also striking when comparing Germany to other OECD countries (Figure 8). In 2005, venture capital financing accounted for a bit more than 0.05% of GDP, compared with levels as high as 0.3% in the United Kingdom and Sweden and 0.4% in Denmark.

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15. The survey focuses exclusively on companies in high-technology and medium-high-technology manufacturing sectors as well as in knowledge-intensive service sectors.

Figure 8. Venture capital

% of GDP, 2005



Note: Data on venture capital only capture formal venture capital provided by specialised intermediates; capital provided by business angels is excluded. Data for Japan and Korea refer to 2001 and those for Iceland to 2002. For New Zealand, the allocation between early stages and expansion is an estimation based on 2001.

Source: OECD (2007), Science, Technology and Industry Scoreboard.

Venture capital is a particularly well suited type of financial intermediation to support the creation of innovative and entrepreneurial firms. As stressed by Da Rin *et al.* (2005), venture capital funds not only provide money, but also knowledge about markets and entrepreneurial processes as well as access to their networks of contacts.<sup>16</sup> A strengthening of the venture capital market should therefore be a key element of any strategy to improve the German innovation framework. In this sense, the Act on the *Modernisation of Framework Conditions for Venture Capital and Equity Investments (Gesetz zur Modernisierung der Rahmenbedingungen für Kapitalbeteiligungsgesellschaften, MoRaKG)*, adopted in 2008, was an important step in the right direction. In addition, the *High-Tech Start-ups Fund* which was set up within the federal government's *High-Tech Strategy* (Box 4) will bridge part of the financing gap arising from the insufficient depth of the private venture capital market.

These recent initiatives notwithstanding, more needs to be done to improve the framework conditions for venture capital. In particular, the MoRaKG needs to be modified as the EU competition regulator recently stopped parts of the Act and thereby the introduction of the law on venture capital investment (*Gesetz für Wagniskapitalbeteiligungen, WKBG*). When revising the Act, the government should also fix a number of flaws in the original version. For instance, several provisions of the Act appear excessively restrictive and may thus not fundamentally improve the attractiveness of Germany as a location for venture capital funds. Moreover, the Act risks reducing transparency by leading to a legal fragmentation of the market as venture capital companies are to be supervised by the BaFin and capital investment companies by the ministries for economic affairs of the *Länder*.<sup>17</sup> The government should also ensure that sufficient exit possibilities exist for venture capitalists. This includes a close monitoring of the *Entry Standard* segment of the German stock exchange to see whether it adequately serves this purpose. Da Rin *et al.* (2005) provide some evidence that the opening of a stock market segment targeted at entrepreneurial

16. A recent cross-country study by Meyer (2008) shows a significant positive correlation between the volume of venture capital investment and the turnover from innovations. For Germany, the causality appears to run from venture capital to turnover and not *vice versa*.

17. See the reports of the Council of Economic Experts and the Commission of Experts for Research and Innovation for a more detailed discussion (Sachverständigenrat, 2008; Expertenkommission Forschung und Innovation, 2009).

companies considerably increases the share of venture capital that is used for early stage investment as well as the share of private equity that is channelled to high-tech firms.

***Shifting public R&D support towards tax incentives could raise efficiency***

The high uncertainty about the outcome of R&D activities and the substantial spillover effects related to the inability of firms to appropriate all the rents from successful innovation expenditures are generally used to justify state intervention in this area to avoid potential underinvestment.<sup>18</sup> Although the R&D intensity of the private sector is higher than in most other OECD countries (Germany ranks eighth in the OECD), the country is gradually falling behind, reflecting below-average growth rates in private R&D spending (during the 1980s, Germany was still among the three top performers). Against this background, the German government has considerably increased its financial support for R&D in recent years. In 2006, the *High-Tech Strategy* was launched, including plans to invest some EUR 14.6 billion (0.6% of 2006 GDP) in the years 2006 through 2009 to support R&D activities (Box 4). The lion's share of the funds (EUR 11.9 billion) were used to support research and the dissemination of new technology in 17 designated sectors, with the rest channelled to general measures that are not linked to specific sectors. In addition, the second fiscal stimulus package included several measures to stimulate R&D activities over the period 2009 to 2011 (Koske, 2010).

The recent efforts to broaden public support for R&D investment are highly welcome. Even so, there appears to be room for further improvement. Germany currently mainly relies on direct government subsidies to support private R&D activities. Tax incentives, which are becoming an increasingly popular measure among OECD and non-OECD governments, are not used. Even though the literature on the efficacy of the two types of government support is far from reaching a consensus, a number of recent papers point towards tax incentives as the more effective tool. For example, Harris *et al.* (2009) argue that the literature on the effectiveness of government grants yields mixed results, whereas there is broad agreement that tax incentives stimulate R&D.<sup>19</sup> Recent empirical studies reporting positive effects of tax incentives on R&D expenditures include Bloom *et al.* (2002), Klassen *et al.* (2004), Falk (2004), Wu (2005) and Jaumotte and Pain (2005a, b).<sup>20</sup> The size of the effect is often found to be relatively small, but still larger than the effect of direct funding (Johansson *et al.*, 2008).

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18. Grants, tax credits, public procurement, and direct performance of research (through universities and public research institutes) are the main policy tools.

19. Similar conclusions are drawn by Garca-Quevado (2004) stating that the literature on the relationship between public funding of business R&D and private R&D expenditure obtains contradictory results that are difficult to reconcile and Hall and Van Reenen (2000) claiming that there is substantial evidence that R&D tax reliefs have a positive impact on the amount of private sector R&D spending.

20. Even if R&D tax credits are effective, the question remains as to whether the foregone tax revenues could have been better spent on other measures with a higher social return (Jaumotte and Pain, 2005a). Using a computable general equilibrium model, Russo (2004) finds that the welfare gains from R&D tax reliefs are markedly higher than those from corporate or personal income tax cuts.

#### Box 4. The High-Tech Strategy

In 2006 the German government launched the *High-Tech Strategy* as a comprehensive initiative, encompassing all ministries, to stimulate private R&D investment.\* The strategy pursues three main goals:

- **Creating/expanding lead markets in four priority areas: health, climate protection/resources conservation/energy, mobility and security.** Examples of recent actions include the establishment of innovation alliances and strategic partnerships such as *Organic Light-Emitting Diodes* and *Carbon Nanotubes*; and the launch/expansion of a number of funding programmes such as *WING – Materials Innovations for Industry and Society*, which promotes research aimed at producing more efficient and lower-cost materials.
- **Building new bridges between industry and science by promoting cooperation, networks and clusters, with a special focus on SMEs.** Examples of actions include accelerated access to funding programmes for SMEs *via* the *KMU-innovativ* programme; launch of the top cluster competition; consolidation and expansion of SME funding *via* the *Central Innovation Programme*; and support for clusters and networks *via* special programmes such as *Cutting-edge Research and Innovation in the New Länder*, *Entrepreneurial Regions* and *Innovation Competence East*.
- **Improving the framework conditions for innovation.** Examples of actions include the facilitation of start-ups through an amendment of the law on limited liability companies; innovation support *via* public procurement; and advice and support for higher education institutions and start-up entrepreneurs in connection with patent law issues.

Over the period 2006-09 EUR 14.6 billion were to be invested to support R&D activities. Out of the total funds, EUR 11.9 billion were to be channelled to 17 selected sectors (sectors that either belong to one of the four priority areas or that provide key technologies for several of those areas) with space technologies, energy technologies and ICT receiving a bit more than half of the funds. The remaining EUR 2.7 billion were to be used for general measures that are not linked to specific sectors such as improving the conditions for innovative SMEs (EUR 1.8 billion), strengthening the links between science and industry (EUR 0.6 billion) and supporting technology start-ups (EUR 0.2 billion).

\* For more detailed information on the *High-Tech Strategy* see Federal Ministry of Education and Research (2006), *The High-Tech Strategy for Germany*, Bonn/Berlin; and Federal Ministry of Education and Research (2009), *Research and Innovation for Germany*, Bonn/Berlin.

In addition to the impact on overall R&D spending, other aspects have to be taken into account when deciding about which policy tool to use. For example, there is a higher probability of research duplication when support is offered by means of tax reliefs rather than by grants, and there is less chance of expenditure occurring in areas with high social but relatively low private returns, such as basic research, which is an important determinant of a country's longer-run innovation capabilities. New and small firms may also be at a relative disadvantage if support is provided only through the tax system, as such firms may have relatively little taxable income (Sachverständigenrat, 2009; Jaumotte and Pain, 2005a). On the other hand, grants have the disadvantage that the winning projects are picked by the government rather than the market, which may generate distortions in the allocation of resources between different fields of research (though in some cases such distortions are desired to ensure that industry helps address public objectives, such as defence or energy security). Two striking features of the *High-Tech Strategy* are the importance given to space technologies (almost one-third of the funds were earmarked for this area) and the low importance given to services (0.5% of the funds). At the same time, the share of business R&D conducted by services sectors is amongst the lowest in the OECD.

Against this background, the government should consider introducing tax incentives as a complementary tool to direct subsidies, though duplication of public subsidisation should be excluded. When introducing tax incentives, attention has to be given to the issue of policy design as the social gains from such programmes do not necessarily outweigh the associated costs.<sup>21</sup> In general, fiscal incentives for R&D come in three forms: *i*) tax deferrals, which are reliefs in the form of a delay in the payment of a tax; *ii*) tax allowances or extra amounts over current business expenses deducted from gross income to arrive at taxable income; and *iii*) tax credits or amounts deducted from tax liability (OECD, 2003). In OECD countries, tax credits have become more popular over time than tax allowances with a tendency to favour small firms in the R&D tax provisions. A case for providing special support to SMEs could be made on the grounds that the share of business R&D conducted by small firms (less than 250 employees) is amongst the lowest in the OECD (despite a high number of innovative SMEs).<sup>22</sup>

An important choice to make for both tax credits and tax allowances is whether to base them on the level of R&D expenditures in a given year or on the increment of R&D expenditures (or on a combination thereof). Incremental incentives have the advantage that they only subsidize new R&D and not R&D that a firm would have done anyway, thus addressing the problem of windfall gains. On the other hand, they involve the difficulty of defining a base period or base level of R&D to determine the increment with some methods potentially distorting incentives (Bloom *et al.*, 2001; Mohnen and Lokshin, 2009). Another aspect to consider is that subsidies and tax incentives might be substitutes (with an increased intensity of one reducing the effect of the other on business R&D) as indicated by the empirical study of Guellec and Van Pottelsberghe (2000).

### **The education reform needs to continue**

In an increasingly knowledge-driven global economy, human capital development is a major driver of a country's economic competitiveness, not least through its impact on innovation. Globalisation and technological progress increase the relative demand for high-skilled jobs. As argued by Autor *et al.* (2003), most of the jobs that are hollowed out in advanced economies by offshoring and computerisation are medium-skilled jobs that require routine manual and cognitive skills (*e.g.* assembly line work, technical jobs in programming). By contrast, the least skilled jobs that typically require non-routine manual skills (most often in services occupations) are unlikely to disappear and the most-skilled jobs that require non-routine cognitive skills (*e.g.* managers, scientists) are even likely to grow.<sup>23</sup> Globalisation and technical progress also increase the need for a more flexible workforce that is able to retrain easily in response to changing economic conditions. As argued by Snower *et al.* (2009) it is the capacity to adapt which is crucial for making most out of globalisation.

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21. For example, the OECD country with the most generous tax regime for R&D by a representative firm is Spain. Yet, Spain is one of the OECD countries with the lowest private sector R&D intensity. A number of countries have recently provided estimates of the revenue forgone due to R&D tax incentives (OECD, 2007d). Most countries estimate the cost at around 0.03% to 0.05% of GDP (*e.g.* Australia, France, Ireland, Mexico, Portugal, Spain, United Kingdom, United States), though some report higher numbers (*e.g.* Canada with 0.2% of GDP).

22. This is supported by Lach (2002) showing for Israeli firms that government subsidies have a significant positive impact on company financed R&D expenditures for small firms, but no effect on expenditures by large firms.

23. Spitz (2003) provides evidence for Germany that the technological features of computer technologies shift the relative skill requirements of occupations towards analytical and interactive activities for which employees with higher educational attainment have comparative advantages.

Despite some progress in recent years in reforming the German education system, there remains scope for further improvement to ensure that it is well prepared to deal with these challenges.<sup>24</sup> Although there were no broad-based shortages of skilled labour ahead of the economic crisis, a lack of highly qualified personnel seems to have been a constraint in at least some sectors, such as metals/metal products and machinery/electrical/optical/transport equipment, where the share of hard-to-fill vacancies was more than twice the national average (*IAB Job Vacancy Survey* 2008). In terms of qualifications, specialists in the areas of mathematics, informatics, natural science and technology, and with completed technical training (at the technician and master craftsman levels) were in particularly high demand (Federal Ministry of Education and Research, 2009). In line with this, the *Mannheim Enterprise Panel* pointed to skilled labour shortages as one of the most important obstacles for new firm creations in high-tech sectors (Niefert *et al.*, 2006; Gottschalk *et al.*, 2007). These problems are likely to reappear once the economic crisis dissipates and will be aggravated further in the coming years on account of ongoing technological change and population ageing.<sup>25</sup>

To address these challenges, reforms are necessary in a number of areas. Most importantly: *i*) tertiary graduation rates need to be lifted further to ensure a sufficient supply of highly qualified labour;<sup>26</sup> *ii*) the vocational education system needs to be modified to ensure that apprentices are more equipped with general skills that allow them to easily adapt to changing job requirements; and *iii*) the participation of adults in lifelong learning activities should be strengthened further.

### ***Tertiary attainment remains low among younger age cohorts***

Whilst tertiary attainment rates are about average for the working-age population as a whole, they are below the levels seen in most other OECD countries for 25-to-34-year-olds (Figure 9, panel A). Despite some increase in graduation rates in recent years, tertiary attainment of younger age cohorts in Germany has fallen further behind the OECD average as other countries have seen even stronger increases. Drop-out rates are modest by OECD standards (in 2005 23% of tertiary students failed to successfully complete a programme equivalent to this level of education, compared with an OECD average of 30%), suggesting that the low graduation rates reflect low entry rates into tertiary education. Indeed, while entry rates are about average for tertiary type-B programmes, it is estimated that only 34% of young adults in Germany enrol in a tertiary type-A programme during their lifetime, compared with 56% in the average OECD country (Figure 9, panel B).<sup>27</sup>

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24. Chapter 4 of OECD (2008) provides a thorough discussion of the challenges of the German education system, looking also at childhood care and education as well as at primary and secondary school education.

25. As the productivity-adjusted capital-labour-ratio remains constant over time irrespective of fluctuations in labour supply (Brücker and Jahn, 2009; Ottaviano and Peri, 2006), demographic change does not necessarily lead to labour shortages or a drop in unemployment. However, as the age cohorts that will quit the labour force in the coming years are relatively well educated, there will be a lack of skilled labour (and an oversupply of less skilled labour). The Centre for European Economic Research is forecasting a shortage of between 180 000 and 490 000 skilled persons, resulting from ageing and structural change, for the year 2014 (Egeln *et al.*, 2007). See also Bonin *et al.* (2007), Fuchs and Reinberg (2007), Schnur and Zika (2007) and Biersack *et al.* (2008) for a discussion of this issue.

26. With the number of youth projected to decline by one third by 2050, the tertiary graduation rate has to increase by about 12 percentage points merely to keep the number of university graduates constant (Fuchs and Weber, 2007).

27. 5A programmes are largely theoretically based and are intended to provide sufficient qualifications for gaining entry into advanced research programmes and professions with high skills requirements whereas 5B programmes are generally more practical/technical/occupationally specific than ISCED 5A programmes.



The low entry rate for tertiary type-A programmes reflects a low number of young adults who have the necessary qualification to enrol in such programmes.<sup>28</sup> Although graduation from upper secondary education programmes designed to provide direct access to tertiary type-A education (ISCED 3A) has increased in recent years, it remains well below the OECD average (Figure 9, panel C). In fact, together with Austria and Switzerland, Germany is among the few countries where both female and male students are more likely to graduate from upper secondary programmes leading to vocationally oriented tertiary education (tertiary type-B) rather than tertiary type-A programmes (OECD, 2009c). In addition, only about 71% of all students who achieve qualifications designed for university level entrance actually take up university studies. While Germany does not appear to be an outlier among OECD countries in this respect (OECD, 2009c), the decline in this share in recent years provides reason for concern (Figure 9, panel D), especially since it appears to have more than offset the positive effect on tertiary-type A entry rates that was coming from the rising number of upper secondary graduates with a type-A qualification.

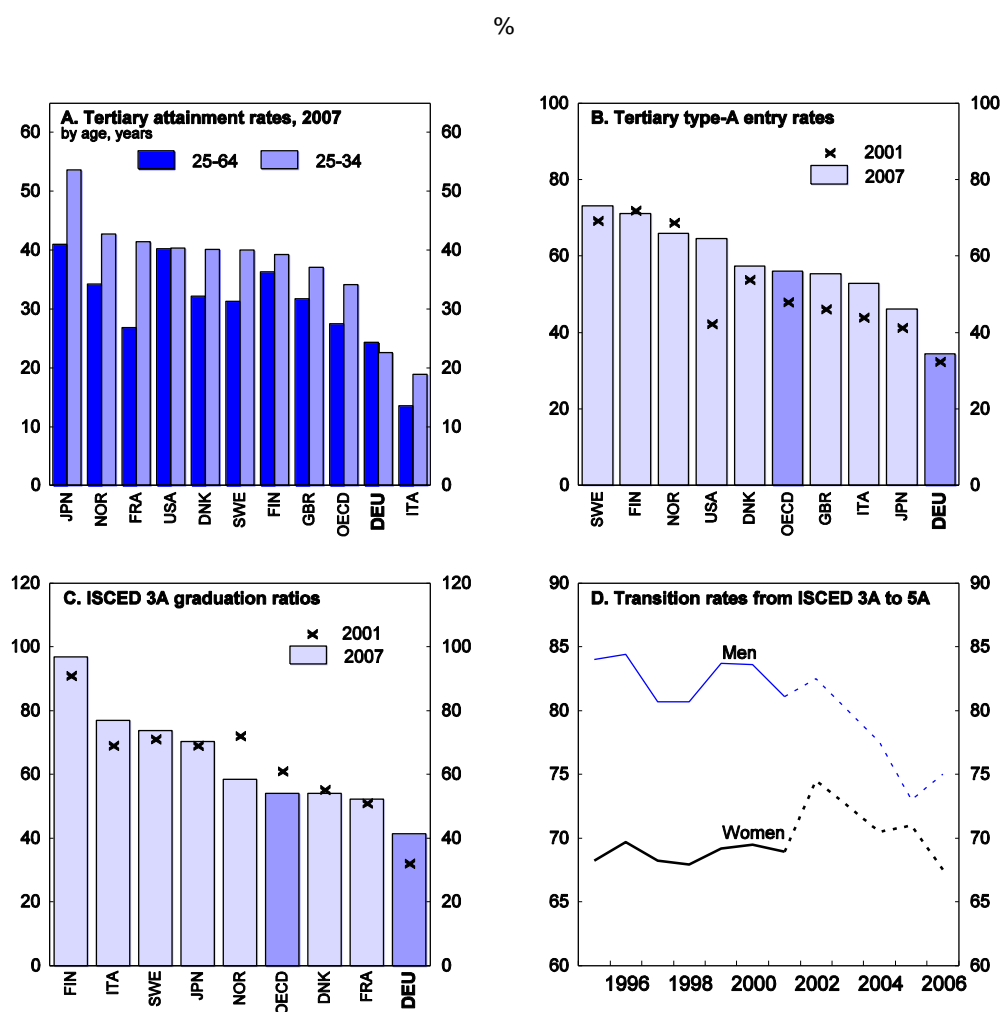
The low number of students who graduate from upper secondary education programmes that facilitate direct entry into tertiary type-A education is likely to reflect two factors. *Firstly*, the high stratification of the German school system may prevent some students who would be able and willing to pursue university education from obtaining the required qualification.<sup>29</sup> The German school system is characterized by early tracking with the first selection between tracks generally occurring at the age of 10, earlier than in any other OECD country except Austria. In some *Länder* students are sorted into three tracks (the *Hauptschule* track for less academically able students, the *Realschule* track for students in the middle ability group and the *Gymnasium* track for the most academically able students), while others have a two-track system. The different tracks are mostly offered in separate school types (around 80% of all students enter such specialized schools). Whilst students might theoretically change tracks at a later stage, this rarely happens in practice and if it happens, the transition is usually from a higher to a lower track (Autorengruppe Bildungsberichterstattung, 2008). Similarly, although failure to enter the *Gymnasium* track does not preclude acquiring a tertiary type-A entrance qualification, less than 5% of such qualifications were obtained outside this track in the school year 2006/07. Tracking decisions are influenced by the socioeconomic background of the child (with children from a more favourable background having a higher likelihood of attending a *Gymnasium*; OECD, 2008), suggesting that tracking closes off possibilities for some students. The impact is less pronounced in Berlin and Brandenburg, the two *Länder* that delay tracking until age 12.

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28. An *allgemeine Hochschulreife* (Abitur) provides admission to all subjects at all higher education institutions and a *Fachhochschulreife* provides admission to universities of applied sciences. In addition, a *fachgebundene Hochschulreife* entitles the holder to study particular subjects at a higher education institution. For a detailed overview on the German education system see Annex 4.A1 of OECD (2008).

29. As stressed by Meier and Schütz (2007), tracking decisions at a young age involve a higher risk of making a mistake in measuring true ability (and hence of sending a child to the wrong track) because ability is revealed only gradually and because younger students show stronger differences in maturity.

Figure 9. Some stylized facts about tertiary education

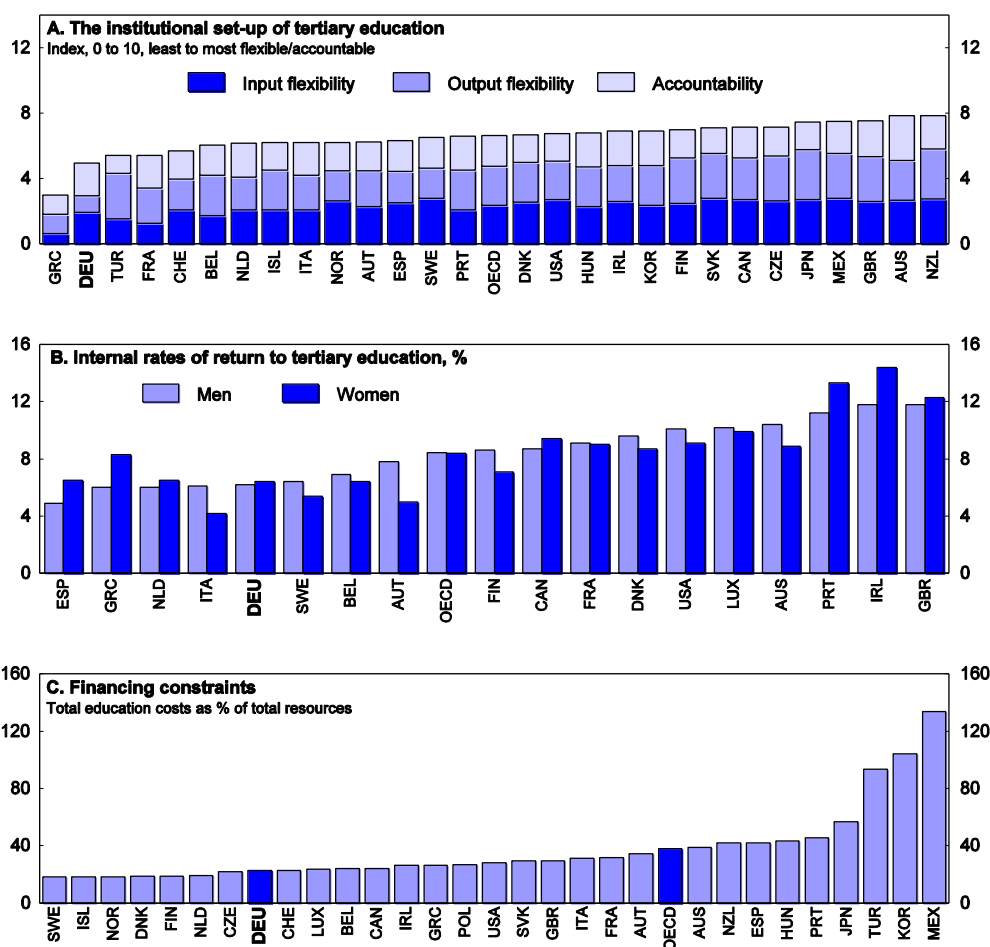


Note: In panel B, entry rate is an estimated probability that a school leaver will enter tertiary education during his/her lifetime. In panel D, values for 2002 to 2006 are estimates and that for 2003 is the average of values for 2002 and 2004; data refer to share of students with 3A qualification who enrol for 5A programme.

Source: OECD (2009), Education at a Glance; Autorengruppe Bildungsberichterstattung (2008), Bildung in Deutschland 2008 - Ein indikatorengestützter Bericht mit einer Analyse zu Übergängen im Anschluss an den Sekundarbereich I, Bertelsmann Verlag, Bielefeld.

The recent decision to introduce common standards across all *Länder* for admitting students to university education based on their professional qualification is an important step in the right direction (see also the discussion in the next section). This measure increases transparency which should eventually show up in higher enrolment and graduation rates. Nonetheless, more needs to be done in this area. In particular, the stratification in the school system should be reduced further to raise the equality of education opportunities, as recommended in OECD (2008).<sup>30</sup> Possibilities include delaying the first tracking decision to reduce the risk of making a mistake in measuring true ability, offering the *Hauptschule* and *Realschule* tracks in one school type to avoid grouping very weak students together in a single school type with low achievement expectations, and increasing permeability between education tracks in practice.

Figure 10. The attractiveness of tertiary education



Note: In panel B, internal rates of return are computed by estimating labour market premia on cross-country comparable individual level data and then adjusting the premia for fiscal and education cost. In panel C, education costs correspond to tuition fees and living costs. The resources are those available through each country's financing systems (grants and loans) when available, and also through families' financing capacity, as well as possible revenue from student part-time work.

Source: Oliveira Martins, J. et al. (2007), "The policy determinants of investment in tertiary education", OECD Economics Department Working Papers, No. 576; Boarini, R. and H. Strauss (2007), "The private internal rates of return to tertiary education: new estimates for 21 OECD countries", OECD Economics Department Working Papers, No. 591.

Secondly, a low attractiveness of tertiary type-A education might deter students from completing the additional years of schooling that are necessary to earn an upper secondary type-A rather than type-B qualification. Oliveira Martins *et al.* (2007) show that an individual's decision to invest in tertiary education is influenced by the internal rate of return to tertiary education, the institutional setting for supplying tertiary education and the availability of individual financing. Whilst students in Germany generally face low liquidity constraints, the country scores pretty poorly on the other two indicators (Figure 10). The low internal rate of return mainly reflects a low net wage premium (the increase in after-tax income entailed by an additional year of education) whereas the poor supply side performance is related to universities' lack of autonomy over issues such as student selection, staff policy, and course content.

Several reforms aimed at improving the attractiveness of university studies have been initiated in recent years. These include the introduction of shorter programmes in the context of the Bologna reform, the strengthening of the labour-market focus through the involvement of social partners in programme design, and the easing of *Numerus clausus* restrictions.<sup>31</sup> In addition, all *Länder* gave universities the right to select 60% of their students and some to set tuition fees.<sup>32</sup> In light of these reforms, it is surprising that in 2007 relatively fewer students entered tertiary-type A programmes than in 2003. One explanation is the rising uncertainty that comes with wide-ranging reforms such as the move to the Bologna system (for example, regarding the employment opportunities after a bachelor's degree), which may temporarily discourage students from enrolling in the new programmes. In the longer run, the reforms are likely to contribute to an increase in tertiary attainment. For example, based on a cross-section regression Oliveira Martins *et al.* (2007) simulate for Germany that a reduction in the average study duration to about 3 years should boost the tertiary graduation rate by around  $\frac{3}{4}$  percentage points.

Even so, more needs to be done to encourage students to seek university education. In particular, those *Länder* that have not yet taken sufficient steps to improve the institutional set-up of tertiary education (e.g. by giving universities more autonomy regarding tuition fees) should consider doing so. Also, the autonomy of universities regarding student selection could be raised further. In addition, the government should address the problem of low net returns to undertaking tertiary education. The design of the tax and benefit system appears to be a major reason for the low internal rates of return, as the net wage premium is even further below the OECD average than the gross wage premium (the net wage premium is 50% below the OECD average *versus* 30% for the gross wage premium).<sup>33</sup> Policy decisions in this area depend of course on many other factors than students' incentives to invest in education. Nonetheless, as recommended in OECD (2008), it would help if future decisions about the progressivity of the personal income tax would take the impact of this factor on the incentives to acquire tertiary qualification into account.

### ***Adapting the vocational education system to the demands of a globalised world***

Vocational education and training (VET) plays an important role in the German education system with about two-thirds of a typical age cohort obtaining a qualification from an upper-secondary vocational programme.<sup>34</sup> About 70% of these individuals obtain their qualification in the dual system, which combines practical training on the workplace with formal education at a part-time vocational school. The remaining 30% obtain their qualification in entirely school-based vocational programmes (Autorengruppe Bildungsberichterstattung, 2008).<sup>35</sup> In the past, the VET system has contributed substantially to the economic success of the country, providing the labour market with high-skilled craftsmen and technicians. In particular, it allowed for a smooth transition of youth into the labour market, thereby keeping youth unemployment rates low. However, there is a risk that these advantages are diminishing in a world that is increasingly driven by rapid technological change and the forces of globalisation. The vocational education

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31. *Numerus clausus* restrictions limit the number of students admitted for study, normally by requiring a minimum average mark in the upper-secondary graduation exam (*Abitur*).

32. Empirical evidence suggests that any negative effects of tuition fees on enrolment can be fully offset by improvements of financial aid schemes (Santiago *et al.*, 2008; Heller, 1999).

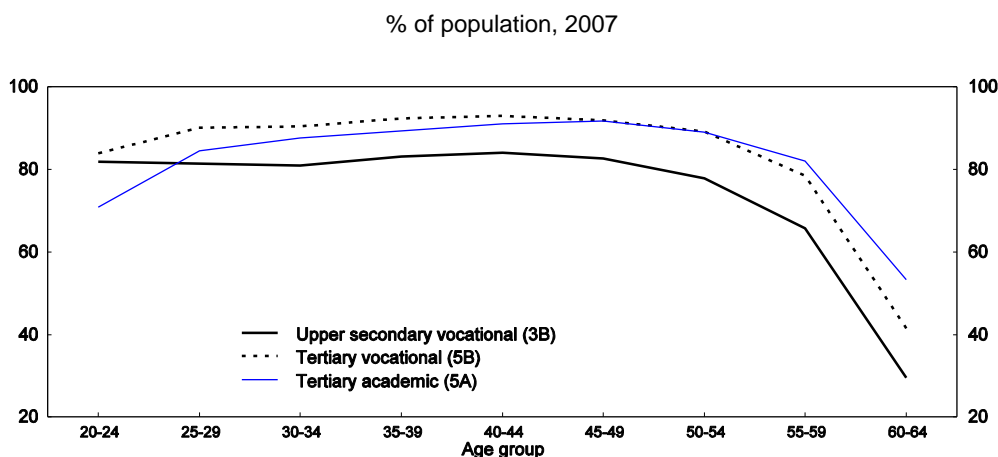
33. This comparison does not yet take into account the *Hartz* reforms which should have raised the net wage premium somewhat as tertiary graduates have a lower risk of unemployment than other groups.

34. For an in-depth survey of the German VET system see Hoeckel (2010).

35. The dual system and the full-time school system are complemented by the so-called transition system which provides basic vocational training without leading to a recognized vocational qualification (it is meant for school leavers from general education schools who cannot immediately find a place in the dual system or the full-time school system).

system may equip apprentices with too much specialised and too little general knowledge, thereby reducing their ability to adapt to changing job requirements or to switch professions during their career. Moreover, as stressed by Baethge (2008), the system appears to have difficulties in teaching non-cognitive skills such as communication skills or the ability and willingness to solve problems, make judgements and engage in life-long learning – skills which are becoming ever more important in a knowledge-driven society.

**Figure 11. Employment by age group and highest education attainment in Germany**



Note: Codes refer to the ISCED97 classification of educational programmes.

Source: OECD, Education Directorate.

Krueger and Kumar (2004a, b) provide some evidence that Germany's focus on vocational education worked well between the 1960s and 1970s, when available technologies changed slowly, but may have hampered economic growth in a quantitatively significant way in the ICT age of the 1980s and 1990s. Similarly, Gervais *et al.* (2007) argue that skill-specific human capital is more valuable in relatively stable environments while general human capital appears to suit better under high uncertainty. This is consistent with the observation that labour market outcomes of upper secondary vocational graduates are similar to those of tertiary graduates at the beginning of the career, but compare less favourably over the life cycle. The gap in employment rates between graduates of tertiary and upper secondary vocational education programmes rises markedly as workers approach retirement age (Figure 11), which might be related to a faster depreciation of human capital under conditions of structural change (OECD, 2009d). This is supported by Ludwig and Pfeiffer (2005), who use survey data to show that the depreciation rate of human capital for individuals with vocational education is about 0.42%, whereas it is not statistically different from zero for university graduates. What makes matters worse, the depreciation rate for VET graduates appears to be increasing over time which the authors attribute to an increasing pace of organizational and technological change. VET graduates appear to be disadvantaged particularly in the case of a change in profession, when almost 80% of the knowledge learned in vocational education programmes becomes obsolete. By contrast, the usability of knowledge learned in university programmes is reduced by just 20% in such a case.

While the general set up of the VET system should be maintained, some modifications are necessary in order to help VET graduates better meet the challenges associated with globalization. *Firstly*, the existing balance between general and specialized study content is questionable. The number of VET qualifications is relatively high (around 350 separately defined professions) and some professions are rather specific (*e.g.* ice cream maker). As an early specialization on a narrowly defined profession may reduce an individual's ability to switch professions at a later stage of his career, the number of VET qualifications should be reduced by combining similar professions. This could for example be achieved by

having a common basic education for similar professions during the first phase of the VET programme and then specializing in a specific profession during the second phase (Sachverständigenrat, 2009). Moreover, VET students in the dual system obtain relatively little universal education in the part-time vocational schools (Baethge, 2008). As globalization has increased the importance of core literacy and numeracy skills (OECD, 2007b), a broader teaching of such skills appears essential. The same is increasingly true with respect to ICT competences.

A *second* area of concern is the interplay between the two pillars of the dual system. The school-based part (approximately 1 to 2 days per week) currently receives much less attention than the workplace training. In most *Länder*, the final examination is dominated by the professional chambers with the vocational schools not involved in its preparation and only marginally in its execution. It is possible to fail the final exam in the vocational school and still obtain the dual VET degree in case the student passes the chamber exam (Baethge, 2008).<sup>36</sup> A better approach would be for schools and chambers to prepare and carry out the final examination together, as is already done in some *Länder*. Such a joint exam would not only increase the weight of the school-based part in the dual system but might also enhance collaboration between the two learning places more generally.

A *third* shortcoming of the German system is the low mobility between upper-secondary VET and tertiary type-A education. Only 1% of all students who enrolled in a university or a university of applied sciences in 2006 were admitted based on their professional qualification, *i.e.* without a school-based entry qualification (Autorengruppe Bildungsberichterstattung, 2008). The government has taken several initiatives to dismantle barriers between the two areas of education. Most recently, individuals who have completed a tertiary type-B programme were allowed to study all subjects at all higher education institutions and individuals who have completed a 2-year apprenticeship and have at least 3 years of work experience were granted the right to study subjects that are related to their professional qualification at all higher education institutions after passing an entrance exam or successfully completing a probationary study.<sup>37</sup> As this reform was just introduced in 2009 it is still too early to properly assess its impact on tertiary type-A enrolment rates of VET graduates. Another area worth looking into is the vocational baccalaureate – an optional additional degree for students in upper-secondary vocational programmes who wish to enrol in a university or a university of applied sciences. While the vocational baccalaureate exists in most *Länder*, institutions and programmes differ widely across *Länder* which risks reducing transparency. This may discourage students from pursuing this additional degree, although empirical studies on this link are missing.

### ***Encouraging participation in lifelong learning***

Globalisation has increased the pace of organisational and technological change and hence the risk that workers' skills and knowledge become obsolete. Participation in lifelong learning is thus more important than ever to ensure the continuous acquisition of new skills and the upgrading of existing ones. How Germany compares to other OECD countries regarding the participation is hard to assess as different data sets point in different directions. The *Adult Education Survey* produced by the Statistical Office of the European Communities puts Germany in the upper range of participating countries on non-formal learning

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36. Since the 2005 reform of the *Vocational Education and Training Act (Berufsbildungsgesetz, BBiG)*, VET graduates may request that the results of the school exam are shown in the final VET certificate.

37. Also before this reform, pathways to university education existed for individuals with a professional qualification, though the precise rules differed across *Länder*. The major achievement of the recent reform was thus the introduction of a harmonized set of university entry requirements based on professional qualification that is applicable in all *Länder*. In addition to these common pathways, the *Länder* are allowed to have *Länder*-specific pathways which have to be accepted by the remaining *Länder* after one year of successful study.

(where the country scores 4th after Sweden, Finland, and Norway), but in the lower middle range on formal learning (where the country scores 12th). The *Lifelong Learning Survey*, which was carried out as an *ad hoc* module to the EU *Labour Force Survey*, places Germany in the lower middle range of EU countries on all three forms of learning (formal, non-formal and informal).<sup>38</sup> Regarding the development over time, participation rates have increased strongly throughout the 1990s but have stagnated or even declined in recent years (Figure 12, panel A). Less well qualified individuals do not participate as much in lifelong learning activities as individuals with a higher educational attainment. Although this is a general phenomenon across countries, it is a reason for concern particularly for Germany as upgrading the skills of less qualified workers could help prevent ageing-related skilled labour shortages.

The government is undertaking a number of initiatives to promote a wider participation in lifelong learning activities. The Federal Ministry of Education and Research and the Standing Conference of the Ministers of Education and Cultural Affairs of the *Länder* work together on the development of a Qualifications Framework for Lifelong Learning (*Deutscher Qualifikationsrahmen, DQR*), which represents the first comprehensive matrix for the alignment of qualifications.<sup>39</sup> In a first step, all formal qualifications within the German education system are included in the framework with the results of non-formal and informal learning supposed to follow in future steps. Currently, there are a wide variety of procedures and approaches to the recognition of non-formal and informal learning, each having different goals and responsibilities, rather than one standardised system.<sup>40</sup> The associated loss in transparency may discourage adults from engaging in continued education. Ongoing work to increase transparency in this area is therefore welcome. In particular, it is crucial that non-formal and informal activities are included in the qualification framework in due course as a standardized system of recognition makes the acquired skills credible, transparent and easily signalled to both individuals and firms, thereby ensuring that the skills are not devalued in the labour market (OECD, 2005).<sup>41</sup>

The adult education market in Germany is characterized by a wide variety of institutions, programmes and overlapping legal orders which significantly reduces transparency (Faulstich, 2008). The coalition treaty of the new government foresees to improve transparency and, in particular, to facilitate access to guidance on adult education and training. As high-quality information and guidance provision facilitates access to participation in adult learning and ensures a better match between the demands of individuals and supply, these initiatives are highly welcome and should be swiftly implemented. Experience from other OECD countries suggests that individual counselling support is effective, particularly in the case of low-skilled and disadvantaged adults (OECD, 2005). Moreover, it appears important to link providers by a network through which they can share and exchange information (for example in the form of one-stop shops as they exist in the United States).

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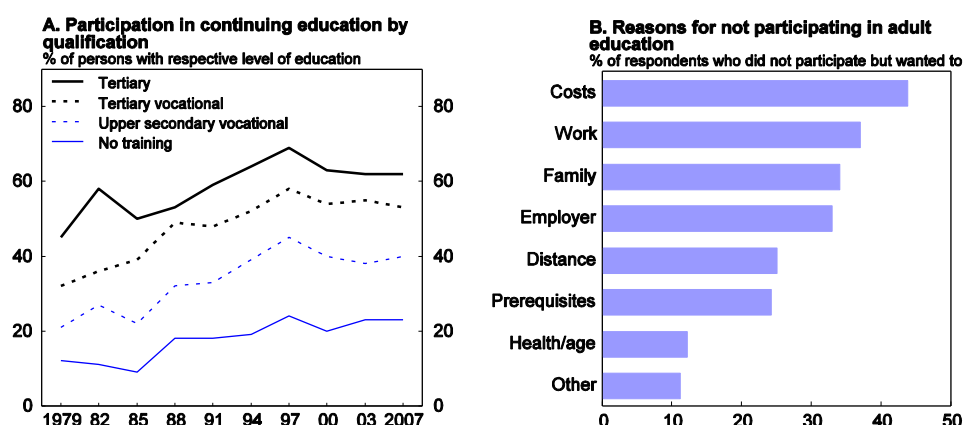
38. Formal education corresponds to education and training in the regular system of schools, universities and colleges; non-formal education includes all types of taught learning activities which are not part of a formal education programme; informal learning corresponds to self-learning which is not part of either formal nor non-formal education and training, by using printed material, computer or web based learning, educational broadcasting, audio or videotapes, or by visiting facilities aimed at transmitting educational content (e.g. libraries).

39. The DQR is not limited to improving continuing education and training in Germany, but aims at improving transparency and transfer opportunities for all areas of education.

40. See Federal Ministry of Education and Research (2008) for an overview on the current setup.

41. Detailed recommendations on how best to structure and organise systems for recognition of non-formal and informal learning are provided by OECD (2010b).

Figure 12. Participation in lifelong learning



Note: In panel B, 2006/2007 or latest available period; Work, Family, Employer and Other refer respectively to Work schedule, Family constraints, No employer support and Not willing to go back to school.

Source: Deutsches Institut für Erwachsenenbildung (2008), Trends der Weiterbildung - DIE Trendanalyse 2008, Bielefeld; Eurostat (2009), Adult Education Survey.

A major obstacle to continued education is the high cost involved. In the 2006/07 *Adult Education Survey*, almost half of all respondents who had not participated (but wanted to participate) in a training activity claimed high costs as one of the reasons (Figure 12, panel B). The same survey indicates that the costs of education and training are indeed relatively high in Germany. On average, a participant spends EUR 1 025 (EUR 223) on formal (informal) education and training. Among the 15 OECD countries that participated in the survey only two came out with even higher costs for informal education and training (Austria and Norway); formal training and education was higher in five OECD countries. Financial constraints are likely to be particularly severe for low-income earners and older workers who usually only have a short period available in the labour market over which to recoup the returns on investment in training. Moreover, individual firms may not have sufficient financial incentives to invest in general as opposed to firm-specific employee skills, even when this may be worthwhile for the economy as a whole (OECD, 2005).

There is thus a case for public support, especially for low-skilled and disadvantaged groups as well as for employees of certain types of firms, such as SMEs. However, as education generates considerable private returns, the adult learning expenses should be co-financed by firms and individuals. The government has recently launched a set of programmes to financially support adult education. Since end-2008, adults with an annual taxable income of less than EUR 25 600 (EUR 51 200 for couples) are eligible for an education voucher of up to EUR 500 per year, provided they spend at least the same amount on the training activity. Since early-2009, all households, irrespective of their income, can access funds accumulated on special savings accounts that are subsidized by the so-called employee savings bonus (*Arbeitnehmersparzulage*) without an early withdrawal penalty provided the funds are used to finance learning activities.<sup>42</sup> Moreover, the government is planning to introduce continued education loans (by analogy to student loans) to finance more expensive education and training activities. These measures have the potential to contribute towards a wider participation of adults in lifelong learning. However, the government should carefully monitor the outcome to avoid measures turning into a waste of public resources to fund learning with public subsidies that would have been undertaken anyway.

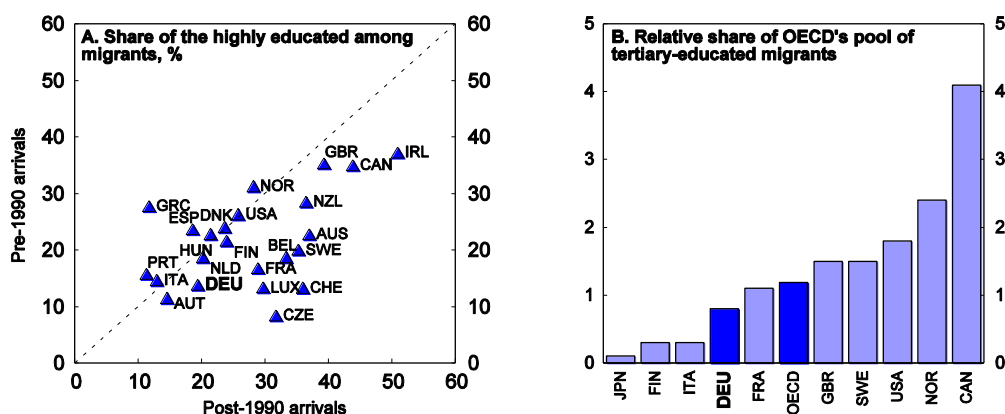
42. In addition, there are some *Länder*-specific support programmes such as the *Bildungsscheck NRW* in North Rhine-Westphalia.



### Immigration policy needs to make Germany more attractive to high-skilled foreigners

Education reform alone will not be sufficient to address the issue of skilled labour shortages as changes in this area usually need several years to tackle through into a better educated workforce.<sup>43</sup> In this context the existing overly strict immigration rules make it difficult for firms to fill their vacancies for skilled workers. While Germany is an important source of high-skilled migrants to countries such as the United States (*e.g.* Borrmann *et al.*, 2007), it does not attract a sufficiently high number of high-skilled foreigners. The proportion of highly educated among migrants is lower in Germany than in many other OECD countries (Figure 13, panel A). This unfavourable skill-mix is partly related to the heavy recruitment of low-skilled labour in the post-war economic boom which triggered additional low-skilled immigration in later decades through family reunification (OECD, 2007e). Germany also performs poorly on another indicator of the skill-level of immigrants, which is the country's share of the OECD's pool of tertiary educated migrants relative to its share of the OECD's population (Figure 13, panel B). Germany has 7% of the OECD's total population, but only 7% of all tertiary-educated foreigners living in OECD countries (corresponding to a ratio of 0.8). Canada, on the other hand, has 11.4% of all tertiary education foreigners, which is four times as great as one might anticipate from its relative population size (it has 2.8% of the OECD's population).

Figure 13. Educational attainment of immigrants



Note: In panel B, ratio of a country's share of the OECD's pool of tertiary educated migrants to its share of the OECD's population. Total population as of 2007 and foreign tertiary-educated population as of 2000.

Source: OECD (2008), *A Profile of Immigrant Populations in the 21st century*, OECD, Paris, Chart 4.4; OECD (2009), *The future of international migration to OECD countries*, OECD, Paris, Table 2.12.

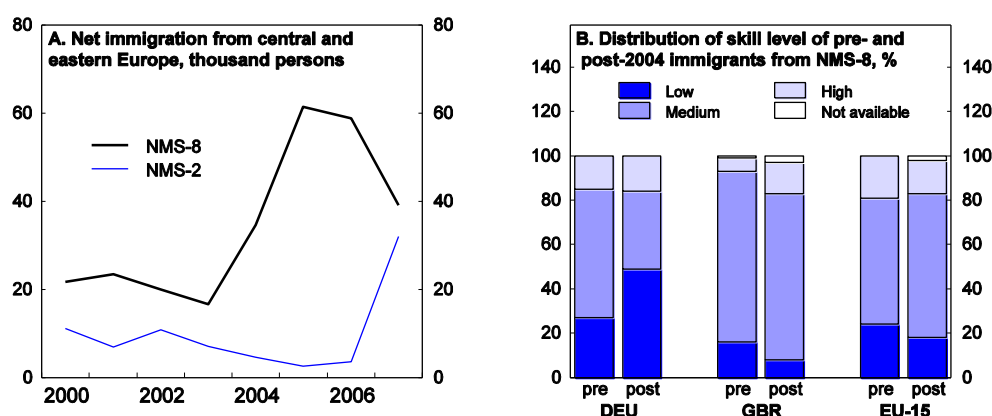
Borrmann *et al.* (2007) show that a greater openness to countries with poorly educated populations contributes to the low share of high-skilled migrants in Germany, but that a less favourable (self-) selection of migrants is the main factor (meaning that Germany attracts less high-skilled migrants from a certain country of origin than other OECD countries do). Factors contributing to a higher immigration of highly educated individuals in other countries include the after-tax skill wage premium and immigration legislation which favours high-educated immigrants relative to less educated ones (Grogger and Hanson, 2008; Bertoli *et al.*, 2009).

43. For example, with an average duration of bachelor programmes of 3½ years, a postponement of the tracking decision beyond the age of 10 will impact the pool of skilled labour with a minimum time lag of 10½ years.

*The free movement of workers from the new EU member countries was postponed...*

An investigation of German migration policy needs to distinguish between intra-EEA migration and migration from third countries.<sup>44</sup> Workers from EEA countries enjoy the right of free movement which is governed by Article 2 of the *Immigration Act*. An exception applies to citizens of the new EU member states (NMS) that joined the union in 2004 and 2007. The treaty regulating their accession allowed existing members to postpone free immigration of workers from these countries for up to 7 years.<sup>45</sup> All member countries opted for such transitional restrictions following the 2004 enlargement with the exception of the United Kingdom, Ireland and Sweden. While most member countries have by now fully opened their labour markets, Germany and Austria decided to maintain restrictions until 2011. As to the 2007 enlargement, Germany's restrictions on immigration from Bulgaria and Romania were recently prolonged until the end of 2011 and may be extended further until the end of 2013.

Figure 14. Migration flows



Note: NMS refers to new EU member states. NMS-8 is Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia; NMS-2 is Bulgaria and Romania. In panel B, data for NMS-8 exclude ethnic Germans (so-called *Spätaussiedler*) which have migrated from the NMS into the EU15 during the 1990s.

Source: OECD (2009), Migration database; Brücker and Damelan (2007), Labour mobility within the EU in the context of enlargement and the functioning of the transitional arrangements: Analysis of the scale, direction and structure of labour mobility; Institut für Arbeitsmarkt- und Berufsforschung, Nürnberg.

During the transition period, citizens from the new member states still require an EU work permit to take up employment in Germany (similar to non-EEA citizens, see below), which is only approved by the competent labour agency if no workers from old member states are available (the so-called priority examination). However, NMS citizens are free to enter and stay in the country, and to carry out any legal self-employed or entrepreneurial activity. Since the beginning of 2009 academics from the new member states are exempt from the priority examination. The new pathways to immigration were welcomed by NMS citizens as indicated by a jump in net immigration following the 2004 and 2007 enlargements

44. The European Economic Area (EEA) includes all 27 EU countries plus Iceland, Norway and Liechtenstein. Swiss citizens enjoy the same rights as EEA-citizens.

45. The transitional arrangements are based on the 2-3-2 formula: For the first two years following enlargement, access to the labour markets in incumbent member states depends on national laws and policies, which can be extended for a further period of three years. Should a member state find that after that period its labour market has been severely disrupted it is possible to have the national rules extended for a further two years. Citizens of Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia, and Romania are subject to these transitional arrangements.

(Figure 14, panel A). Especially the possibility to work in Germany as a self-employed was widely used. As documented by Brenke and Zimmermann (2007) about 40% of the migrants that came from the Czech Republic, the Slovak Republic, Hungary and Poland after 2004 are self-employed, whereas this share just amounts to 14% for migrants that had lived in Germany already prior to 2004.

Nonetheless, the overall increase in net immigration was small relative to other EU15 countries. Between 2003 and 2007 the share of NMS-8 citizens in the total population increased by 15% in Germany, but more than doubled in the EU15 countries as a whole.<sup>46</sup> Empirical studies on the impact of post-enlargement migration on the host country's economy point to substantial gains in terms of GDP growth, whereas adverse effects on the employment and wages of natives are generally found to be small or non-existent (Box 5).<sup>47</sup> Due to its restrictive policies, Germany participated little in these developments. Simulations by Baas *et al.* (2007) suggest that the 2004 enlargement boosted the factor income of natives in the United Kingdom by 0.31 percentage points during the period 2004 to 2007 (after the adjustment of capital stocks), but by only 0.03 percentage points in Germany. In this sense it is unfortunate that Germany did not open its labour markets earlier. The economic upswing in 2006/07 would have presented a good opportunity for such a move. Instead, the labour market will now have to be fully opened in 2011, at a time when unemployment is expected to reach its peak during the current downturn.<sup>48</sup>

#### Box 5. The economic impact of EU enlargement on incumbent member states

Studies on post-enlargement migration flows suggest that the number of immigrants moving from new to old member states was quite modest on average, though large discrepancies exist between countries (European Commission, 2008). The average population share of NMS-8 citizens living in the EU15 rose from 0.2% in 2003 to 0.5% by the end of 2007. The population share of Bulgarians and Romanians living in the EU15 increased by roughly the same amount over that period with migration starting well ahead of the two countries' accession in 2007. The majority of immigrants from the NMS-8 – mostly from Poland, Lithuania and Slovakia - went to Ireland and the United Kingdom, while Spain was the main destination country for Bulgarians and Romanians. Yet, with the exception of Ireland, post-enlargement flows from the new to the old member states have been significantly outnumbered by recent immigration of non-EU nationals (European Commission, 2008, Table A3).

Simple models of migration imply that the first-order effect of immigration is to lower real wages in the host economy, to the extent that the labour demand curve is downward-sloping. The overall welfare of natives increases as capital owners gain more than workers lose. In the presence of barriers to the downward adjustment of wages, immigration results instead in higher unemployment. In the long run, higher returns to capital stimulate investment and firm creation, so that capital per worker and the number of firms adjust and wages, unemployment as well as the return to capital return to their original levels. This should be reinforced by tax and social security contributions made by migrants, which at least in the first phases of immigration exceed the value of public services for migrants. A number of factors make the impact of immigration more complex. For example, additional welfare gains may result from skill-mix differences between immigrants and natives. Moreover, equilibrium unemployment may be lowered as immigrants often have lower reservation wages and are more flexible in terms of their location decision, thus improving labour market efficiency. For these reasons the size of the economic impact of immigration remains to a large extent an empirical issue.

Baas *et al.* (2007) estimate that migration from the NMS-8 during 2004-07 increased aggregate GDP in the EU15 by around 0.13% in the short run and 0.26% in the long run, *i.e.* after the adjustment of capital stocks. The

46. Data on migrant stocks in the EU15 are taken from Brücker and Damelang (2007), Table 3a.

47. This favourable assessment refers to the pre-crisis period. To what extent the picture is changed by the recent crisis remains to be seen.

48. Although historical evidence demonstrates that migration flows adjust to a downturn of the business cycle, it is unclear to what extent such historic patterns apply to the current downturn, given that both host and home countries are affected simultaneously (see OECD, 2009e, for some early evidence). Moreover, the effects of immigration on unemployment in a downturn are not yet sufficiently understood, such that some uncertainty about the exact impact remains in any case.

effects were much smaller for Germany, 0.04% in the short run and 0.1% in the long run. Migrants from Bulgaria and Romania boosted GDP by similar amounts. The impact on GDP *per capita* in the receiving countries is found to be negative in the short run, but neutral or even slightly positive in the long run. The results are confirmed by Barrel *et al.* (2007) showing that post-enlargement migration will boost GDP in receiving countries by between 0.09% (Italy) and 1.66% (Ireland) in the long run (2015). For Germany, the authors find a long-run effect of 0.14%. In addition, research suggests that labour migration from the new member states reduced inflationary pressures in receiving countries (Barrel *et al.*, 2007; Blanchflower *et al.*, 2007). The effect was the highest in Ireland where inflation is estimated to have been reduced by around ½ percentage point on average during the period 2005-09 (Barrel *et al.*, 2007, Table 3).

The impact of post-enlargement labour migration on wages and employment of native workers is generally found to be very small. Baas *et al.* (2007) find that wages in the EU15 are on average 0.09% lower in the short run than they would have been without additional migration from the NMS-8, with no impact at all in the long run, *i.e.* once the capital stock has adjusted to the higher labour supply. Similarly, the increase in unemployment is found to be small in the short-run (around 0.06 percentage points for NMS-8 citizens and 0.1 percentage points for NMS-2 citizens) and even smaller in the long run (0.02 percentage points for NMS-8 citizens and zero for NMS-2 citizens). For Germany, the short-run labour market effects are estimated to be smaller than for the EU15 aggregate (wages fell by 0.03% and unemployment rose by 0.03 percentage points due to immigration from NMS-8), reflecting the smaller inflow of immigrants. Due to the very balanced skill distribution of immigrants, the impact does hardly differ across skill levels. The moderate impact on wages and unemployment is confirmed by several other studies. Barrel *et al.* (2007) show that the labour market impact of EU enlargement was the greatest in Ireland and the United Kingdom where unemployment was respectively 0.8 percentage points and 0.2 percentage points above the baseline level on average between 2005 and 2009. In the other countries that are covered in this study the average impact over this period was smaller than 0.05 percentage points (in Germany, unemployment was on average 0.03 percentage points above the baseline). The long-run effect (by 2015) is found to be either zero or negative (meaning that unemployment declines) in all countries considered. Lemos and Portes (2008) estimate the impact of migration from new EU member states on labour market outcomes of natives in the United Kingdom. The wage and employment effects are either found to be small or insignificant, a result that is robust across different specifications, subsamples and estimation methods.

The skill structure of post-enlargement immigrants deviates from that of earlier vintages. In Germany, the average skill level of NMS-8 immigrants has deteriorated since enlargement and is below that of the same communities in other destinations (Figure 14, panel B). In particular, the share of low-skilled immigrants has substantially increased. This is in contrast to some other countries such as the United Kingdom, where the education level of immigrants from the NMS-8 countries has markedly improved over time (though many of the higher skilled immigrants worked in low and medium-skilled occupations). This can be interpreted as indirect evidence that migrants from the new member states are less favourably (self-) selected with regard to their education level in Germany (Baas and Brücker, 2007). Differences in the returns to human capital may have contributed to this phenomenon. For example, as argued by Baas and Brücker (2007), the exclusion of migrants from welfare benefits in the United Kingdom may have resulted in a better skill composition relative to Germany. However, differences in immigration policies are likely to have played a role as well. According to this line of reasoning, the restrictive policies of Germany may have led to a diversion of high-skilled migrants to more open countries like the United Kingdom, whereas those who migrated to Germany concentrated on semi-skilled operations, working as self-employed (Kahanec and Zimmermann, 2008; Brenke *et al.*, 2009). Against this background, the decision to fully open the labour market in 2009 for workers from the new member states that possess a university degree is highly welcome.

### ***... and the immigration law for non-EEA citizens remains overly restrictive***

The legislation governing migration from non-EEA countries was fundamentally changed in 2005 when the new *Immigration Act* came into force. While the Act by and large kept the ban on the recruitment of unskilled and semi-skilled workers, a number of entry opportunities exist for skilled and high-skilled workers. The main statute governing immigration for employment purposes is article 18 of the *Residence Act*, according to which a residence permit for employment purposes requires approval by the competent employment agency, which in turn requires: *i*) a legal provision granting access to the German labour

market; *ii*) a specific job offer; *iii*) that no EEA citizen or third-country national with unrestricted labour market access is available for the specific job (the above mentioned priority examination); and *iv*) working conditions comparable to those of Germans.<sup>49</sup> In addition, a number of special pathways exist for high-skilled workers which fully or partially waive the requirements of article 18 of the Act. *First*, a temporary residence permit for the purpose of employment can be obtained without employment agency approval for certain professions such as journalists and, since the beginning of 2009, for all academics. *Second*, article 19 of the *Residence Act* gives scientists with special expertise and teachers in senior functions the right to a permanent settlement permit which is issued without approval by the employment agency. The same applies to specialists and executives with a special professional experience provided they receive a salary of at least EUR 64 800 per year (until 2009 this threshold was EUR 86 400). *Third*, article 20 of the *Residence Act* gives researchers the right to a (temporary) residence permit for the purpose of carrying out a research project with a research establishment certified for implementing the special admission procedure for researchers, which is issued without approval by the employment agency. *Fourth*, foreign graduates from German universities and technical colleges may remain in Germany for up to one year to seek employment. In 2007, the labour market access of foreign graduates was eased by exempting them from the priority examination if the job corresponds to their field of studies. A *fifth* pathway (which is not exclusive to the high-skilled) is the possibility to work in Germany as self-employed. A number of conditions are attached to this pathway, which are considered as fulfilled if the immigrant invests at least EUR 250 000 and secures the creation of more than 5 jobs.

Overall, the newly created special pathways have been little used by high-skilled immigrants. For example, between 2005 and 2008 fewer than 1 400 of the immigrants were granted a settlement permit in accordance with article 19 of the *Residence Act*. This number increased after the easing of the income threshold in 2009 (in that year about 690 settlement permits were granted, which represents an increase of 45% on 2008), but remains fairly low.<sup>50</sup> One potential factor contributing to low take up is the income ceiling which is still well above the earnings level of individuals with a university degree at the beginning of their career, *i.e.* at the time when most individuals make their migration decision.<sup>51</sup> Similarly, foreign students are not sufficiently used as a talent pool. While the number of foreign students at German universities (relative to its population) is reasonably high for a non-English speaking country, only few foreign students stay in the country after graduation. In 2006, fewer than 2 000 of the about 14 500 foreign graduates from non-EU countries took advantage of the possibility to remain in the country to look for work (Chalaff and Lemaitre, 2009). To what extent the recent waiving of the priority examination has improved the situation remains to be seen.

OECD countries use a wide range of policy tools to manage high-skilled labour migration. Their experience with these tools might provide some guidelines for Germany on how to increase its intake of high-skilled immigrants. As stressed by Chalaff and Lemaitre (2009), there is a tendency among OECD countries to move away from employment tests towards a broader use of shortage lists. This reduces the time delays and arbitrariness often associated with employment tests (Burkert *et al.*, 2008, provide some indicative evidence of such discretionary behaviour in Germany), though other issues arise such as finding an appropriate definition of occupations in short supply that is neither too narrow nor too broad. While the recent opening of the labour market to foreign academics is a welcome step, the government might

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49. In addition, the issuance of a residence permit for employment purposes requires approval by the *Aliens Authority* which examines the foreigner's application according the *Residence Act* and concomitant ordinances. However, in line with the one-stop government principle, immigrants have to submit only one application.

50. Most immigrants from non-EEA countries use family reunification and similar channels for immigration.

51. The average annual starting salary for a bachelor's degree is about EUR 39 000, for a master's degree it is about EUR 42 000.

consider complementing the employment test with a list of occupations in short supply (for which the employment test is waived). Another incremental change concerns the income threshold for the immigration of specialists and executives with a special professional experience under article 19 of the *Residence Act*, which could be reduced further.

**Table 5. Points attributed under a points system, selected OECD countries**

Characteristic	Australia	Canada	New Zealand	United Kingdom
Language ability	15-25	0-24	Obligatory	10
Sufficient funds for initial period		Obligatory		10
Age (younger = more points)	15-30	0-10	5-30	5-20
Qualifications/academic	5-25	0-25	50-55	30-50
Skilled occupation	40-60			
Work experience in occupation	5-10	0-21	10-30	
Recent earnings				5-45
Spouse/partner skills	5	0-10	50	
Shortage occupation	15-20		20	
In-country work experience	10	0-10	5-15	5
Regional study	5			
Designated area sponsorship	25			
Job offer		0-10	50-60	
State/territory of settlement	10		10	
Professional language skills	5			
<b>Number required</b>	<b>100-120</b>	<b>67</b>	<b>100-140</b>	<b>95</b>

Source: Chaloff and Lemaitre (2009), "Managing highly-skilled labour migration: A comparative analysis of migration policies and challenges in OECD countries", OECD Social, Employment and Migration Working Papers, No. 29.

A more far-reaching reform would be to introduce a points system to manage immigration as is done in several other OECD countries like Australia, Canada, Denmark, New Zealand, and the United Kingdom.<sup>52</sup> In such a system candidates are assigned points based on their characteristics and are considered for admission if the number of points exceeds a certain threshold. Criteria for points include language skills, age, educational attainment, work experience (in the host country), financial security, and the holding of an occupation considered to be in shortage (Table 2). A points system was envisaged in the original draft of the 2005 *Immigration Act*, but failed in the legislative process. Compared to a system in which the initiative for immigration comes from the employer who has a perceived need for a certain foreign worker, a points system has the drawback that the immigrant is not immediately employed upon arrival, though (as in New Zealand) a job offer could add points. On the other hand, a points system is very transparent and flexible and takes into consideration general human capital needs rather than the specific immediate occupational needs of employers. In any case, as argued by Chaloff and Lemaitre (2009), an employer-driven system might be less appropriate for non-English speaking countries such as Germany, where hiring directly into jobs is difficult except in special circumstances (for example in multinational enterprises where the language of work is English). In this case, a points system may be superior, with significant investments made in language teaching for new arrivals.<sup>53</sup>

Germany might also have to engage more actively in recruitment policy, including through international job fairs, multilingual job postings, and special assistance to high-skilled immigrants who often lack host-country-specific human capital such as knowledge of job-search channels or contacts with

52. Brücker and Ringer (2008) show for a panel of six OECD countries that the qualification level of immigrants is notably higher in countries which manage migration based on a points system.

53. Even with a points system, employer-initiated migration may still be needed to satisfy temporary labour needs, which a points system is not able to address expeditiously.

potential employers (Chaloff and Lemaitre, 2009). As noted by Heß and Sauer (2007), programmes or organisations to systematically recruit highly qualified foreign labour hardly exist in Germany. In addition, a fast and transparent system of recognizing foreign qualifications is urgently needed, not least because many highly qualified immigrants continue to arrive without job offers in the country, for family or humanitarian reasons. Empirical evidence indicates that employers attribute less value to qualifications and experience obtained abroad and in particular from non-OECD countries (OECD, 2007e), leading to less favourable labour market outcomes for immigrants relative to natives. Recent government initiatives in this direction are welcome. For example, the government ratified the *Convention on the Recognition of Qualifications concerning Higher Education in the European Region* which allows for a more transparent process for recognising foreign qualifications that provide access to higher education, and has agreed on key points for legislation to improve the assessment and recognition of vocational qualifications acquired abroad.

#### **Box 6. Recommendations to lift potential growth in a globalised world**

##### **Making product market regulation more competition-friendly**

- Further simplify the license and permit system.
- Further simplify the insolvency law to ensure that the possibility for restructuring is used more frequently.
- Ease conduct regulation of professional services, for example, by further reducing restrictions on the cooperation between professions (while maintaining high quality standards), by further liberalizing prices and by reassessing the need for restrictions on advertising.
- Simplify entry conditions into professional services by rethinking compulsory chamber memberships while maintaining necessary standards for professional qualification in order to protect consumers. At the very least, reduce the number of activities over which certain professions have exclusive rights and further lower education requirements for full chamber membership.

##### **Improving the framework conditions for innovation**

- Ensure that the existing institutions on the domestic capital market (such as the designated stock market segment for SMEs) provide venture capitalists with sufficient exit possibilities.
- Modify the MoRaKG so that it complies with EU regulation and fix flaws in the original version (such as the reduced transparency that stems from having venture capital companies supervised by the BaFin and capital investment companies by the ministries for economic affairs of the *Länder*).
- Consider introducing tax incentives to complement grants, though duplication of public subsidisation should be excluded.

##### **Raising education attainment and outcomes**

- Raise tertiary attainment by reducing stratification in the school system and by improving the institutional set up of tertiary education also in those *Länder* that have not yet taken steps in this direction.
- Continue the reform of the vocational education and training (VET) system by adapting it to changing labour market needs. In this regard, consideration should be given to reducing the variety of VET qualifications. Continuing education offers of general skills - in addition to vocational training - must be provided according to need. This refers in particular to the teaching of general skills in mathematics, German, and foreign languages as well as sufficient computer skills in dual VET. Let vocational

schools and chambers jointly prepare and carry out the final examination of dual VET programmes.

- Raise participation in lifelong learning by swiftly implementing the plan to improve transparency in the adult education market and to facilitate access to guidance on adult education and training, by quickly proceeding with the planned incorporation of non-formal and informal activities in the *Qualifications Framework for Lifelong Learning*, and by carefully monitoring the outcome of recently introduced financial support programmes for adult learning and education to minimize the deadweight loss.

#### **Attracting high-skilled immigrants**

- Enhance possibilities for immigration of high-skilled workers, for example by introducing a points system. In addition, consider further reducing the income threshold for obtaining a permanent settlement permit for the immigration of specialists and executives with a special professional experience and complementing the employment test for foreign academics with a list of occupations in short supply.
- Consider engaging more actively in recruitment policy, including through international job fairs, multilingual job postings, and special assistance to high-skilled immigrants.
- Introduce a fast and transparent system of recognizing foreign qualifications.



## BIBLIOGRAPHY

- Allard, C. *et al.* (2005), “Explaining differences in external sector performance among large Euro Area countries”, *IMF Country Reports*, No. 05/401.
- Amiti, M. and S.J. Wei (2006), “Service offshoring and productivity: evidence from the United States”, *NBER Working Papers*, No. 11926.
- Arnold, J. *et al.* (2009), “Structural reforms and the benefits of the enlarged EU internal market: much achieved and much to do”, *OECD Economics Department Working Papers*, No. 694.
- Autor, D.H., F. Levy and R.J. Murnane (2003), “The skill content of recent technological change: an empirical exploration”, *Quarterly Journal of Economics*, Vol. CXVIII, pp. 1279-1333.
- Autorengruppe Bildungsberichterstattung (2008), *Bildung in Deutschland 2008 - Ein indikatoren gestützter Bericht mit einer Analyse zu Übergängen im Anschluss an den Sekundarbereich I*, Bertelsmann Verlag, Bielefeld.
- Baas, T. and H. Brücker (2007), *Labour mobility within the EU in the context of enlargement and the functioning of the transitional arrangements – Country Study: Germany*, Institut für Arbeitsmarkt- und Berufsforschung, Nürnberg.
- Baas, T. *et al.* (2007), *Labour mobility within the EU in the context of enlargement and the functioning of the transitional arrangements – The macroeconomic consequences of labour mobility*, Institut für Arbeitsmarkt- und Berufsforschung, Nürnberg.
- Bachmann, R. and S. Braun (2008), “The impact of international outsourcing on labour market dynamics in Germany”, *Ruhr Economic Papers*, No. 53.
- Baethge, M. (2008), “Das berufliche Bildungswesen in Deutschland am Beginn des 21. Jahrhunderts”, in Cortina, K.S. *et al.* (eds.), *Das Bildungswesen in der Bundesrepublik*, Rowohlt Verlag GmbH, Reinbek.
- Balassa, B. (1965), “Tariff protection in industrial countries: An evaluation”, *Journal of Political Economy*, Vol. 73, pp. 573-594.
- Barrell, R., J. FitzGerald and R. Riley (2007), “EU enlargement and migration: assessing the macroeconomic impacts”, *NIESR Discussion Papers*, No. 292.
- Becker, S.O. *et al.* (2005), “Location choice and employment decisions: a comparison of German and Swedish multinationals”, *Review of World Economics*, Vol. 141, pp. 693-731.
- Bertoli, S. *et al.* (2009), “The battle for brains: how to attract talent”, mimeo.
- Biersack, W. *et al.* (2008), “Akademiker/innen auf dem Arbeitsmarkt: gut positioniert, gefragt und bald sehr knapp”, *IAB Kurzbericht*, 18/2008.

- Blanchflower, D.G., J. Saleheen and C. Shadforth (2007), "The impact of the recent migration from eastern Europe on the UK economy", *IZA Discussion Papers*, No. 2615.
- Bloom, N., R. Griffith and A. Klemm (2001), "Issues in the design and implementation of R&D tax credit for UK firms", *Briefing Notes*, No. 15, Institute for Fiscal Studies, London.
- Bloom, N., R. Griffith and J. van Reenen (2002), "Do R&D tax credits work? Evidence from a panel of countries 1979-1997", *Journal of Public Economics*, Vol. 85, pp. 1-31.
- Bonin, H. *et al.* (2007), "Zukunft von Bildung und Arbeit - Perspektiven von Arbeitskräftebedarf und -angebot bis 2020", *IZA Research Reports*, No. 9.
- Borrmann, C., R. Jungnickel and D. Keller (2007), "Standort Deutschland – abgeschlagen im Wettbewerb um Hochqualifizierte?", *Wirtschaftsdienst*, Vol. 87, pp. 127-134.
- Brenke, K. and K.F. Zimmermann (2007), "Zuwanderungen aus Mittel- und Osteuropa trotz Arbeitsmarktbarrieren deutlich gestiegen", *Wochenbericht*, Nr. 44, Deutsches Institut für Wirtschaftsforschung, Berlin.
- Brenke, K., M. Yuksel and K.F. Zimmermann (2009), "EU enlargement under continued mobility restrictions: consequences for the German labor market", in Kahanec, M. and K.F. Zimmermann (eds.), *EU labor markets after post-enlargement migration*, Forschungsinstitut zur Zukunft der Arbeit, Bonn.
- Brücker, H. and A. Damelang (2007), *Labour mobility within the EU in the context of enlargement and the functioning of the transitional arrangements – Analysis of the scale, direction and structure of labour mobility*, Institut für Arbeitsmarkt- und Berufsforschung, Nürnberg.
- Brücker, H. and E.J. Jahn (2009), "Migration and wage-setting: reassessing the labor market effects of migration", *Kiel Institute for the World Economy Working Papers*, No. 1502.
- Brücker, H. and S. Ringer (2008), "Ausländer in Deutschland: vergleichsweise schlecht qualifiziert", *IAB Kurzbericht*, 1/2008.
- Bundesbank (2006a), "German foreign direct investment (FDI) relationships: recent trends and macroeconomic effects", *Monthly Report*, September, pp. 43-58.
- Bundesbank (2006b), "Determinants of the current accounts in central and east European EU member states and the role of German direct investment", *Monthly Report*, January, pp. 15-33.
- Bundesbank (2006c), "Germany in the globalization process", *Monthly Report*, December, pp. 17-34.
- Burkert, C., A. Niebuhr and R. Wapler (2008), "Regional disparities in employment of high-skilled foreigners – Determinants and options for labour migration policy in Germany", *International Migration and Integration*, Vol. 9, pp. 383-400.
- Chalaff, J. and G. Lemaitre (2009), "Managing highly-skilled labour migration: a comparative analysis of migration policies and challenges in OECD countries", *OECD Social, Employment and Migration Working Papers*, No. 79.
- Danninger, S. and F. Joutz (2007), "What explains Germany's rebounding export market share?", *IMF Working Papers*, No. 07/24.

Da Rin, M., G. Nicodano and A. Sembenelli (2005), “Public policy and the creation of active venture capital markets”, *ECB Working Papers*, No. 430.

Denis, C., K. Mc Morrow and W. Röger (2006), “Globalisation: trends, issues and macro implications for the EU”, *European Economy Economic Papers*, No. 254.

Duval, R., J. Elmeskov and L. Vogel (2007), “Structural policies and economic resilience to shocks”, *OECD Economic Studies*, Vol. 2008, pp. 201-238.

Egeln, J. *et al.* (2007), *Bericht zur technologischen Leistungsfähigkeit Deutschlands 2007*, Federal Ministry of Education and Research, Berlin.

Egger, H. and P. Egger (2006), “International outsourcing and the productivity of low-skilled labor in the EU”, *Economic Inquiry*, Vol. 44, pp. 98-108.

European Commission (2008), *The impact of free movement of workers in the context of EU enlargement – Report on the first phase (1 January 2007-31 December 2008) of the transitional arrangements set out in the 2005 Accession Treaty as requested according to the transitional arrangements set out in the 2003 Accession Treaty*, Brussels.

European Communities (2009), “European Innovation Scoreboard 2009 – comparative analysis of innovation performance”, Office for Official Publications of the European Communities, Luxembourg.

Expertenkommission Forschung und Innovation (2009), *Research, innovation and technological performance in Germany – Report 2009*, Expertenkommission Forschung und Innovation, Berlin.

Falk, M. (2004), “What drives business R&D intensity across OECD countries?”, *WIFO Working Papers*, No. 236.

Faulstich, P. (2008), “Weiterbildung“, in Cortina, K.S *et al.* (eds.), *Das Bildungswesen in der Bundesrepublik*, Rowohlt Verlag GmbH, Reinbek.

Federal Ministry of Education and Research (2008), *Status of recognition of non-formal and informal learning in Germany*, Federal Ministry of Education and Research, Bonn.

Federal Ministry of Education and Research (2009), *Research and innovation for Germany*, Federal Ministry of Education and Research, Bonn.

Fryges, H. *et al.* (2007), *Hightech-Gründungen und Business Angels*, Zentrum für Europäische Wirtschaftsforschung, Mannheim.

Fuchs, J. and A. Reinberg (2007): “Demografische Effekte auf das Erwerbspersonenpotenzial“, in Institut für Arbeitsmarkt- und Berufsforschung (ed.), *Fachkräftebedarf der Wirtschaft, Materialsammlung B: Zukünftiger Fachkräftemangel?*, Nürnberg.

Fuchs, J. and B. Weber (2007), Demografischer Wandel - Ein altbekanntes Menetekel, *IAB-Forum 2/07*.

García-Quevedo, J. (2004), “Do public subsidies complement business R&D? A meta-analysis of the econometric evidence”, *Kyklos*, Vol. 57, pp. 87-102.

- Geishecker, I. (2006), "Does outsourcing to central and eastern Europe really threaten manual workers' jobs in Germany?", *The World Economy*, Vol. 29, No. 5, pp. 559-583.
- Geishecker, I. (2008), "The impact of international outsourcing on individual employment security: a micro-level analysis", *Labour Economics*, Vol. 15, No. 3, pp. 291-314.
- Gervais, M., I. Livshits and C. Meh (2007), "Uncertainty and the specificity of human capital", *Bank of Canada Working Papers*, No. 5.
- Görg, H., A. Hanley and E. Strobl (2008), "Productivity effects of international outsourcing: evidence from plant-level data", *Canadian Journal of Economics*, Vol. 41, pp. 670-688.
- Gottschalk, S. et al. (2007), *Start-ups zwischen Forschung und Finanzierung: Hightech-Gründungen in Deutschland*, Zentrum für Europäische Wirtschaftsforschung, Mannheim.
- Grogger, J. and G. H. Hanson (2008), "Income maximization and the selection and sorting of international migrants", *NBER Working Papers*, No. 13821.
- Guellec, D. and B. van Pottelsberghe (2000), The impact of public R&D expenditure on business R&D, *STI Working Papers*, No. 2000/4.
- Hall, B.H. and J. van Reenan (2000), "How effective are fiscal incentives for R&D? A review of the evidence", *Research Policy*, Vol. 29, pp. 449-469.
- Harris, R., Q.C. Li and M. Trainor (2009), "Is a higher rate of R&D tax credit a panacea for low levels of R&D disadvantaged regions?", *Research Policy*, Vol. 38, pp. 192-205.
- Heller, D. (1999), "The effects of tuition and state financial aid on public college enrolment", *Review of Higher Education*, Vol. 23, pp. 65-89.
- Heß, B. and L. Sauer (2007), *Conditions of entry and residence of third country highly qualified and highly skilled workers: the situation in Germany*, Federal Office for Migration and Refugees, Berlin.
- Hoeckel, K. (2010), *Learning for Jobs: OECD Reviews of Vocational Education and Training - Germany*, OECD, Paris, forthcoming.
- Hülskamp, N. and O. Koppel (2005), "Deutschlands Position im Innovationswettbewerb - Ergebnisse des IW-Innovationsbenchmarks", *IW-Trends*, Vol. 32, No. 3, pp. 45-61.
- Jaumotte, F. and N. Pain (2005a), "An overview of public policies to support innovation", *OECD Economics Department Working Papers*, No. 456.
- Jaumotte, F. and N. Pain (2005b), "From ideas to development: the determinants of R&D and patenting", *OECD Economics Department Working Papers*, No. 457.
- Johansson, Å et al. (2008), "Tax end economic growth", *OECD Economics Department Working Papers*, No. 620.
- Kahanec, M. and K.F. Zimmermann (2008), "Migration in an enlarged EU: A challenging solution?", *DIW Discussion Papers*, No. 849.

- Klassen, K., J. Pittman and M. Reed (2004), “A cross-national comparison of R&D expenditure decisions: tax incentives and financial constraints”, *Contemporary Account Research*, Vol. 21, pp. 639–680.
- Klodt, H. (2004), “Mehr Arbeitsplätze durch Auslandsinvestitionen”, *Die Weltwirtschaft*, Vol. 4/2004, pp. 373–398.
- Koske, I. (2010), „After the Crisis - Bringing German Public Finances Back to a Sustainable Path”, OECD Economics Department Working Papers, No. 766.
- Kreditanstalt für Wiederaufbau (2004), *Studie zu den Auslandsaktivitäten deutscher Unternehmen - Beschäftigungseffekte und Folgen für den Standort Deutschland*, KfW, Frankfurt.
- Krueger, D. and K.B. Kumar (2004a), “US-Europe differences in technology-driven growth: quantifying the role of education”, *Journal of Monetary Economics*, Vol. 51, pp. 161-190.
- Krueger, D. and K.B. Kumar (2004b), “Skill-specific rather than general education: a reason for US-Europe growth differences?”, *Journal of Economic Growth*, Vol. 9, pp. 167-207.
- Lach, S. (2002), “Do R&D subsidies stimulate or displace private R&D? Evidence from Israel”, *Journal of Industrial Economics*, Vol. L, pp. 369-390.
- Lemos, S. and J. Portes (2008), “New labour? The impact of migration from the central and eastern European countries on the UK labour market”, *IZA Discussion Papers*, No. 3756.
- Ludwig, V. and F. Pfeiffer (2005), “Abschreibungsraten allgemeiner und beruflicher Ausbildungsinhalte”, *ZEW Discussion Papers*, No. 05-36.
- Marin, D. (2004), “A nation of poets and thinkers – less so with eastern enlargement? Austria and Germany”, *CEPR Discussion Papers*, No. 4358.
- Meier, V. and G. Schütz (2007), “The economics of tracking and non-tracking”, *Ifo Working Papers*, No. 50.
- Meyer, T. (2008), *Venture Capital: Brücke zwischen Idee und Innovation?*, Deutsche Bank Research, Frankfurt.
- Mohnen, P. and B. Lokshin (2009), “What does it take for an R&D tax incentive policy to be effective?”, *Institut d'Economia de Barcelona Working Papers*, No. 2009/9.
- Molnar, M., N. Pain and D. Taglioni (2008), “Globalisation and employment in the OECD”, *OECD Economic Studies*, Vol. 2008, pp. 83-116.
- Moser, C., D.M. Urban and B. Weder di Mauro (2009), “Offshoring, firm performance and establishment-level employment: identifying productivity and downsizing effects”, *CEPR Discussion Papers*, No. 7455.
- Niefert, M. et al. (2006), *Hightech-Gründungen in Deutschland: Trends und Entwicklungsperspektiven*, Zentrum für Europäische Wirtschaftsforschung, Mannheim.
- OECD (2003), *Tax incentives for research and development: trends and issues*, OECD, Paris.
- OECD (2005), *Promoting adult learning*, OECD, Paris.

- OECD (2007a), *Staying competitive in the global economy: Moving up the value chain*, OECD, Paris.
- OECD (2007b), *OECD Economic Surveys: United Kingdom*, OECD, Paris.
- OECD (2007c), *Going for Growth*, OECD, Paris.
- OECD (2007d), *Science, Technology and Industry Scoreboard*, OECD, Paris.
- OECD (2007e), *Jobs for Immigrants (Vol. 1): Labour Market Integration in Australia, Denmark, Germany and Sweden*, OECD, Paris.
- OECD (2008), *OECD Economic Surveys: Germany*, OECD, Paris.
- OECD (2009a), *OECD Economic Outlook*, No. 86, OECD, Paris.
- OECD (2009b), *OECD Patent Statistics Manual*, OECD, Paris.
- OECD (2009c), *Education at a glance*, OECD, Paris.
- OECD (2009d), *OECD Economic Surveys: Switzerland*, OECD, Paris.
- OECD (2009e), *International Migration Outlook*, OECD, Paris.
- OECD (2010a), *OECD Economic Surveys: Germany*, OECD, Paris.
- OECD (2010b), *Recognising non-formal and informal learning: Outcomes, policies and practices*, OECD, Paris.
- Oliveira Martins, J. *et al.* (2007), “The policy determinants of investment in tertiary education”, *OECD Economics Department Working Papers*, No. 576.
- Ottaviano, G. and G. Peri (2006), “Rethinking the effects of immigration on wages”, *NBER Working Papers*, No. 12497, Cambridge, MA.
- Paterson, I., M. Fink and A. Ogus (2007), “Economic impact of regulation in the field of liberal professions in different member states”, *European Network of Economic Policy Research Institutes Working Papers*, No. 52.
- Rae, D. and M. Sollie (2007), “Globalisation and the European Union: which countries are best placed to cope?”, *OECD Economics Department Working Papers*, No. 586.
- Russo, B. (2004), “A cost-benefit analysis of R&D tax incentives”, *Canadian Journal of Economics*, Vol. 37, pp. 313-335.
- Sachverständigenrat (2004), *Erfolge im Ausland - Herausforderungen im Inland*, Jahresgutachten 2004/2005.
- Sachverständigenrat (2008), *Die Finanzkrise meistern - Wachstumskräfte stärken*, Jahresgutachten 2008/2009.
- Sachverständigenrat (2009), *Die Zukunft nicht aufs Spiel setzen*, Jahresgutachten 2009/2010.

Santiago, P. *et al.* (2008), *Tertiary education for the knowledge society*, Volume 1: “Special features: governance, funding, quality”, OECD, Paris.

Schnur, P. and G. Zika (2007), “Arbeitskräftebedarf bis 2025: die Grenzen der Expansion”, *IAB Kurzbericht*, 26/2007.

Sinn, H.-W. (2006), The pathological export boom and the bazaar effect: how to solve the German puzzle, *The World Economy*, Vol. 29, No. 9, pp. 1157-1175.

Snower, D. J., A. J. G. Brown and C. Merkl (2009), “Globalization and the welfare state: a review of Hans-Werner Sinn’s *Can Germany be saved?*”, *Journal of Economic Literature*, Vol. 47, pp. 136-158.

Spitz, A. (2003), “IT capital, job content and educational attainment”, *Centre for European Economic Research Discussion Papers*, No. 03-04.

Stahn, K. (2006), “Has the impact of key determinants of German exports changed?”, in De Brandt, O., H. Herrmann and G. Parigi (eds.), *Convergence or divergence in Europe? Growth and business cycles in France, Germany and Italy*, Springer, Berlin/Heidelberg.

Von Hirschhausen, C. *et al.* (2009), *Innovationsindikator Deutschland 2009*, Deutsches Institut für Wirtschaftsforschung, Berlin.

Wu, Y. (2005), “The effects of state R&D tax credits in stimulating private R&D expenditure: a cross-state empirical analysis”, *Journal of Policy Analysis and Management*, Vol. 24, pp. 785-802.

## ANNEX A1

## WHAT FACTORS WERE BEHIND THE GERMAN EXPORT BOOM?

To explore the reasons behind the strong increase in German exports prior to the recent crisis, a number of equations are estimated relating the volume of exports to a measure of export market, and measures of price and non-price competitiveness. A coefficient of unity is imposed on export market size, so that ultimately the export market share is modelled. The equations are estimated separately for capital goods and non-capital goods to investigate whether the importance of explanatory variables differs across the two types of goods (capital goods play a crucial role for the German export sector, accounting for about 62% of the total value of goods exports in 2008, down from around 65% in 2000). The data set is annual and covers the period 1994 to 2007. To account for the unit-root characteristics of the time series, the analysis makes use of the dynamic OLS estimator proposed by Saikkonen (1991) which involves adding leads and lags of the changes in all explanatory variables to the equation:

$$\ln\left(\frac{EXP_t}{EXPM_t}\right) = \alpha + \beta_1 \ln(PC)_t + \beta_2 \ln(NPC)_t + \sum_{p=-n}^n \gamma_{1p} \Delta \ln(PC)_{t-p} + \sum_{p=-m}^m \gamma_{2p} \Delta \ln(NPC)_{t-p} + \varepsilon_{it}$$

where *EXP* is the volume of respectively capital and non-capital goods exports, *EXPM* is the size of the potential export market, and *PC* and *NPC* are measures of price and non-price competitiveness. Given the short sample period, *n* and *m* are set equal to unity. To obtain a parsimonious specification, insignificant dynamic terms are dropped. Unit root tests indicate that the residuals of the estimated equations are stationary.

Data on capital and non-capital exports (in value terms) are obtained from the UN *Comtrade Database*.<sup>1</sup> As no price data are available for capital and non-capital goods, export values are deflated using the private non-residential fixed capital formation deflator for capital goods and the private consumption expenditure deflator for non-capital goods. These data are obtained from the OECD Analytical Database. The export market is computed as a weighted average of imports in trading partners, following the procedure described in Box A of Pain *et al.* (2005) with all data taken from the UN *Comtrade Database*.<sup>2</sup> It is calculated separately for capital and non-capital goods. Price competitiveness is alternatively measured by total economy unit labour costs and export prices, with data on both variables taken from the OECD *Analytical Database*. The latter variable has the advantage that it is a more direct measure of a country's price competitiveness, accounting not only for changes in the costs of labour input but also in the costs of other input factors (*e.g.* cheaper sourcing of intermediate goods due to offshoring activities) as well as for changes in profit margins. The two price competitiveness variables are measured

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1. Capital goods include manufactured metals, machinery/transport equipment, manufactured professional/scientific/photographic/optical apparatus and watches and clocks. They are defined as SITC Revision 3 commodity codes 67+68+69+7+87+88. Non-capital goods are defined as the remaining SITC Revision 3 commodity codes except for non-classified commodities, which are omitted from the analysis.
  2. Data availability problems restrict the set of trading partners to Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Mexico, Netherlands, New Zealand, Norway, Korea, Spain, Sweden, Switzerland, United Kingdom and the United States.



relative to a weighted average of respectively unit labour costs and export prices in competitor countries, where the weighing procedure follows again Pain *et al.* (2005).<sup>3</sup> Non-price competitiveness is measured by the number of triadic patent families per million population. The variable is measured relative to a weighted average of competitor countries. Data on patents are obtained from the OECD *Patents Database* and population data are taken from the OECD *Analytical Database*. As patenting activity is likely to affect competitiveness with a lag, a 3-year moving average of the series is used in the estimation.

Table A1. Estimation results

Specification	(1)	(2)	(3)	(4)
Dependent variable	$\ln(EXP^C/EXPM^C)$	$\ln(EXP^{NC}/EXPM^{NC})$	$\ln(EXP^C/EXPM^C)$	$\ln(EXP^{NC}/EXPM^{NC})$
$\ln(RULC)$	-1.944*** (0.546)	-1.235* (0.656)		
$\ln(RPEXP)$			-5.372*** (1.210)	-3.475** (1.220)
$\ln(RPAT)$	3.237*** (0.656)	4.132*** (0.789)	3.000*** (0.951)	3.726*** (0.958)
Adj. R-squared	0.937	0.812	0.802	0.588

Notes:  $EXP^C$  = capital goods exports;  $EXP^{NC}$  = non-capital goods exports;  $EXPM^C$  = export market for capital goods;  $EXPM^{NC}$  = export market for non-capital goods; RULC = relative unit labour costs; RPEXP = relative export prices; RPAT = relative patents per million population (3-year moving average). \*\*\*, \*\*, \* denote significance at the 1%, 5%, 10% significance level. Standard errors in parentheses.

The long-run coefficients are displayed in Table A1. The coefficients on the two measures of price competitiveness are significant for Germany in all four specifications and have the expected negative sign. The significance of the variable is somewhat lower for non-capital goods exports than for capital goods exports. The point estimates of the coefficients are somewhat smaller for non-capital goods exports, but the difference is not statistically significant. The relative number of triadic patent families per million population has a highly significant impact on both capital and non-capital goods exports, suggesting that non-price factors are an important determinant of German exports. The size of the estimated coefficients is higher for non-capital goods than for capital goods, but again the difference is not statistically significant.

## BIBLIOGRAPHY

Pain, N. *et al.* (2005), "The international trade model", *OECD Economics Department Working Papers*, No. 440.

Saikkonen, P. (1991), "Asymptotically efficient estimation of cointegrating regressions", *Econometric Theory*, Vol. 7, pp. 1–21.

3. The set of partner countries is identical to the one used for the calculation of export markets.

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