



The future of Germany as an automaking location

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The differences between the German automotive industry and the automotive industry in Germany have grown steadily in recent years. This is a consequence of the increasing localisation of carmaking in foreign markets. Foreign production by German carmakers will also continue to increase in future. Ensuring that this trend is not detrimental to Germany's status as a manufacturing location requires firms to continuously boost their domestic productivity and refine the technology in their vehicles. Policymakers have to create an investment-friendly environment. However, current political developments (e.g. in labour market policy) raise fears that carmaking in Germany will become less appealing to companies in future.

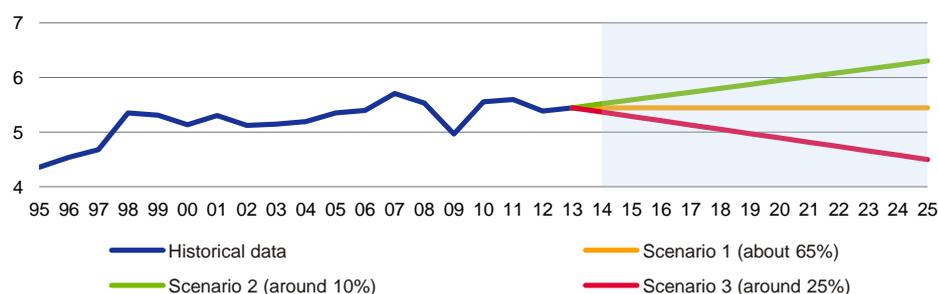
In 2013 the number of cars manufactured by German firms in foreign countries climbed to more than 8.6 million units – an increase of 133.7% compared with the level in 2000. By contrast, domestic car output in 2013 (5.4 million) was just 6.1% higher than in 2000 (equivalent to an annual increase of 0.5%).

Apart from localising production, the second pillar of the globalisation strategy is exports. In 2013, over 77% of all the cars manufactured in Germany were exported. Although the number of cars exported from Germany rose by more than 70% between 1995 and 2013, there has been no growth in these exports for several years. The demand for cars in China, for example, is increasingly being met by local facilities.

We shall outline three potential scenarios for the development of Germany as an automaking location until 2025. In our most likely scenario domestic car output remains at around its current level until then. Germany benefits from a gradual recovery in western European car demand. In addition, smaller export markets become more important. In the negative scenario, whose likelihood we estimate at about 25%, the political conditions in Germany deteriorate in such a way that the domestic production base is weakened gradually. A stable or even positive development in Germany's status as an automaking location thus cannot be taken for granted.

Auto output in Germany: Stable or even positive development cannot be taken for granted

Cars produced in Germany according to different scenarios*, m



*Assuming linear development

Sources: VDA, Deutsche Bank Research



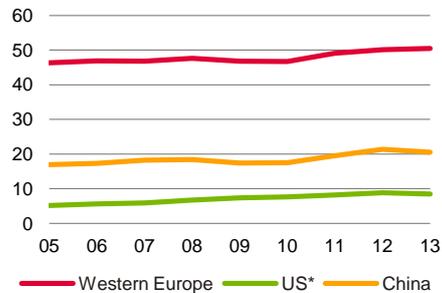
The future of Germany as an automaking location

1. Introduction: German automotive industry well positioned

Market share of German corporate brands has trended up

1

German corporate brands' share of new car registrations/unit car sales, %



* Light Vehicles

Source: VDA

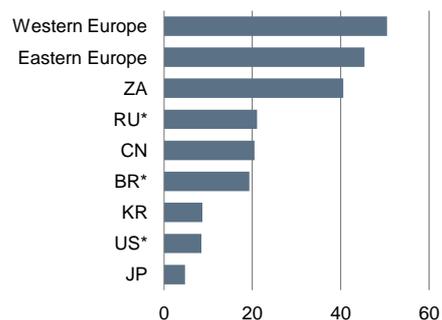
The German automotive industry has done very well relative to its international competitors in recent years. In the world's most important car markets German companies have managed to grow or at least maintain their respective shares of car sales. Some 20 years ago, when the sector slid into a deep recession following the reunification boom and had to grapple with high structural costs, a number of market observers claimed that the German automotive industry was in terminal decline. In this light, the positive performance of the sector since then is commendable.

German automakers would not have been able to achieve this success if their product ranges did not satisfy the demands of car buyers. German corporate-brand vehicles set world-leading standards in safety, performance, comfort, versatility, design, reliability and image. Another decisive factor in the pleasing development was a concentration on core competences, which helped to cut internal fixed costs. The 1990s in particular saw carmakers outsource significant segments of their value chain to suppliers and other upstream segments. As a result the domestic value added share of production value declined from 33% in 1991 to just under 25% ten years later. In addition, moderate pay settlements in recent years boosted the competitiveness of the sector relative to that of its foreign counterparts. At the same time, companies made increasing use of flexible working time models that enabled cyclical fluctuations to be handled without recourse to wholesale cuts in the core workforce. Another strong point of the auto sector is the close technological and geographical links between carmakers, suppliers, logistics firms, equipment suppliers (e.g. engineering companies) and research institutions in the university segment and beyond. The structure of this automotive cluster in Germany is probably unique worldwide and enables continual productivity gains and innovations, for example.

Market share high in Europe above all

2

German corporate brands' share of new car registrations/unit car sales, %, 2013



* Light Vehicles

Source: VDA

Internationalisation strategy is one key to success

Another factor that played a particularly important part in the success of the German automotive industry was its massive internationalisation strategy. Over recent years the companies have not only started selling their products in more and more new foreign markets, they have also diversified their purchasing operations and procure many inputs (parts and modules) from abroad; four of the ten biggest importing nations in the sector are eastern European. Furthermore, the German automotive industry – automakers and suppliers – has expanded its production capacities abroad. As a consequence the number of cars produced by German companies abroad has risen strongly, while domestic production has trended sideways over the long term (at a high level). As well as manufacturing operations the sector has also been expanding its R&D activities in foreign locations for quite some time.

Vertical integration declined in 1990s, but has been quite stable since then

3

Gross value added as a share of output value of automotive industry in Germany, %



Source: Federal Statistical Office

German automotive industry ≠ automotive industry in Germany

Above all, the increasing localisation of production has resulted in the differences between the “German automotive industry” and the “automotive industry in Germany” becoming larger and larger. In this report we will seek to examine what impact this divergence may have on Germany as an automaking location and whether its growth potential will be reduced over the long term. This issue is pertinent in no small measure, because a look at the automotive output in other western European countries shows that it cannot be taken for granted that a high production level can be maintained permanently. For example, automotive output in France and Italy is now much lower than a few years ago. So, ultimately the issue is also whether Germany can continue to do well as an

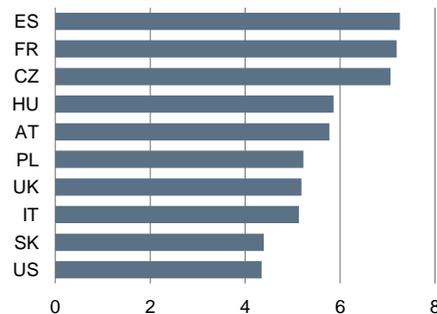


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Many imports in auto industry come from eastern Europe

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Germany's biggest import markets in the auto industry*, imports per country, EUR bn, 2013



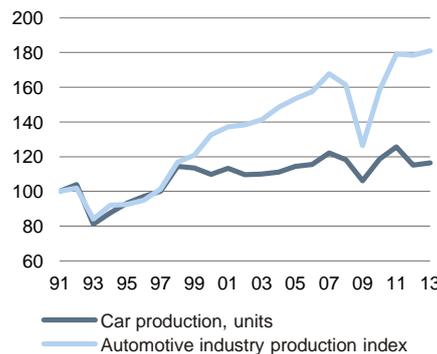
*Entire automotive industry, incl. parts suppliers

Source: Federal Statistical Office

Significant qualitative growth

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Automotive output in Germany, 1991=100

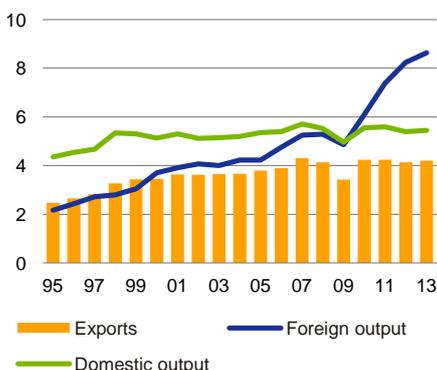


Sources: Federal Statistical Office, VDA

German automotive industry becoming more international

6

Car output of German OEMs* and car exports from Germany, m



*Original equipment manufacturer

Source: VDA

automaking location against its international competitors or whether it will also lose ground – like other European countries.

We shall outline Germany's potential development as an automaking location using three scenarios. First, we shall present a data analysis of the output of the German automotive industry domestically and abroad, of automotive output in Germany as well as of auto exports from Germany. For comparison, we shall also take a look at the production figures in other EU countries and cite specific reasons for the contrast in performance. To conclude, we shall examine the instruments potentially available to German politicians to boost automaking capabilities in Germany.

2. Globalisation strategy of the German automotive industry

Before we take a closer look at the production figures inside and outside Germany it is advisable to make an introductory observation about the statistical database: in the automotive industry it is standard practice to measure the economic performance of the sector using the number of vehicles that are produced or sold or the number of new registrations. Focusing on unit figures has the advantage that the corresponding data is generated on a timely basis (often monthly) and is relatively easy to record. One disadvantage, however, is that value-related and/or qualitative differences between specific types of vehicle (e.g. executive versus compact models) as well as general improvements in vehicle quality over time are not captured by purely unit-based statistics. The real production index is therefore a better indicator of the economic performance of the automotive industry. In particular it incorporates those qualitative elements and also the output of the automotive supplier industry operating in Germany (including that of foreign firms). Furthermore, it enables comparisons to be made with other industrial sectors, for which the production index is also calculated. Production index data is available on a timely basis from month to month, too.

Qualitative growth is much higher than unit growth

The importance of this qualitative growth for the automotive industry is shown by a comparison between unit production figures and the real production index: in 2013 unit car production in Germany was 16.5% higher than in 1991 and 43.5% above the low reached in the recessionary year 1993. The production index for 2013, by contrast, was 81% higher than in 1991. Compared with 1993 the increase was even bigger, at nearly 116%. These enormous differences are due to the value-related quality improvements made to the vehicles (e.g. more safety technology, more refined engines and equipment levels) and are not the result of price increases.

For the EU countries the production index in the automotive industry is reported according to a standard Eurostat definition. Unit production figures are also provided for those countries in which there is significant final assembly. A comparison between the countries is thus possible in both cases. An analysis of how German automakers' production has developed at home and abroad is, however, limited to unit figures, as these are the only foreign output statistics available for German firms. By contrast, a national production index does not distinguish between the respective activities of domestic or foreign firms or generally their origin.

Foreign production outstripping domestic production significantly

A key component of the globalisation strategy of the German automotive industry is – as mentioned in the introductory chapter – the pronounced



The future of Germany as an automaking location

Stock of foreign direct investments in the auto industry rising 7

Direct and indirect German investments abroad, EUR bn



Source: Bundesbank

“localisation” of automaking abroad. This can be underlined impressively with statistics: in 2013 German companies manufactured more than 8.6 million cars abroad.¹ This figure was 133.7% higher than in 2000 and nearly four times as high as in 1995. This represents average annual growth of 6.7% between 2000 and 2013. The qualitative growth has probably been even higher, because the equipment levels of vehicles made abroad are also getting better and better.

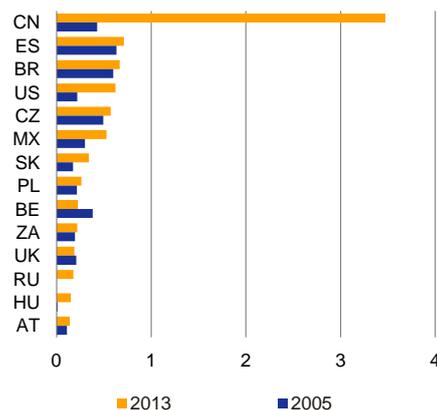
By contrast, domestic car production in 2013 was just 6.1% higher than in 2000 (+0.5% p.a.); compared with 1995 the increase was a little under 25%. Since 1998 car production in Germany has always topped 5 million units, except in the recession year 2009. On average the level has settled at around 5.3 million units, even though cyclically induced positive and negative outliers have been discernible.

It is striking that the gulf between domestic and foreign output widened faster mainly between 2010 and 2012. 2010 was the first year in which more German corporate-brand cars were manufactured abroad than in Germany. In 2013 the number of foreign-built cars was already nearly 59% higher than the number built in Germany. The German auto industry thus boosted production significantly at its foreign facilities following the crisis in 2009. During this period a lot of new car plants were opened abroad (and existing ones expanded); this applies to China above all, but also to the NAFTA region. The stock of foreign direct investments of the German automotive industry has, however, also risen over the long term; in 2011 it came to nearly EUR 130 bn. This meant that the automotive industry accounted for some 43% of total foreign direct investment of the German manufacturing sector.

China by far the most important foreign production location

China by far the most important location 8

Car output of German OEMs outside Germany, m



Source: VDA

The newly created manufacturing capacities in China are also reflected in the statistics of the German automotive industry's biggest foreign production locations. Whereas in 2005 China was just one of many important manufacturing countries, in the meantime it has become the undisputed number one: in 2013 nearly 3.5 million cars rolled off the production lines in China; in 2005 the total was only 430,000. This is equivalent to average annual growth of almost 30%. China thus accounted for around 40% of foreign output by German manufacturers.

In Spain, the second most important production location, German carmakers “only” manufactured around 720,000 cars in 2013. This means there is a huge gap compared with China. Next come Brazil, the US, the Czech Republic and Mexico; output in each of these countries exceeded 500,000 units in 2013. The main increases in production compared with 2005 came in the US (average growth: 13.9% p.a.), in Slovakia (+8.7% p.a.) and in Mexico (7.2% p.a.). In Russia, where nearly 190,000 cars left German automakers' factories in 2013, not a single production facility existed in 2005. Out of the major foreign production locations only Belgium and the UK produced fewer cars in 2013 than in 2005. This is, among other things, a consequence of the acute situation in the western European car market over recent years, which has negatively impacted local production activity. Strong growth in car demand outside Europe has resulted in German manufacturers primarily also expanding their capacities there.

¹ Here and in the following we utilise the VDA definition whose “foreign production by German manufacturers” statistic includes all the vehicles made by BMW, Daimler and Volkswagen (including all their corporate brands such as Mini, Smart and Seat). Also included in these statistics are the cars produced in Ford's Genk factory in Belgium and the Opel brand cars made in Poland, because they are counted as products made by Germany's Ford plants and Adam Opel AG respectively.



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Many key motives for foreign production

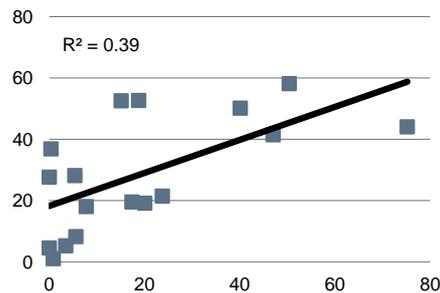
Those wanting to investigate how German companies' expansion of their foreign production could potentially impact automotive manufacturing in Germany have to ask which were the decisive motives for establishing production facilities in the individual markets. This could provide clues as to whether the addition of foreign capacity is detrimental to domestic factories in Germany or occurs primarily to satisfy additional demand.

In general, when a decision is made where to locate a manufacturing facility there are multiple factors of relevance. Factors of major importance are the customary locational costs (e.g. pay, taxes and fees, energy prices) that differ widely from one country to the next. Another motive for manufacturing abroad is to make it easier to tap into local markets. There is a positive correlation between German automakers' share of the cars produced in individual countries and their respective share of sales in the local market. This means that in those countries where German companies operate production facilities their share of car sales tends to be higher (see chart 9). Tariffs and non-tariff trade barriers can also be arguments in favour of boosting production abroad. In this connection "local content" rules play an important role in the automotive industry. These rules oblige companies to create a certain proportion of added value in the country in which they wish to sell their cars. Such regulations have led to products being prefabricated in Germany but then shipped in kit form and then undergoing final assembly at foreign plants (CKD manufacturing; CKD = completely knocked down); besides complying with local content regulations CKD manufacturing often also enables import tariffs to be reduced significantly. Other reasons for boosting foreign production can be to reduce exchange-rate risk or to lower transport costs. A modicum of political stability is of course a key prerequisite for entering a foreign market.

Local production boosts local sales*

9

X: German OEMs' share of local car product.,
Y: German OEMs' share of local car sales, m



*Based on data for 2011

Sources: VDA, Deutsche Bank Research

Significance of specific motives differs from market to market

In selecting their locations for foreign production the above-mentioned factors have been of differing importance for the German automotive industry, as the following examples show.

The primary motive in China is to satisfy the rapidly increasing local demand for cars. In fact, to date nearly all the cars that roll off German manufacturers' production lines in China are also sold locally; in any case car exports from China – in terms of the total output of all automakers – is still insignificant (to date). Another driver of automotive manufacturing by German firms in China is local content regulations or the avoidance of import tariffs. Admittedly, wage costs and other local expenses are lower than in Germany.

The imperative for German manufacturers to operate production facilities in other western European countries is less obvious. It is important of course that western Europe as a whole remains the biggest market for German carmakers. Significant local manufacturing is therefore only natural. Another overriding argument is also that a regionally diversified manufacturing structure can be beneficial by precluding cluster risks. Lower wage costs were probably the primary reason for investments made in the 1980s and 1990s (for example, activities in Portugal or Spain). Foreign manufacturing facilities are also in part the result of takeovers of originally foreign carmakers or brands by German carmakers (e.g. Volkswagen and Seat or BMW and Mini); these acquisitions frequently involved taking on existing local production capacities. Within the EU single market, by contrast, tariffs and non-tariff trade barriers are not relevant.

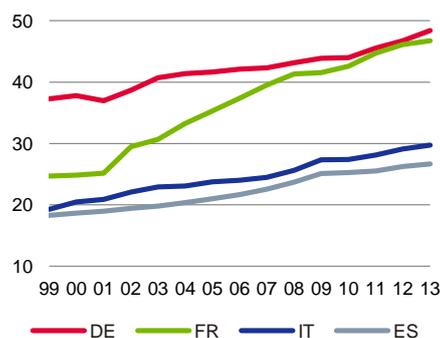
In the case of eastern Europe there is a lot to suggest that the low local manufacturing costs have probably been the main reason why German firms

Cars made in China are primarily sold locally

Labour costs rising particularly fast in France

10

Labour costs in the automotive industry, EUR per hour



*Based on blue and white collar workers, including supplementary personnel costs

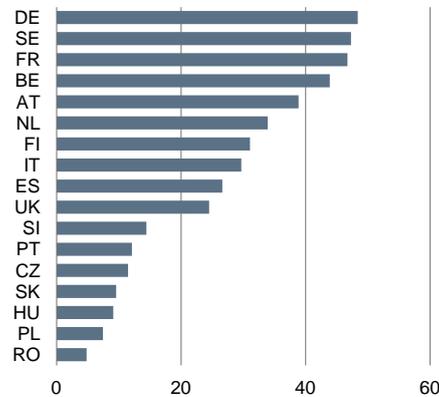
Source: VDA



The future of Germany as an automaking location

Considerable differences in labour costs 11

Labour costs* in the automotive industry, EUR per hour, 2013



*Based on blue and white collar workers, including supplementary personnel costs

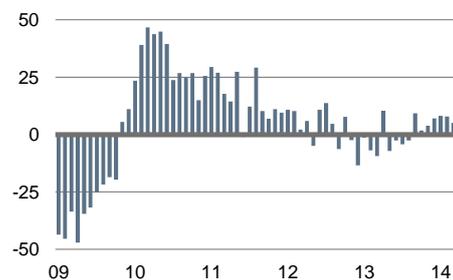
Source: VDA

have built factories there: in 2013 labour costs in the automotive industry in the Czech Republic were only nearly 24% of the German level, and in Slovakia around 20%. Tapping into the local market to sell cars is of less significance. This can be seen by the fact that in 2012 a mere 15% of cars built locally by German corporate brands were also sold in those local markets. By contrast, 73% were exported to western Europe. Eastern Europe will thus remain more important as a manufacturing location than as a market for car sales over the long term. In the eastern European EU countries, too, circumventing trade barriers is of no relevance, whereas this motive is significant for the building of factories in Russia.

A look at the US as a manufacturing location provides mixed evidence. True, German firms did also sell a lot of their locally produced cars in the US; in 2013 the share was 42% according to the VDA. Nevertheless, exports are also important: in 2013, 24% of German branded cars made in the US were shipped to Europe, another 23% were exported from the US to Asia. This mixed sales structure suggests that the US is an attractive manufacturing location for German companies for a multitude of reasons. Apart from tapping into the very important local market for car sales another plus point is that wage costs are lower than in Germany: they were only around 53% of the German level in 2013 and thus make exports to other markets commercially lucrative. The key to low labour costs is that the car plants and thus also the personnel of the German companies are still relatively young. Furthermore, the exchange rate risks decline when German firms manufacture on both sides of the Atlantic. Of less relevance, by contrast, are import tariffs in the US, which have in any case already reached a low level (2.5%). Non-tariff trade barriers (e.g. mutual recognition of technical standards) have still not been banished from the automotive industry, but compared with the above-mentioned factors they play a less important part in the decision to manufacture in the US.

Germany's automotive industry: Export driver stuttering 12

German car exports*, by value, % yoy



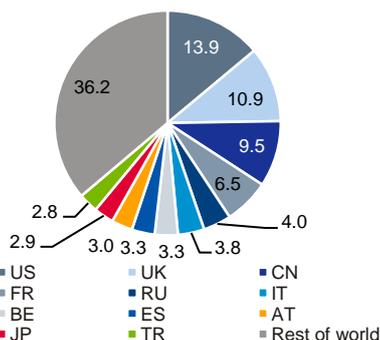
*Entire automotive industry, incl. parts suppliers

Sources: Federal Statistical Office, Deutsche Bank Research

In the case of manufacturing in south America (dominated by Brazil) tapping into the local market is obviously a major motive, since 84% of the cars made in south America in 2012 were also sold there. Import tariffs on vehicles – of 35% in Brazil, for example – and low labour costs are additional factors. Unlike in Brazil, the manufacturing capacities of German firms in Mexico are used much more for exports to other markets. Apart from its low labour costs Mexico's liberal trade relations with many important car markets are another advantage of its location.

Export structure highly diversified 13

Share of German car exports in individual markets by value, %, 2013



*Entire automotive industry, incl. parts suppliers

Source: Federal Statistical Office

Exports are a second pillar of the successful globalisation strategy, ...

As well as manufacturing abroad the exporting of vehicles, bodies and parts is the second pillar of the German automotive industry's globalisation strategy. This strategy has been so successful in recent years that in 2013 more than 77% of cars made in Germany were exported; in 1995 the figure was "only" almost 57%. Based on sales revenues the automotive industry's export share was about 65% in 2013. These export shares are an indication of the sector's strong international competitiveness. In 2013 Germany exported more cars than any other country on earth.

Between 1995 and 2013 unit car exports from Germany rose by more than 70%. This means that although unit car exports grew more slowly than foreign output (+298% in the period stated), they increased much faster than unit production in Germany (+25%). It is thus quite clear that for the entire period car exports were the most important driver of domestic manufacturing.

It is striking that since 2008, when the financial crisis rocked the global economy and the global automotive sector collapsed, certain export markets have become less important for Germany. This is illustrated by a look at the value of

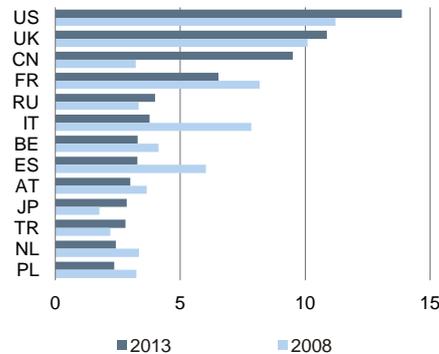


The future of Germany as an automaking location

US and China gaining significantly – western Europe losing

14

Share of individual markets in German car exports by value, %



*Entire automotive industry, incl. parts suppliers

Source: Federal Statistical Office

exports by Germany's automotive industry, which also includes the automotive suppliers. Whereas in 2008 France, Italy, Spain and the Netherlands together accounted for over 25% of all exports, in 2013 the figure was just 16%. The only major western European country during this period that managed to grow its export share (from a good 10% to nearly 11%) was the UK. Furthermore, the share of German auto industry exports absorbed by Poland, the Czech Republic, Hungary and Slovakia has dipped since 2008 (from 8.7% to 7%). This demonstrates that the factories located there mainly build vehicles for the western European market, which has contracted sharply in recent years.

Exports to China have become considerably more important. In 2008 China absorbed 3.2% of exports; by 2013 the figure had already climbed to 9.5%. The US has also become more important than previously as an export market, although exports nosedived in 2009 due to the crisis. In 2013 the US was the most important foreign market in terms of value for the German automotive industry, accounting for 14% of sales. Furthermore, sector exports to Japan and Korea were appreciably higher in 2013 than just a few years earlier in 2008.

Overall, the above-mentioned figures show the crisis in the western European auto market as well as the strong growth in China and – after overcoming the crisis – in the US, too. In the case of the last two countries it is striking that both local production and the exports from Germany to these markets have increased on average in the last few years.

... but export growth is slowing considerably

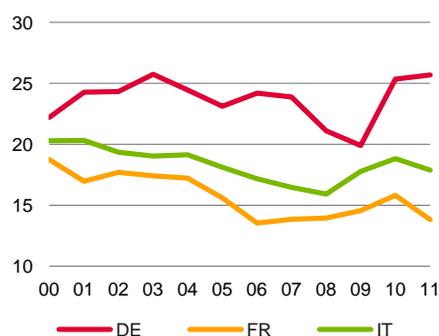
It is, however, also striking that the growth rate in exports to China has fallen steadily in recent years; in 2013 exports actually fell by 6.7%, although car sales grew by 23% in China. This shows that local demand is also increasingly being met by local manufacturing facilities, which are replacing exports from Germany. In the US, too, export growth slowed considerably in 2013. All in all, exports fell in terms of value by 0.6% in 2013, due mainly to the above-mentioned poor sales figures in western Europe.

Unit export figures hit record high in 2007

Relatively high degree of vertical integration in Germany

15

Gross value added as a share of output value of the automotive industry, %



Source: Eurostat

There has been no discernible growth trend in unit car exports for several years already. In 2007 car exports topped 4 million units for the first time. At the same time, that year marked the all-time high in car exports. Of course the fact that sales contracted heavily in the western European market during this period was also a factor. The western European share of German car exports still amounted to 58% in 2008; by 2013, however, it had slipped to 49%. Without the increase in exports to the UK the decrease would have been even steeper. On average in recent years the decline in exports to western Europe could not be offset by boosting exports to other countries. The general question that therefore arises is whether the German auto industry's export model will come under sustained pressure from the expanding local production in the growth markets.

3. Impact of the globalisation strategy on Germany as an automotive manufacturing location

Globalisation strategy not yet hampering production inside Germany ...

The data analysed in the previous chapter show that the rapid rise in foreign production has not yet adversely affected Germany as a manufacturing location. We have detailed that also domestic unit output – driven in no small measure by higher car exports on a long-term comparison – has increased; this applies even more strongly to qualitative growth. A key reason for this is that many foreign car plants are supplied with high-value parts and modules (e.g. engines or gear-boxes) from domestic plants. The customers of suppliers based in Germany are



The future of Germany as an automaking location

Employment up recently 16

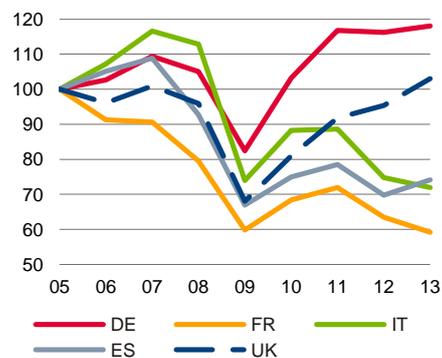
Employees in the automotive industry, '000



Source: Federal Statistical Office

Only Germany well above pre-crisis level 17

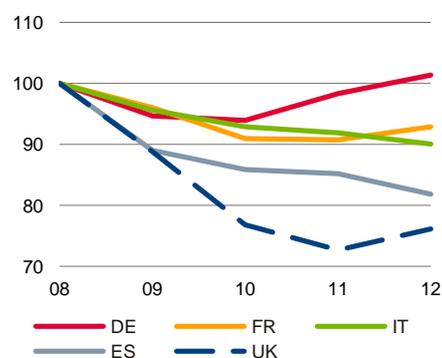
Automotive industry production index, 2005=100



Source: Eurostat

Employment only stable in Germany 18

Number of employees in the automotive industry, 2008=100



Sources: Eurostat, VDA

both foreign automakers and companies with German roots. The great importance of automotive suppliers for the German auto industry is made clear by the fact that the share of domestic gross value added in domestic production comes to nearly 26% (2011; more recent figures are not yet available), much higher than, for instance, France or Italy (14% and 18% respectively). This means that inputs (from other sectors and/or abroad) play a bigger part in the car industries in France and Italy than in Germany.

Also, with regard to employment in Germany it is true that the expansion of the auto industry outside Germany has not resulted in a contraction of the domestic market. Although there was a temporary crisis-induced loss of jobs in the sector between autumn 2008 and the start of 2010, this would certainly have been more pronounced without the temporary expansion of short-time working arrangements. Since then the number of employees in Germany has however risen again and at over 760,000 at present is 9% higher than at the start of 2010. The VDA's argument is thus ultimately correct that boosting production abroad helps to secure jobs in Germany. In the last few years the share of engineers and other graduates in the workforce as a whole has probably risen; official public data on this topic is not available, however.

... and has been much more successful on a European comparison

Comparing the economic development of the automotive industries in Germany, France and Italy, which are each dominated by domestic automakers, also illustrates that expansion by companies at foreign locations and successful development of their domestic production base do not have to be mutually exclusive. The opposite is true: while the production index in the sector in Germany again climbed nearly 8% in real terms above the pre-crisis record (2007) in 2013, production levels in France (2013 compared with 2007: -34.6%) and in Italy (-38.3%) remain a long way below their previous peaks. During the last few decades neither the French nor the Italian carmakers focused their activities so aggressively on tapping into foreign – especially non-European – markets as their German competitors. This made French and Italian manufacturers more dependent on developments in the western European market, which explains the poor performance in the more recent past. The focus on western Europe is also the main reason for the decline of auto manufacturing in Spain (a contraction of 31.9% between 2007 and 2013). In France, Italy and Spain also unit car production has lagged behind that in Germany over recent years. On a long-term comparison the decline is particularly striking in Italy, where in 2013 nearly 73% fewer cars rolled off the production lines compared with 2000. What comes as less of a surprise is that employment in the sector in southern European countries also contracted given the negative trend in production.

Of course there are many key reasons for the differences in performance of the respective automotive industries in the above-mentioned countries. Individual carmakers' vehicles enjoy differing levels of popularity, which has little or nothing to do with the respective manufacturing location. Basically, the German automotive industry has established a strong position in the less cyclical premium segment. French and Italian carmakers, by contrast, concentrate mainly on the volume segment, where the competition with Japanese, Korean, but also German brands is fierce and where in recent years various state incentives to buy have led to major fluctuations in individual markets. Some of the decline in production in western Europe is due to the installation of new capacity in eastern Europe. In 2013 more than twice as many cars were produced in the eastern European EU states than was the case ten years ago. The key arguments for this shift from west to east were the usual locational factors such as the absolute pay level, the development in pay, labour

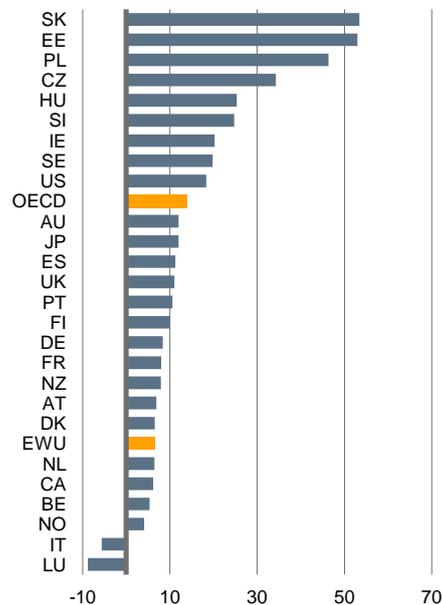


The future of Germany as an automaking location

Above all eastern Europe has become more productive

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Change in labour productivity (overall economy) between 2000 and 2012, %

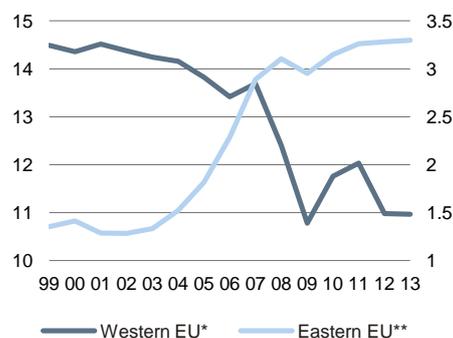


Source: OECD

Shift in car production from western to eastern Europe

20

Car production in selected EU countries, m



* BE, DE, ES, FR, IT, UK
** CZ, HU, PL, RO, SI, SK

Sources: OICA, VDA

productivity or tax level. In this respect many eastern European countries and in part also Germany have done better than France or Italy in recent years.²

Despite these factors there is a lot to suggest that ultimately the inadequate internationalisation strategy (localisation of production, tapping into non-European growth markets) of the automotive industries in France and Italy is one major reason for their poorer commercial performance than that of the auto sector in Germany.

Is Germany's model for success as an automaking location at risk?

Whether Germany will continue to develop successfully as an automotive manufacturing location in future depends on many uncertain parameters. The following unanswered questions mainly centre on the strategy of manufacturers: how quickly will the construction and/or expansion of production facilities abroad be continued? Which of the models that are currently also rolling off the production lines in Germany will in future be produced exclusively or on a supplementary basis at foreign locations? Which components of value added (automotive suppliers) will follow final assembly? How quickly will foreign factories be used as export hubs for other markets? To what extent will German manufacturers succeed in breaking into currently quite disregarded markets (e.g. ASEAN) with exports from Germany? How will investment in domestic factories develop?

Other structural factors are influenced more by politicians and the collective bargaining parties in the auto industry. Such factors are the tax burden for companies, other local costs (e.g. shipping and energy prices), labour market policy, public investment in education and research, the availability of skilled personnel, the quality of the infrastructure or the change in wages and salaries. Since the quality of a location is always relative, it is always a matter of the change in the political framework compared with alternative production facilities. Another locational factor is the degree of openness of a manufacturing location. The appeal of individual countries is influenced by the level of tariffs and non-tariff trade barriers that exist towards important trading partners.

In addition, cyclical factors play a part: since western Europe is particularly important as a market for the auto industry in Germany, the development of domestic production in the next few years will rely heavily on how dynamic and how sustainable the (expected) recovery in car demand in western Europe turns out to be. Of course cyclical developments are also important in other major export markets.

Since it is unclear how the factors mentioned will develop, it seems to make sense to describe the future of Germany as an automotive manufacturing location using potential future scenarios. Below we shall outline three possible scenarios. They will be described by taking a retrospective view from the year 2025 and include the key developments on the journey there.

Scenario 1: Continuation of the status quo

In the first scenario the overall development of the automaking location of Germany between 2015 and 2025 was roughly as in previous years. The sector was characterised by unit car output in Germany trending sideways, flat car exports, moderate qualitative production growth in Germany – primarily due to higher levels of equipment in the vehicles – and foreign production by German manufacturers continuing to rise. Investments by the sector in Germany were

² See Heymann, Eric and Stefan Vetter (2013). Europe's re-industrialisation: The gulf between aspiration and reality. Deutsche Bank Research. EU Monitor. Frankfurt am Main.



The future of Germany as an automaking location

Scenario 1: China and North America – popular manufacturing locations

(above all in the volume segment) mainly for maintenance and modernisation purposes, whereas the investments abroad were predominantly for expansion.

The German automotive industry pressed ahead with the localisation of production abroad. China and North America (US and Mexico) are particularly popular manufacturing locations.³ Until 2025 German manufacturers had also expanded their capacities in India, Brazil and the ASEAN states, but they were much smaller than in the markets mentioned above. Automotive suppliers also increased their foreign investments, thereby stoking competition with domestic facilities and even replacing some of them. This expansion of the production base especially in North America and China negatively impacted the sector's export activity from Germany. Whereas in 2013 there were nearly 900,000 cars built in Germany that made their way to the US and China, which represented more than 20% of all German car exports, a good ten years later this figure was down by some 30-40%. The majority of the further increase in car demand in these markets is met via local production in 2025. Furthermore, as the years went by the foreign factories were increasingly used for exports, to western Europe for example. Initially this mainly applied to the plants in the US and Mexico, but from 2020 onwards also in China.

Scenario 1: Car demand in western Europe is a catalyst

The fact that in this scenario both unit production in Germany and car exports “only” moved sideways and did not drop was thanks to a change in the driving forces. A decisive role was played by the general recovery in western European car demand that commenced in 2014. Average new car registrations in the EU-15 between 2015 and 2025 were thus a good 2 million units (or about 20%) higher than in 2013. At the same time German carmakers managed to maintain their market share in western Europe of about 50%. During this period some 40% of western European demand was met from factories in Germany. This resulted in additional exports (compared with 2013) of about 400,000 vehicles.⁴ Germany thus managed to benefit most from the recovery in western European car demand; true, this confirmed that western Europe is no longer a growth market for the auto industry, but that from 2014 onwards above all the declines of previous years were cancelled out. In our scenario Germany also succeeded in breaking into smaller growth markets more effectively and supplying them with products from Germany. This enabled gradual declines in exports to be offset by increasing local manufacturing until 2025.

Scenario 2: New impetus

Scenario 2: Expansion investment mainly in the premium segment

In the second scenario the automaking location of Germany was given a new boost until 2025. True, in this scenario German carmakers and parts suppliers also invested more abroad than in Germany. Nevertheless, investments to expand production capacities became more important in Germany, among other reasons because new models were mainly launched in the premium segment, which thanks to ongoing productivity gains can also still be built profitably in Germany in 2025. Compared to other car nations Germany is not among the leaders when it comes to all the locational factors, but the overall package is convincing, also for foreign investors; particularly success in the process automation field (Industry 4.0) gave a productivity boost to the factories in Germany. Furthermore, at the start of the 2020s one Japanese carmaker built an assembly plant in Germany where since then the group's own premium brand vehicles roll off the production line. By doing this the company was able to grow its market share in this segment in Germany and Europe. In the suppliers

³ Real examples confirm this trend. These are the (future) production of the Audi Q5 in Mexico and the notchback version of the Audi A3 in China, the production of the BMW X-models in the US, the Mercedes C-class also in the US or the VW Golf in China; the list goes on and on.

⁴ This forecast can be seen as not excessively optimistic by the fact that in German car exports to western Europe in 2013 were actually 600,000 vehicles lower than in 2007.



The future of Germany as an automaking location

segment, too, Germany benefited from additional investments from abroad. Germany remains a leading research location in the global automotive industry in 2025. Cooperating closely with the universities, the carmakers succeeded in training large numbers of foreign students in Germany and subsequently also retaining the skilled young people at their companies. This speeded up technical progress and the qualitative growth and ensured widespread acceptance of new technologies abroad.

Scenario 2: German carmakers grow market share in western Europe

In the second scenario, too, the recovery in car demand in western Europe benefits automaking in Germany. German carmakers were even able to grow their market share further. In addition, due in part to favourable free trade agreements more products from Germany could be shipped to aspiring car markets such as India, the ASEAN states or the Arabic countries; the pressure to erect assembly plants locally was eased by the reduction of tariffs and non-tariff trade barriers. Demand for cars in China has grown so fast until 2025 that still hardly any of the cars made in local factories are exported. In global terms, too, car sales climbed faster between 2015 and 2025 in our second scenario than in the first one.

All in all, in our second scenario car output rose to well above 6 million units and is thus nearly 20% higher in 2025 than just ten years' ago. Indeed, qualitative growth increased far more vigorously – because the average vehicle value had risen due to alternative propulsion technologies – lightweight construction techniques and new safety technologies, where rapid technical progress took place. Exports are also in 2025 still the most important pillar for Germany as an automaking location, while the companies have continued to diversify their markets.

Scenario 3: Gradual loss of competitiveness

Scenario 3: Political environment deteriorates significantly

In our third scenario Germany's position as an automaking location deteriorates gradually between 2015 and 2025. There were several key reasons for this. The political environment began to weigh on the sector and other industrial segments in 2014/15. Successful reforms to make the labour market flexible and to improve the participation of older people were gradually reversed. The opportunities for industry to adjust to cyclical highs and lows by using temporary workers and working time accounts restricted. On top of this the shortage of non-academic skilled workers became more acute due to the possibility for workers to retire at 63 under certain circumstances. This hit the auto sector and other industrial segments particularly hard at the time when the babyboomers went into retirement. German energy policy led to above-average increases in energy prices, which resulted in reluctance to invest among major (energy-intensive) supplier sectors such as the metals industry and reduced their innovation potential. The closely interlinked industrial value chain in Germany was thus gradually weakened.

Scenario 3: Location costs in Germany rise by more than average

Overall, locational costs rose compared with eastern Europe and also parts of southern Europe (above all Spain), where they gradually managed to attract investments from abroad from 2015 due in part to moderate wage policy. While German carmakers in the premium segment were able to perform relatively well in this environment, several firms in the volume segment and also many automotive suppliers were forced to adjust their capacities downwards in Germany. The maximum CO₂ levels for new cars set by the EU were also a major factor. In order to stay within these limits average vehicle costs rose significantly. The sector reacted to the cost increase by accelerating the shifting of production facilities to foreign locations – above all to eastern Europe. The companies supplied the growth markets outside Europe in large part from local factories from 2020 in any case, not least because the free trade agreements only generated unsatisfactory results and high import tariffs were still the order



The future of Germany as an automaking location

Scenario 3: Domestic car production declines

of the day in many emerging markets. The investment in factories was followed by investments in R&D departments abroad.

Unit car output in Germany settled at well under 5 million vehicles until 2025. Even qualitative growth fell in most years, albeit less sharply. A total of three car plants in the volume segment were closed between 2015 and 2025 – despite a variety of political rescue attempts. The number of people employed in the automotive industry dropped by around 100,000. Although the recovery in car demand in western Europe helped, German carmakers (and the location Germany) lost market share, because following the long crisis many customers in southern Europe were even more inclined to buy cheap small cars than before. The German export model thus gradually came under more pressure.

Preliminary conclusion: The future is uncertain, but a number of trends are discernible

Of course, none of the three scenarios will happen exactly as outlined above. Nevertheless, a number of trends are already apparent. Increasing localisation of production is a feature of all the scenarios. Who would blame the companies for trying to benefit from the opportunities offered by globalisation? The two decisive questions are indeed how quickly this takes place and whether its implementation will in future also cause little or no harm to the domestic location.

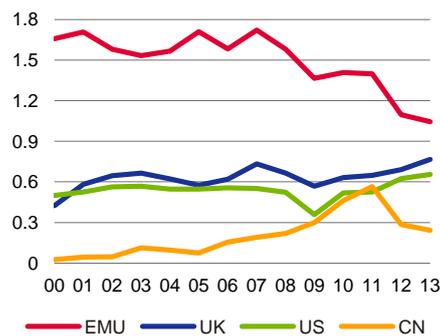
On reflection, we regard the first scenario to be the most realistic. We estimate the probability of this scenario at about two-thirds. One argument in favour of this scenario is that structures (especially in relatively mature sectors) do not change so quickly. True, the automotive industry does face major technological and regulatory challenges and is currently reinventing itself (alternative propulsion technologies, lightweight construction techniques, vehicle connectivity, integrated mobility concepts, autonomous driving etc.). These trends are not, however, a feature of one specific location, but apply more or less globally. Another reason for the high probability of Scenario 1 is that the German automotive industry has no interest in permanently weakening its home base. Even though the value chain in the sector is becoming increasingly international, the slogan “Made in Germany” (or “Engineered in Germany”) is one element of the success of German carmakers. In addition, Germany is one of the most important markets for the sale of premium vehicles. That the increasing localisation of production especially in China negatively impacts on Germany’s export potential is reflected in the development in car exports to China: in 2015 they were 57% below their 2011 level, though changes in the statistical definition are also relevant in this case.

We estimate the probability of the second scenario to be less than 10%. In the end, as things currently stand it is doubtful that extensive expansion investment will be made in a high-wage country like Germany, where the demand for cars is not expected to increase and where the auto industry already has an extremely high export share.

We estimate the probability of the third scenario at around 25%, though. The political aspects described in the scenario are particularly thought-provoking. After all, Germany’s current grand coalition government is actually in the process of reversing successful established reforms with well-meaning labour market measures, while at the same time it is paradoxically calling on the EU periphery to implement precisely such reforms.⁵ Whether all the plans will actually be implemented and whether the impact on the companies will actually

Euroland becoming far less important 21

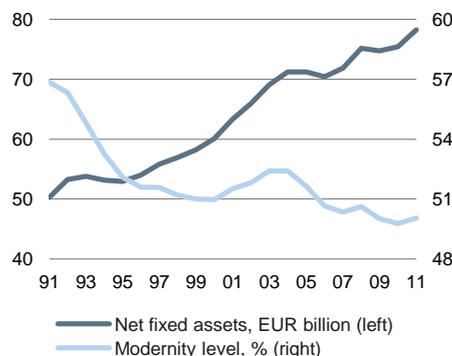
Car exports from Germany by market, m units



Source: VDA

Net fixed assets* rising, modernity level falling** 22

Automotive industry in Germany



*Current replacement costs

**Net fixed assets as share of gross fixed assets

Sources: Federal Statistical Office, Deutsche Bank Research

⁵ Regarding the coalition agreement, see: Böttcher, Barbara and Klaus Günter Deutsch (2013). Grand coalition – poor policies. Deutsche Bank Research. Standpunkt Deutschland. Frankfurt am Main.

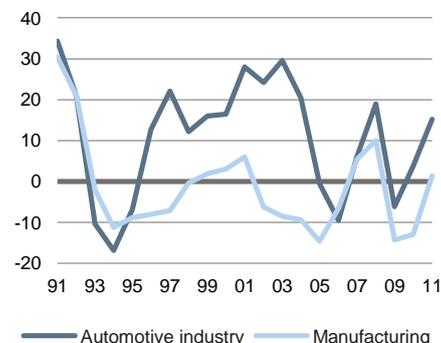


The future of Germany as an automaking location

Automotive industry invests more than the manufacturing sector as a whole

23

Net fixed assets as share of gross fixed assets, %

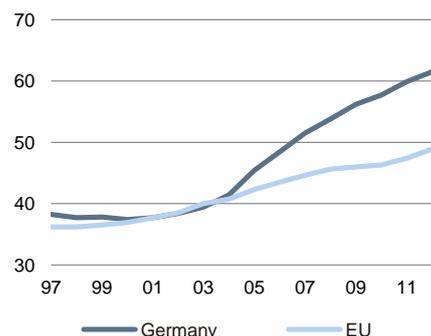


Sources: Federal Statistical Office, Deutsche Bank Research

Elderly more active in labour market

24

Participation rate of 55-to-64-year-olds, %

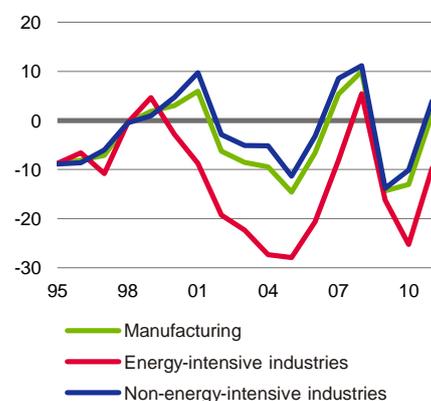


Sources: Eurostat, Federal Statistical Office

Energy-intensive industries running facilities until they wear out

25

Net fixed capital formation as % of gross fixed capital formation



Source: Federal Statistical Office

be as negative as outlined in the scenario is a completely different matter. Politicians must, however, take into consideration that Germany is involved in a competition with other locations. It seems that the era when Germany was seen as the “sick man of Europe” has been forgotten.

4. Policy options for bolstering Germany as an automotive manufacturing location

In the coming years German automotive firms will continue to try and make what they consider to be the best decisions about where to locate their operations. Although there is a strong commitment to the domestic market in the sector, investments in Germany and abroad must – first and foremost – be commercially viable over the long term. Policymakers can of course help to make investments in Germany more attractive to the auto industry. The policy areas mentioned in the scenarios indicate where action may need to be taken:

- **Labour market policy:** Germany is a high-wage country in the context of the automotive industry. In the past the high wages and payroll costs could often be offset via flexible working time models and the use of temporary workers or service contracts. Although it is understandable that politicians want to prevent abuses of these instruments, blanket condemnation of temporary work and service contracts is inappropriate. The introduction of earlier retirement for certain persons (“retirement at 63”) is also likely to negatively impact the sector as it will reduce the potential stock of skilled workers. It would be better to support measures that help to keep older people as productive elements in the value chain, while also taking into account their special needs. The share of older people in the workforce has risen sharply in Germany over recent years.
- **Energy policy:** Germany’s ambitious energy and climate policy has resulted in German energy prices being among the highest worldwide; this applies above all to electricity. Although production by the automotive industry itself in Germany is not energy intensive, important supply sectors such as the metals industry most certainly are. In this and other energy-intensive industrial sectors a barely perceptible process of de-industrialisation has already begun.⁶ In order not to (further) undermine the industrial value chain in Germany energy-intensive sectors engaged in international competition will require special treatment in the future, too. Given the ambitious energy policy objectives in Germany it will be difficult to prevent another above-average increase in energy costs.
- **Education policy:** Germany as a country with few natural resources is particularly dependent on its human capital. This applies in no small measure to the research-intensive automotive industry. It is therefore important to keep government spending on education, research and development at a high level. Of course industry itself also bears a great deal of responsibility, especially in the area of further training.
- **Infrastructure policy:** For years politicians have had no problem in recognising that the transport infrastructure is in a serious state of disrepair. Higher spending on roads, bridges and railways fails to materialise, however, mainly because of funding bottlenecks in the public sector and the priority given to consumption expenditure over investment. In order that transport infrastructure does not become even more of an impediment nor prevent efficient production processes (not only) in the automotive industry, transport expenditure must be increased on a sustained basis and dedicated user financing must be expanded. In 2012 the so-called Daehre

⁶ See Heymann, Eric and Hannah Berscheid (2013). Carbon leakage: A barely perceptible process. Deutsche Bank Research. Current Issues. Frankfurt am Main.

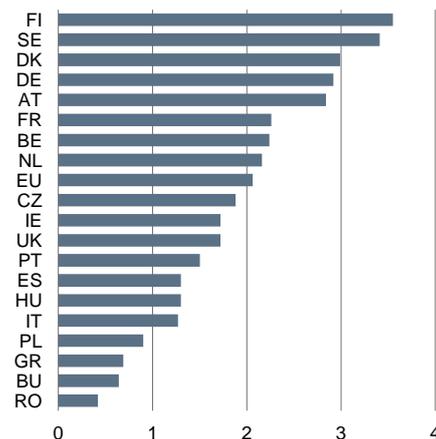


The future of Germany as an automaking location

High R&D intensity in northern Europe

26

All R&D spending as a share of GDP, %, 2012



*Partly provisional or estimated data

Source: Eurostat

Commission estimated the funding deficit just for the maintenance of the transport infrastructure in Germany at EUR 7.2 bn per year. The planned increase in spending during the current legislative period of about EUR 5 bn is a step in the right direction, but given the challenges that loom it is inadequate. In other infrastructure segments (such as broadband networks) large-scale investments are also in the offing.⁷

— Trade policy: As an open, globally oriented economy Germany benefits from a liberal trade policy. This applies especially to the automotive industry. In order to render Europe (and thus Germany) more appealing to the automotive industry as a manufacturing location, the EU should campaign for further liberalisation of trade. At present the EU is engaged in bilateral negotiations with countries or country groupings (e.g. US, ASEAN and Mercosur states, India) about free trade agreements or is making preparations for them. Whereas in the ASEAN states for example a reduction in the high import duties would be helpful, the planned agreement with the US⁸ focuses mainly on the mutual recognition of technical standards and norms in the auto industry (“once approved – accepted everywhere” is the slogan). This could generate considerable cost savings on both sides of the Atlantic. The trade costs of non-tariff trade barriers, according to estimates from Ecorys, are equivalent to a tariff level of more than 25% for both the US and the EU.⁹

Ultimately, policymakers thus have several key instruments that they can use to influence Germany's attractiveness as an industrial location. Of course, Germany can only be a successful automotive manufacturing location if domestic companies offer products that consumers also want to buy.

5. Conclusion

The differences between the German automotive industry and the automotive industry in Germany will continue to expand in the coming years. The installation of production capacities in the growth markets will accelerate in future. In an increasingly globalised world where growth potential differs from region to region anything else would be a surprise. Automotive manufacturers will always attempt to adjust to the regulatory and economic conditions in individual countries so that they achieve the best possible results for as long as possible.

Expansion abroad does not have to be to the detriment of Germany as an automaking location. Germany does possess impressive advantages that we described in the introduction to this report. Companies in the auto sector will continue to seek to derive commercial benefits from these advantages as well as trying to increase these benefits. Germany is well placed to still be one of the most important manufacturing nations in the global automotive industry in 2025. However, constant efforts need to be made to achieve this objective: the carmakers have to give high priority to the technological refinement of their vehicles while keeping an eye on costs and making steady improvements in productivity. And it is up to the politicians to create a reliable and business-friendly environment.

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⁷ See Institut der deutschen Wirtschaft (2014). Infrastruktur zwischen Standortvorteil und Investitionsbedarf. Cologne.

⁸ See Deutsch, Klaus Günter (2013). Atlantic unity in global competition: T-TIP in perspective. Deutsche Bank Research. EU Monitor. Frankfurt am Main.

⁹ Ecorys Nederland BV (2009). Non-Tariff Measures in EU-US Trade and Investment – An Economic Analysis. Final Report to DG Trade. Rotterdam.



The future of Germany as an automaking location

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