

## The Weakness of the German Car Industry and its Sectoral and Global Impacts

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### Key Messages

- Industrial production in the German car industry dropped by 9.4% in the third quarter of 2018
- The drop in industrial production raises questions about broader economic consequences
- The largest effect on GDP is for Germany, followed by Czech Republic, Hungary and Slovakia
- Swiss car industry is the trading partner facing the largest relative estimated loss in industrial production
- The most affected sectors for Germany and its trading partners are fabricated metals and rubber and plastic products
- German industry expected to stay in recession for near future

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## *This policy brief presents estimated sector and global impacts due to a sharp drop in industrial production in the German car industry in the third quarter 2018*

### Summary

Industrial production in the German car industry dropped by 9.4% in the third quarter 2018 mainly due to problems with the implementation of the new Worldwide Harmonized Light-Duty Vehicles Test Procedure (WLTP).

Since the German economy, and here especially the German manufacturing sector, is highly integrated into global value-added chains or even a hub in global networks, the sharp drop in industrial production raises the question about its broader economic consequences.

The sharp decline in German car production in the third quarter of 2018 had an immediate impact on both sectoral and total output of its main trading partners.

From a global perspective, the largest effect on gross domestic product (GDP) is – with -0.75% – estimated for Germany. On top, the three most affected countries are the Czech Republic (-0.21%), Hungary (-0.20%) and Slovakia (-0.18%).

The Swiss car industry has faced the largest relative estimated loss in industrial production of the automotive sector of Germany's trading partners (-1.5%) followed by the Austrian (-1.4%) and Czech car industries (-1.3%).

The impact goes beyond the car industry. The largest part of intermediate inputs originates from different domestic sectors, which highlight the importance of looking at sectoral spillovers.

The five German sectors in which gross value-added growth is estimated to record the largest loss are fabricated metal products (0.9%), rubber and plastic products (0.9%), basic metals (0.8%), electrical equipment (0.5%) and wholesale and retail trade and motor vehicle repair (0.5%).

The strong economic links across economies and sectors, as well as deeply integrated value-added chains, give the decrease in German car production broader economic relevance.

The decrease in industrial production can be expected to have sizeable indirect effects on domestic and foreign sectors.

In the first half of 2019 the decline in German car production continued, mainly due to a weakening of worldwide demand. This drop is worrying for the economic situation of Germany and its trading partners.

# The Weakness of the German Car Industry and Its Sectoral and Global Impacts

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## Abstract

Industrial production in the German car industry dropped by 9.4% in the third quarter 2018 mainly due to problems with the implementation of the new Worldwide Harmonized Light-Duty Vehicles Test Procedure (WLTP). As the car producing industry is the most important sector for the German economy and is deeply integrated into international value-added chains, this policy report presents estimated sectoral and global impacts due to this sharp drop. The most affected sectors are fabricated metals and rubber and plastic products, both in Germany and its main partners, that deliver intermediate inputs (for example, the Czech Republic). From a global perspective, the largest effect on gross domestic product (GDP) is – with -0.75% – estimated for Germany. On top, the three most affected countries are the Czech Republic (-0.21%), Hungary (-0.20%) and Slovakia (-0.18%).

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# 1 Introduction

The German economy faced a period of weak economic performance in the second half of 2018. At the end of last year economic activity stagnated after it decreased by 0.2% in the third quarter of 2018. This weakness is mainly the result of supply-side rigidities faced by German car producers due to the introduction of the newly adopted Worldwide Harmonized Light-Duty Vehicles Test Procedure (WLTP, see, among others, Janssen and Kallweit, 2018 or Wollmershäuser et al., 2018). These supply-side problems led producers to restrict their production, resulting in a sharp decrease of production in the car industry (NACE Rev. 2 – Code 29: Manufacturing of motor vehicles, trailers and semi-trailers) by 9.4% in the third quarter of 2018 (see Figure 1), which is the largest drop since the global financial and economic crisis of 2008/2009. Due to the importance of the car industry for gross value added of German manufacturing (approximately 20% as of 2016), production in total manufacturing fell by 1.4% in the same quarter. As the automotive sector is – with a 5% share in total gross value added – one of the key industries of the German economy, this sharp drop in industrial production contributed to the observed economic cooldown at the end of the previous year.

Figure 1

Production in the German car industry and in total manufacturing  
Growth against previous quarter based on seasonally and calendar adjusted data



Source: Federal Statistical Office Germany.

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Since the German economy, and here especially the German manufacturing sector, is highly integrated into global value-added chains or even a hub in global networks (see World Bank and World Trade Organization, 2019 or Janssen, 2019 for a detailed description of the German car industry), the sharp drop in industrial production raises

the question about its broader economic consequences. To this end, we use the OECD Inter-Country Input-Output (ICIO) Tables from 2015 to illustrate the static sectoral and global impacts. We start by describing the Inter-Country Input-Output Tables and present some key figures on the international interdependency of both the German economy and its automotive sector. Based on these data, we then discuss sectoral effects for both the German and foreign economies as well as the impact on total output that result from this sharp decrease in car production. The policy brief closes with some conclusions and an outlook for the German economy.

## 2 Inter-Country Input-Output Tables

The Inter-Country Input-Output Tables are released by the OECD on an annual frequency. They gather input-output linkages for 64 countries and 36 products. The last available vintage at the date of publication (here: 2015) is used. Based on the idea of ‘hypothetical extraction’ (see Los et al., 2016), the ICIO tables are used to locate the origin of the value added encompassed in the production of the German car industry.

The idea is to take into account not only the loss of value added in the German car industry, but also along its entire supply chain. In case production were to decrease in the German car industry, its suppliers would face losses, but also the suppliers of the suppliers, and the suppliers of the suppliers of the suppliers, etc. The ICIO tables together with matrix computations based on the Leontief inverse enable us to approximate such an indirect impact. In theory, it even takes into account the impact on firms that might not know that their products or services are ultimately encompassed by the German car industry, such as, for instance, raw metals producers in Iceland.

## 3 Domestic and Foreign Economic Effects due to an (Unexpected) Production Decrease

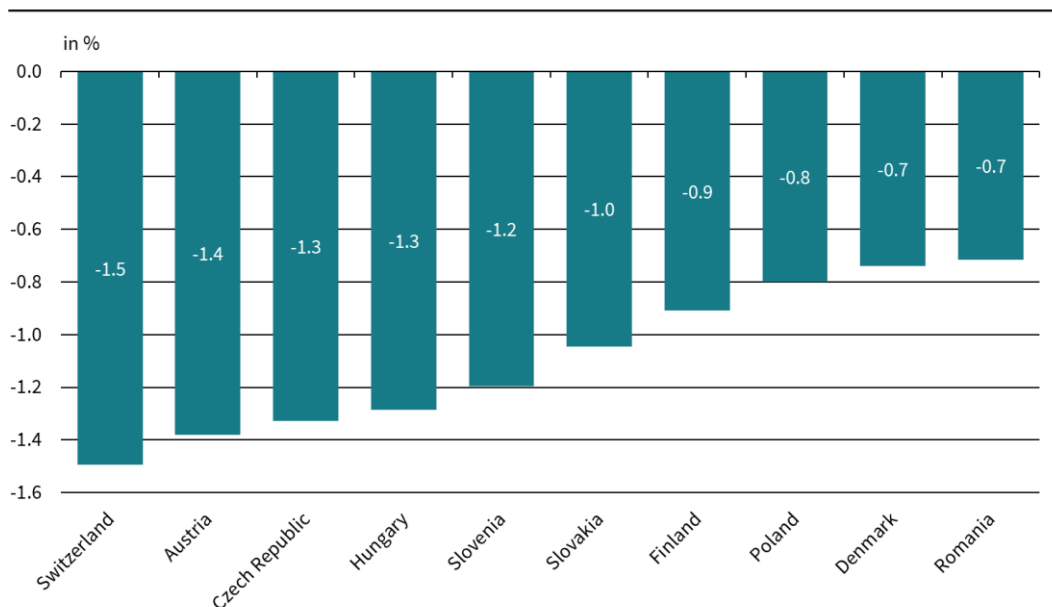
The sharp decline in German car production in the third quarter of 2018 had an immediate impact on both sectoral and total output of its main trading partners. According to the Inter-Country Input-Output Tables of 2015, the German car industry operated with an intermediate inputs rate of approximately 75% of gross car production, from which 54 percentage points are domestic inputs and 21 percentage points are bought abroad. The five most important partners from which the German car

industry received its intermediate inputs were Poland (8.7%), the Czech Republic (8.5%), Italy (8.3%), France (8.0%), and Austria (7.8%). From the point of view of Germany, these intermediate inputs originate mainly from foreign manufacturing sectors, especially from the automotive sector (for example, parts). The German car industry is thus well integrated in very complex, cross-industry and cross-border value-added chains that react very sensitively to swings in industrial production.

Taking this importance as given, [Figure 2](#) shows the estimated loss in industrial production of the automotive sector of Germany's trading partners due to the decline in industrial production of the German car industry. Based on the latest Inter-Country Input-Output Tables, the Swiss car industry has faced the largest estimated loss (-1.5%), followed by the Austrian (-1.4%) and the Czech car industry (-1.3%). Among the ten largest estimated losses, we can also find the Hungarian car industry (-1.3%), where firms are important intermediate goods exporters for Audi.

**Figure 2**

**Loss in automotive sector production due to a loss in German automotive sector output, Q3-2018**



Source: OECD ICIO; European Commission; ifo Institute.

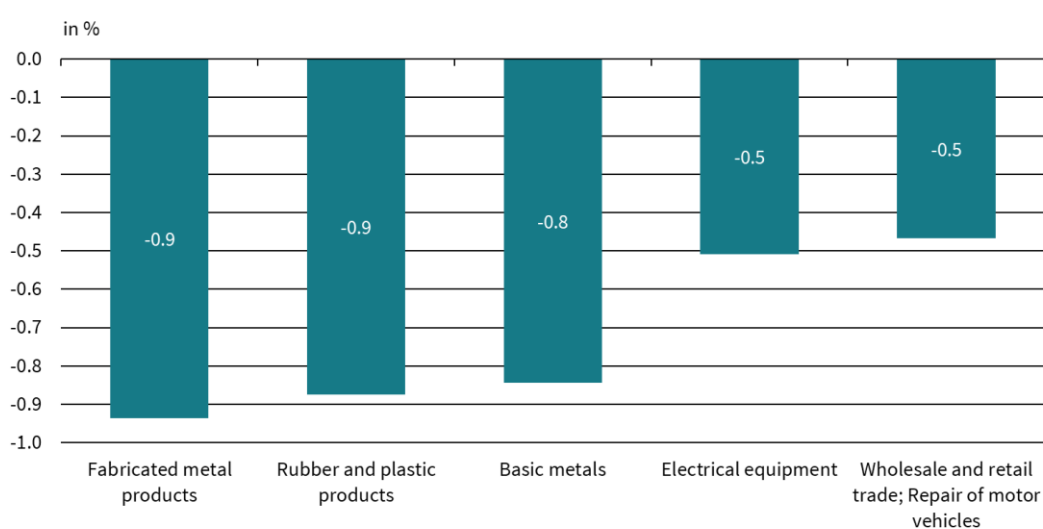
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The impact, however, goes beyond the car industry. The largest part of intermediate inputs originates from different domestic sectors, which highlight the importance of looking at sectoral spillovers. [Figure 3](#) shows the five sectors in which gross value-added growth is estimated to record the largest loss. Among these five sectors, we find four rather traditional manufacturing sectors that are important for the production of cars in general: fabricated metal products (for example, manufacturing of doors) with an estimated loss of 0.9%, rubber and plastic products (for example, interior equipment or tyres; estimated loss: 0.9%), basic metals (for example, manufacturing of brake pipes)

with an estimated loss of 0.8% and electrical equipment (for example, lighting or batteries; estimated loss: 0.5%). All these products have to be distributed across firms, thus, wholesale trade and retail sale is also affected by -0.5%; this sector also comprises the repair of motor vehicles, which might not be as much impacted as the domestic trade sector given that newly produced cars are usually not in need of a repair service in the short run.

**Figure 3**

**Impact on output of different German sectors due to a loss in German automotive sector output**  
Loss in sectoral industrial production, Q3-2018



Source: OECD ICIO; European Commission; ifo Institute.

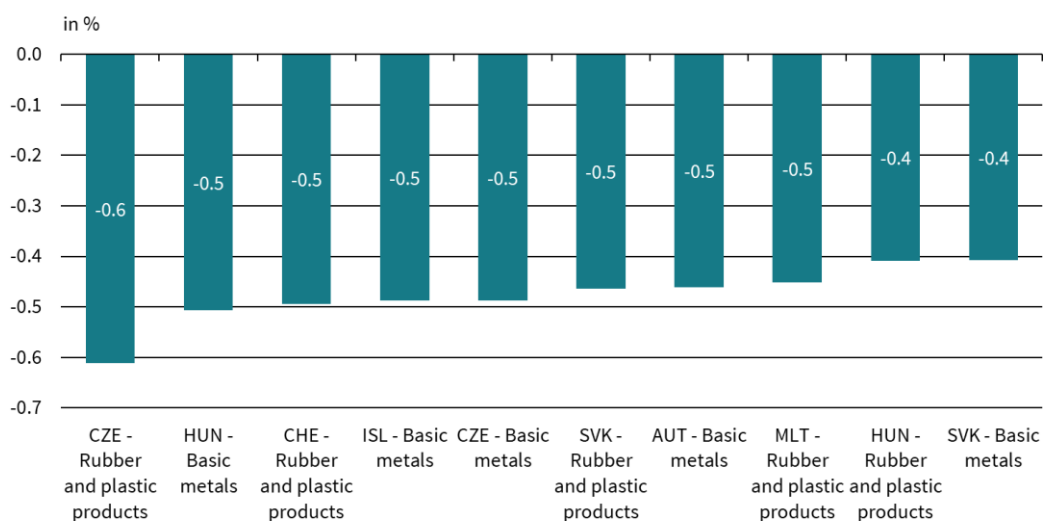
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Next to the domestic economy, also foreign sectors (other than automotive sectors) are affected by the sharp decline in German automotive sector output. [Figure 4](#) presents the corresponding top 10 estimated losses in gross value added of different foreign sectors. It turns out that it is dominated by two sectors: rubber and plastic products and basic metals. The most affected sector is the Czech manufacturing of rubber and plastic products, which we can imagine is the sector that delivers interior equipment used in Germany produced Skoda cars. The other nine sectors are rather similarly affected, ranging from basic metals produced in Hungary (-0.5%) to metal products from Slovakia (-0.4%). This finding underpins the specialization of the several foreign producers to specific metal products (see, for example, the loss of -0.5% in basic metals production in Iceland).



Figure 4

Impact on output of different foreign sectors due to a loss in German automotive sector output  
Loss in sectoral industrial production, Q3-2018



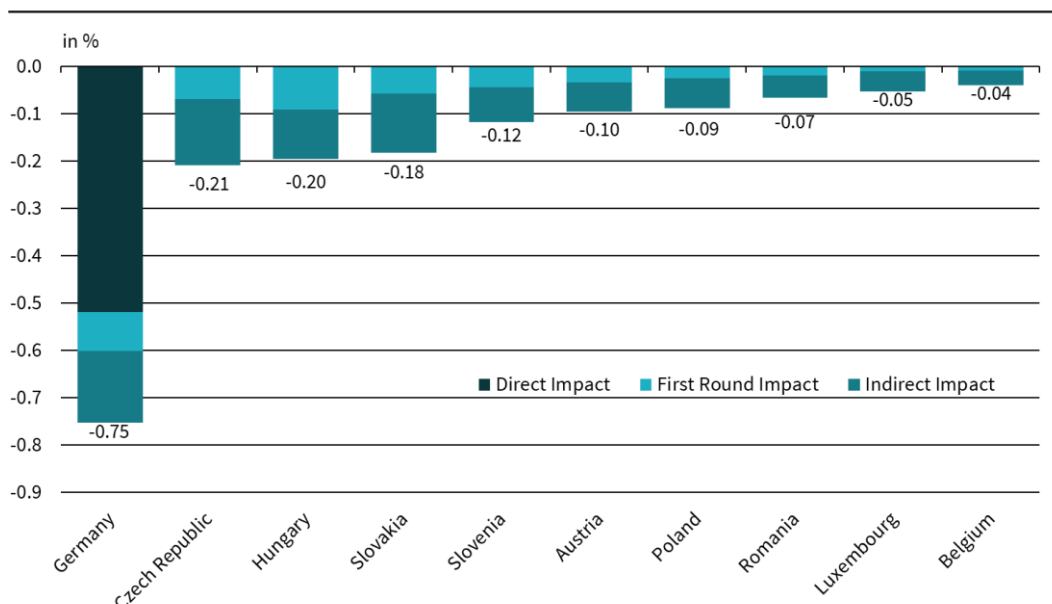
Source: OECD ICIO; European Commission; ifo Institute. Country abbreviations by the OECD are applied: AUT - Austria, CHE - Switzerland, CZE - Czech Republic, HUN - Hungary, ISL - Iceland, MLT - Malta, SVK - Slovakia.

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Accordingly, following the strong economic linkages across economies and sectors as well as the deeply integrated value-added chains, the decrease in German car production had broader macroeconomic relevance. Its impact on the performance of the total economy can be disentangled in a direct and an indirect impact (see European Commission DG ECFIN, 2019). The direct effect mirrors the in- or decrease in final demand for a specific product. The indirect effect is characterized by an in- or decreasing demand for intermediate goods across the value-added chain by the producer. Given the relative size of the German car industry intermediate input rate (75%), the decrease in industrial production can be expected to have sizeable indirect effects as a lot of different domestic and foreign sectors depend on it. By holding the production structure of Germany constant as of the year 2015 (latest Input-Output-Data), the total *ceteris paribus* effect for the German economy due to the drop of 9.4% in car production is a 0.75% decline in gross domestic product (GDP) (see Figure 5). The largest part of this decrease can be traced to the direct impact on the car industry (-0.52 percentage points), which is the mechanical loss in value-added in the German automotive sector due to the drop of 9.4% in output. In addition to this direct impact, limited to the German automotive sector, the first round impact assesses the loss of value-added among its direct suppliers. The first round impact is therefore sizeable not only in Germany (-0.08%), but also in other economies. Finally, the indirect impact takes into account the effect on the rest of the supply chain, i.e. the upstream supply chain of the direct suppliers of the German automotive sector. In Germany, the indirect impact is also sizeable as its value amounts to almost one-third of the direct impact (-0.15%).

Figure 5

Loss in GDP due to a loss in German automotive sector output, Q3-2018



Source: OECD ICIO; European Commission; ifo Institute.

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While the German car industry faced the largest estimated drop in total output, the effects for other economies are, however, also quite sizeable. Total output of the Czech economy was *ceteris paribus* depressed by 0.21%; whereas the indirect effect amounts to -0.14 percentage points; the direct effect for the immediate supply of Czech firms to the German car industry is estimated at -0.07 percentage points. The Hungarian economy faced the second largest estimated drag compared to initial values. However, its total effect of -0.20% is driven broadly evenly by both impacts (first round and indirect). The Slovakian economy faced the third largest estimated impact with -0.18%. For the remaining countries, the impact is rather small when compared to the previously mentioned countries, and originates mostly from the indirect effect. As such, in countries such as Slovakia, Slovenia, Austria and Poland most of the losses in value-added occurred in firms that are not direct suppliers of the German automotive sector. All in all, we can conclude that the drop in German car production had significant effects for single sectors of the domestic economy and foreign economies in total. This holds especially for those partners that share deep supply chains with the German automotive sector.

## 4 Conclusions

The most important industrial sector in Germany, the car industry, faced severe supply side rigidities last year due to the new and mandatory certificate by WLTP. The decrease in German car production (-9.4% quarterly growth in the third quarter of 2018) did not only slow down sector specific output growth, but rather let the German economy shrink in the second half of 2018. On top, and due to the deep integration of value-added chains, also other economies that are highly linked to the German car industry were impacted by the sharp drop in German car production.

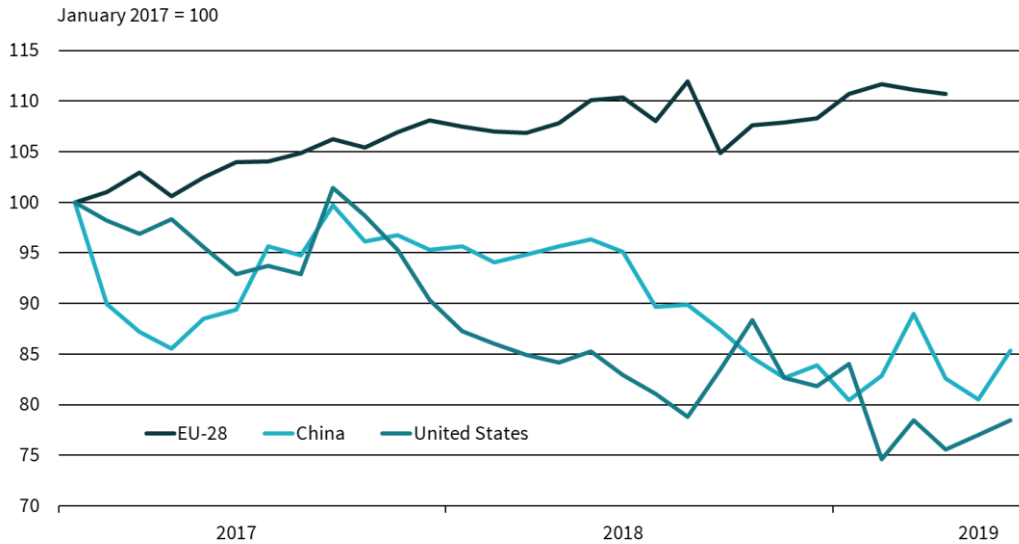
Based on the OECD Inter-Country Input-Output Table for 2015, we estimate the sectoral and global losses that result from the decline in industrial production in the German car industry. From a sectoral perspective, the sectors producing fabricated metals (for example, doors) or rubber and plastic products (for example, interior equipment or tyres) are the ones that are mainly affected by the production loss. This is both true in Germany and its trading partners (for example, the Czech Republic or Hungary). Turning to the global perspective, the largest estimated loss in GDP is faced by Germany itself (-0.75%), followed by the Czech Republic (-0.21%), Hungary (-0.20%) and Slovakia (-0.18%). These results reveal that (unexpected) shocks hitting important and weighty sectors in a value-added chain can have severe effects not only for the domestic economy, but also for its main trading partners offering intermediate inputs.

The future perspectives for the German economy and those of its main trading partners don't look that rosy, especially if we take a closer look at recent developments in car production. Newly released figures by the Federal Statistical Office show that production in the German car industry in the second quarter 2019 again dropped by 2.4% compared to the first quarter 2019, after a decline of 4.2% in the first quarter. If we take these figures as given – together with our results from this policy brief – and presume that no revisions will take place afterwards, this drop is worrying for the economic situation of Germany and its trading partners. Compared to last year, the current weakness of the German car industry is also heavily triggered by a decline in worldwide demand for German cars. Whereas the supply-side problems due to WLTP were of temporary nature, these demand-side cuts can turn out to be of longer-lasting nature. [Figure 6](#) shows domestic sales of motor vehicles from January 2017 to the latest available figures for the EU-28, China and the United States. For the EU-28 a slowdown of motor vehicles sales in the last months can be observed. The sales of motor vehicles in China and the US steadily decline since September 2017, which points to a weak domestic demand for cars.

Figure 6

Sales of motor vehicles

Seasonally and calendar adjusted



Source: Eurostat; China Association of Automobile Manufacturers; U.S. Bureau of Economic Analysis.

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The outlook does not look brighter when taking a closer look at two of the most influential leading indicators of the German manufacturing sector: the Industrial Confidence Indicator by the European Commission and the ifo Business Climate for Manufacturing. Both indicators are on a downward trend since the beginning of 2018 and currently reach levels as of the end of 2012 or the beginning of 2013, respectively; the same picture holds true by looking at the corresponding indices for the German car industry. Taking these indicators seriously, we expect the German industry to stay in recession over the near future, with the German economy growing on a much slower pace compared to previous years.

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