

ECONOMICS DEPARTMENT

**THE IMPACTS OF THE COVID-19 CRISIS ON THE AUTOMOTIVE SECTOR IN CENTRAL
AND EASTERN EUROPEAN COUNTRIES**

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Abstract/Résumé**The impacts of the COVID-19 crisis on the automotive sector in Central and Eastern European Countries**

This paper aims at investigating the impact of the COVID-19 crisis on the automotive sector in Central and Eastern Europe. It details the effects of the pandemic and subsequent lockdown measures on the activity in the sector. It also discusses the prospects for car sales in the short to medium run, potential spillover effects in the region, and new risks to the supply chains posed by the pandemic. It shows that disruptions to the supply chains had limited impact so far and that the sector has been mainly affected by low level of demand. Going forward, the pandemic might have a significant negative impact on investment capacity, while the transition to alternative powertrains and the digital transformation of the industry require large investment and restructuring. The long-term impact on CEE economies is highly uncertain, but will depend on the capacity to maintain a comparative advantage, while the sector transforms deeply.

Keywords: Covid-19, automobile industry, car sales, supply chains

JEL Classification: F15, L62

Les impacts de la crise du COVID-19 sur le secteur automobile dans les pays d'Europe Centrale et Orientale

Cet article vise à étudier l'impact de la crise du COVID-19 sur le secteur automobile en Europe centrale et orientale. Il détaille les effets de la pandémie et des mesures de confinement sur l'activité du secteur. Il aborde également les perspectives de vente de voitures à court et moyen terme, les retombées potentielles dans les économies dans la région et les nouveaux risques pour les chaînes d'approvisionnement posés par la pandémie. Il montre que l'impact des perturbations des chaînes d'approvisionnement ont été limitées jusqu'à présent et que le secteur a été principalement affecté par un faible niveau de demande. À l'avenir, la pandémie pourrait avoir un impact significatif sur la capacité d'investissement, alors que la transition vers des systèmes de propulsion alternatifs et la transformation numérique de l'industrie nécessitent des investissements importants et des restructurations. L'impact à long terme sur les économies des PECO est très incertain, mais dépendra de la capacité à maintenir un avantage comparatif, tandis que le secteur se transforme profondément.

Mots clés : Covid-19, industrie automobile, ventes de voitures, chaînes de valeur

Classification JEL: F15, L62

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The impacts of the COVID-19 crisis on the automotive sector in Central and Eastern European Countries

By Caroline Klein, Jens Høj, and Gabriel Machlica¹

Introduction

The Covid-19 pandemic drove the OECD economies into a deep economic crisis. International trade has declined significantly. Lockdown measures in spring 2020 forced many sectors to close down or to operate at a fraction of their normal capacity. Restrictions on international travel and increased border controls fuelled international trade costs. The virus resurgence in the autumn has led to new containment measures. While less strict than during the first wave, they drag on the economic recovery. Moreover, demand for goods and services plunged and is likely to be subdued for longer, reflecting income losses and heightened uncertainty. World trade may have fallen by 10% in 2020 (OECD, 2020_[1]).

While it recovered somewhat after the initial lockdowns and as the economies reopened, the automotive industry has been hard hit (Figure 1, Panel A). In many Central and Eastern European (CEE) countries, including the Czech Republic, Hungary, Poland, Slovenia, Slovakia and Romania, the automotive sector plays an important role in economic growth and employment. Faced with the prospect of a lengthy crisis as well as underlying challenges stemming from technological changes, the industry's outlook in every country will hinge on foreign demand (with possibly contrasted outcomes for different market segments), the resilience to supply chain disruptions (including vulnerabilities that could stem from firm insolvencies), and the ability to seize new opportunities as the industry adapts and transforms:

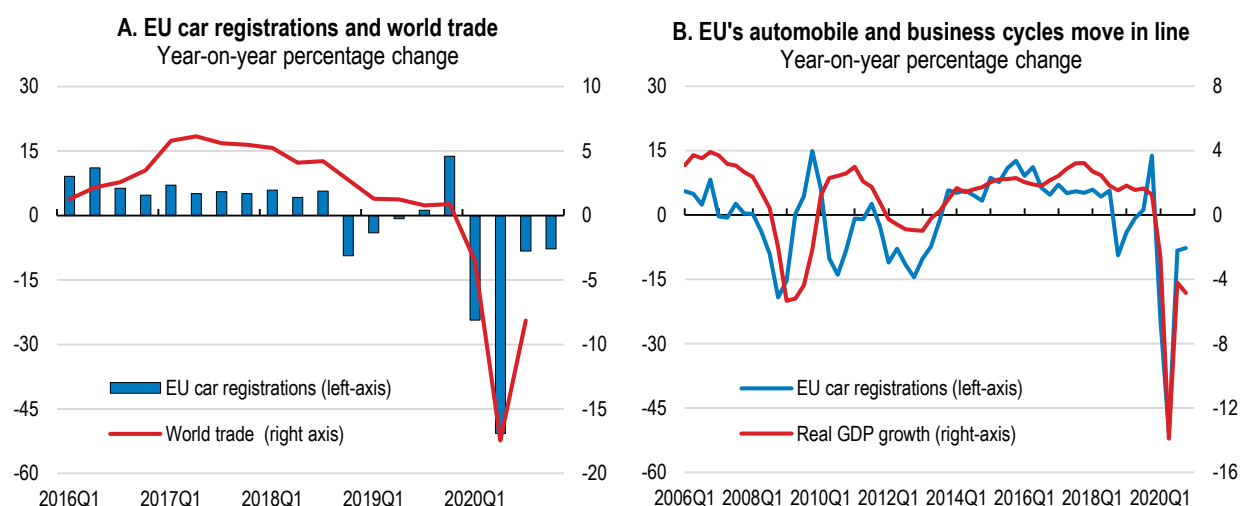
- Prospects in the automotive industry are surrounded by high uncertainty. Car demand will likely remain subdued in the short to medium run. Demand for cars manufactured in Europe is projected to remain 8% below its pre-crisis level in 2021, based on OECD Economic Outlook projections and an estimated relationship between car sales and GDP growth.

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- Prospects in the CEE automotive sectors mainly depend on foreign demand developments, with Europe and Germany still accounting for 67% and 30% of exports of the motor vehicle industry respectively. Car sales move in line with the business cycle (Figure 1, Panel B) and the pandemic is expected to have long lasting negative effects on economic growth in CEE countries' main trading partners (OECD, 2020^[1]).
- The impact of the COVID-19 crisis on demand should vary by market segment. Consumers tend to buy smaller cars during economic downturns. Besides, while sales of fossil-fuel powered cars have plunged, demand for electric cars has remained high. This shift might not benefit car producers in CEE countries, as electric cars still account for a low share of total production in the region.
- The pandemic can cause supply chain disruptions with large negative impact on the automotive industry because of its high degree of integration into global value chains. Until now, these have played a more limited role in crisis transmission mechanisms than the shock to demand, but low demand and repeated outbreaks could lead sub-contractors to stop activities due to insolvency or bankruptcy.
- It is unclear if the pandemic could trigger a shortening of the supply chains, offering CEE countries opportunities to tighten the links between multinational car producers and domestic suppliers, as efficiency losses could be large.
- The crisis could stall investment and upgrading to knowledge-intensive activities. Policies to improve the investment climate, strengthen resilience of viable firms, support digital transformation and adapt to stricter environmental norms can help the recovery.

This paper discusses the Covid-19 impact on the automotive industry in CEE countries. It first details the effects of the pandemic and subsequent lockdowns measures on the activity in the sector. Second, it discusses the prospects for car sales and potential spillover effects in the CEE economies. Third, it analyses new risks to the supply chains posed by the pandemic. Finally, it concludes with a discussion on policy options to address the risks highlighted in the paper.

Figure 1. International trade collapsed and car sales plummeted during the first lockdowns



Source: OECD Economic Outlook: Statistics and Projections database; and ACEA.

The automotive sector in Central and Eastern Europe has been severely hit

The Covid-19 pandemic exposed the worldwide automotive industry to an unprecedented shock. In Europe, the implementation of containment measures has caused production and demand disruptions to carmakers and their sub-contractors.² In early 2020, the abrupt production stop rippled through the industry, effectively closing down the entire supply chain. Lifting of restrictions at a different speed across sectors and countries have resulted in input shortages in the sector's complex value chains. At the same time and more persistently, a demand shock markedly reduced production across all assemblers. More recently, the main factor affecting the automotive sector has been the ongoing negative demand shock. Recent lockdowns in response to the resurgence of the virus have not caused supply disruptions so far.

The effects of the crisis materialised early and were pronounced in the CEE region (Figure 2, Panel A and C). In particular, car sales have plunged by almost 32% in the first two quarters of 2020 (ACEA, 2020_[2]). Car production effectively stopped for an average 28 days. In September, the estimated fall in car production due to factory shutdowns and persistently reduced production capacity ranged from around 17% in Slovakia to 25% in Poland compared to 2019 levels (Figure 2, Panel B). While the shock is significant, it has been lower in most CEE countries than on average in the EU.

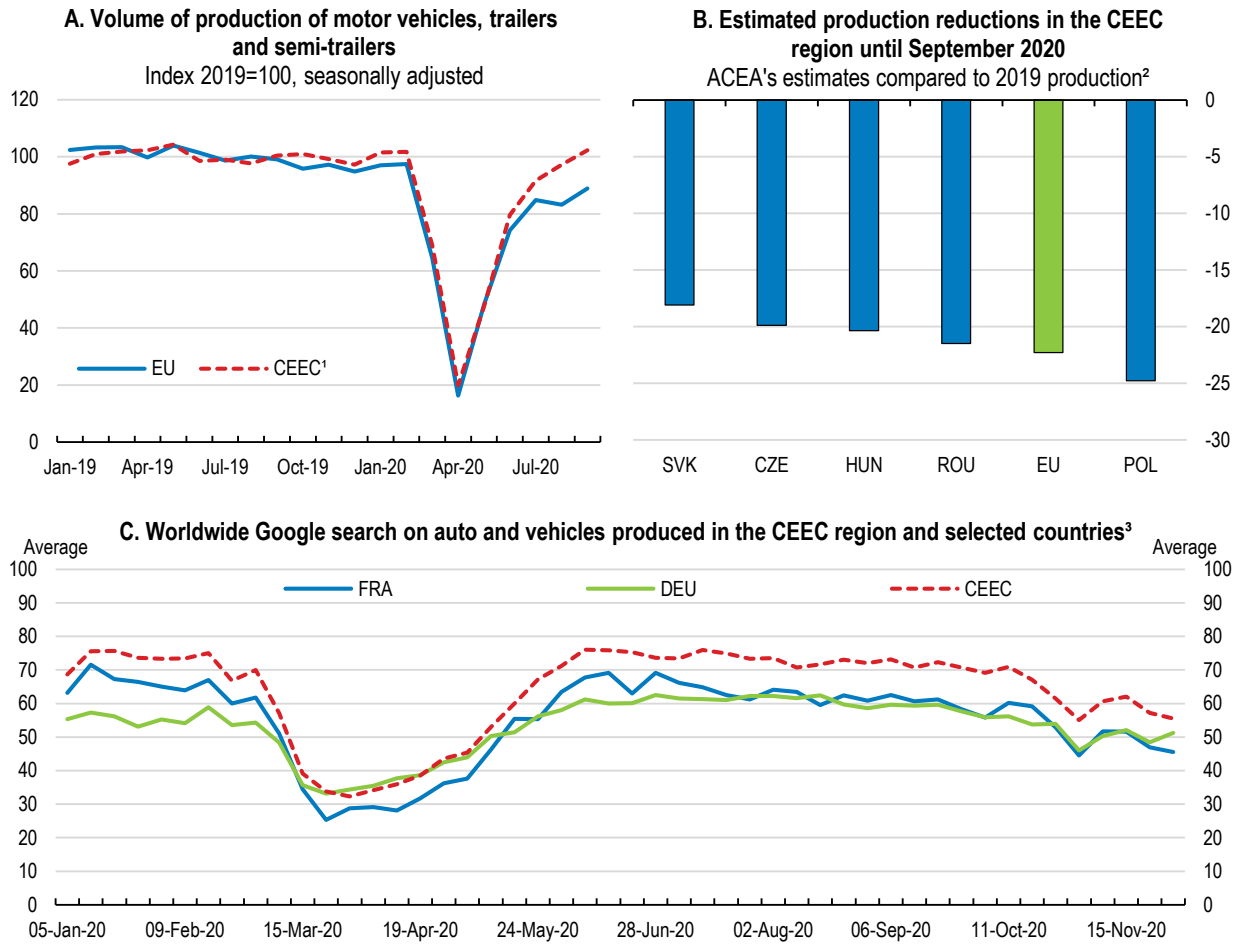
Prospects are uncertain and largely depend on German demand

After the first lockdowns in spring 2020, production in the motor vehicle manufacturing industry has rebounded strongly in Europe and rapidly reached its pre-crisis level in the CEE region (Figure 2, Panel A). However, it can remain well below full capacity levels in the longer term. In particular, demand for cars is highly sensitive to economic conditions and economic prospects have deteriorated significantly, with massive job destruction expected in the medium run (OECD, 2020_[1]). Losses to household purchasing power and a high level of uncertainty will weigh on demand for durable goods whose purchases can be delayed, such as cars.

After a strong rebound, consumer interest in cars produced in the CEE regions has softened over the last few months (Figure 2, Panel C). The European Automobile Manufacturers' Association and S&P see car sales in the European Union falling by 25% and 20% respectively in 2020 (ACEA, 2020_[3]) (S&P Global Ratings, 2020_[4]). Based on the pre-crisis relationship between car sales and fundamental drivers (Klein and Koske, 2013_[5]) and on the OECD Economic Outlook projections (OECD, 2020_[1]), demand for cars manufactured in Europe is projected to remain 8% below its 2019 level in 2021 in absence of policy support.

² In this paper, the automotive industry refers to the manufacturing of motor vehicles, trailers and semi-trailers, the manufacturing of bodies (coachwork) for motor vehicles and the manufacturing of parts and accessories for motor vehicles and their engines.

Figure 2. Production has significantly declined



1. In panel A, CEEC include the Czech Republic, Hungary, Poland, Slovak Republic and Romania. Data refer to the Motor vehicles, trailers and semi-trailers industry (i.e. category 29 in the ISIC Rev 4 classification), except for Slovak Republic (Manufacture of transport equipment industry i.e., categories 29 and 30).

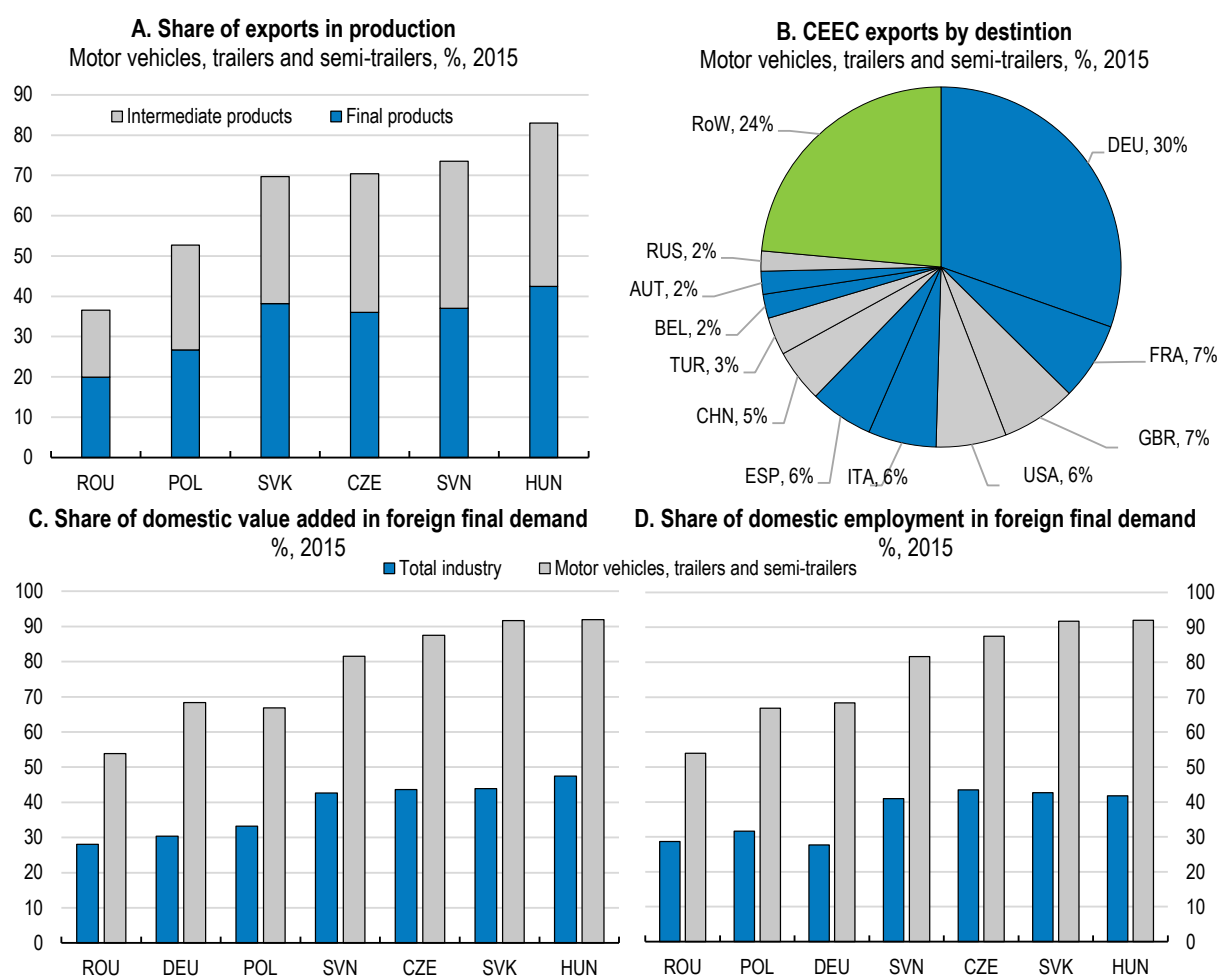
2. Panel B shows the impact of the coronavirus pandemic on the production of passenger cars and light commercial vehicles (up to 6 tonnes) in 2020 (until September), compared to 2019 production. The EU aggregate take also into account the United Kingdom.

3. Averages of the interest over time on car models produced in each country/region (from Google Trends). The interest over time represents the number of worldwide searches for each car model produced in the country/region, relative to the highest number of researches recorded over the period from 1st January 2019 to 29th November 2020. This indicator varies between zero (no or limited number of searches) and 100 (peak of popularity).

Source: Eurostat; National Bank of Slovakia; and OECD calculations based on ACEA and Google Trends.

Prospects in the CEE automotive sectors mainly depend on foreign demand developments. Around 65% of production of the motor vehicle manufacturing industry is exported and more than 79% of domestic employment in the sector depends on foreign demand (Figure 3). Dependence on Germany, the largest trading partner, has declined, but remains high (Figure 3, Panel B). Exports to non-European countries, such as the US, China, and Russia, have increased, but Europe and Germany still account for 67% and 30% of exports respectively.

Figure 3. The CEE automotive industry mainly serves foreign demand



Note: In the four Panels, data refer to exports of the Motor vehicles, trailers and semi-trailers industry (category 29, according to the ISIC Rev 4 classification). In Panel B, intra-CEE transactions are not included. In Panel C, the share of domestic value added in foreign final demand shows domestic value added generated by industry *i* in country *c* embodied in foreign final demand as a percentage of total domestic value added from industry *i*. In Panel D, the share of domestic employment embodied in foreign final demand is defined as domestic employment embodied in foreign final demand, as a percentage of total employment in industry *i* and country *c*.

Source: OECD Trade in Value Added (TiVA) database.

A large uncertainty surrounds the projections for car demand. First, the economic outlook highly depends on the sanitary situation, policies implemented to counter the pandemic, measures to support the recovery, and confidence effects (OECD, 2020_[1]). Second, the pandemic could also affect consumer behaviour and preferences. Widespread teleworking could reduce car demand, while greater reluctance for using public transportation could have the opposite effect. A transformation of demand could also happen, with a shift of demand towards rental cars or car sharing.

The negative impact of the on-going economic crisis could also differ among market segments. The share of small cars in total car sales tends to increase during downturns, even when oil prices drop (Klein and Koske, 2013). As a result, car production in the CEE region could fare relatively better than elsewhere in Europe because of this focus on mass-market segments. Multi-national producers operating in CEE countries are mostly producing smaller and cheaper models within their respective model range.

By contrast, car producers in CEE countries might not benefit from the increasing appetite of consumers for electric cars. Demand for electric cars has surged since the beginning of the year, supported by government programmes (Box 1). While new car sales declined by 38% in the first half of 2020 in Europe, electric car sales increased by more than 20% and their market share reached almost 20% (Figure 4, Panel A). As a result, production of electric cars fared much better than the combustion engine segment. Alternative car sales have increased in most CEEs as well, but electric cars continue to account for a relatively small share of automobile exports, with the notable exception of Slovakia, and, to a smaller extent, Romania (Figure 4, Panel B).

Box 1. Government support to the automotive sector in selected EU countries

This box provides details on support measures put in place in four main export destinations of the CEE automotive industry, Germany, France, Spain and Italy in 2020.

Germany

The package for the automotive industry amounts to around EUR 8 billion (0.2% of Germany's GDP). It significantly strengthens subsidies for electric car sales. The bonus for the replacement of old cars by electric vehicles increased from EUR 3,000 to EUR 6,000. Other measures include 2 billion investments in the charging station infrastructure, a bonus program for future investments by vehicle manufacturers and their domestic suppliers, and support for the modernization of bus, truck and non-profit organization fleets.

France

The May-2020 EUR 8 billion package (0.3% of France's GDP) increases subsidies for buyers of electric vehicles, provides help for companies facing difficulties, and supports a medium-term investment program. The bonus for consumers buying electric cars increased from EUR 6,000 to EUR 7,000. Business customers can receive a new additional bonus of EUR 2,000 for the purchase of plug-in hybrids. In addition, consumers who buy new or used latest-generation petrol or diesel vehicles and full-electric models will be entitled to an increased bonus for their old cars. The package also includes a EUR 5 billion loan for the French carmaker Renault, and creates a EUR-1-billion fund to support new investment and innovation.

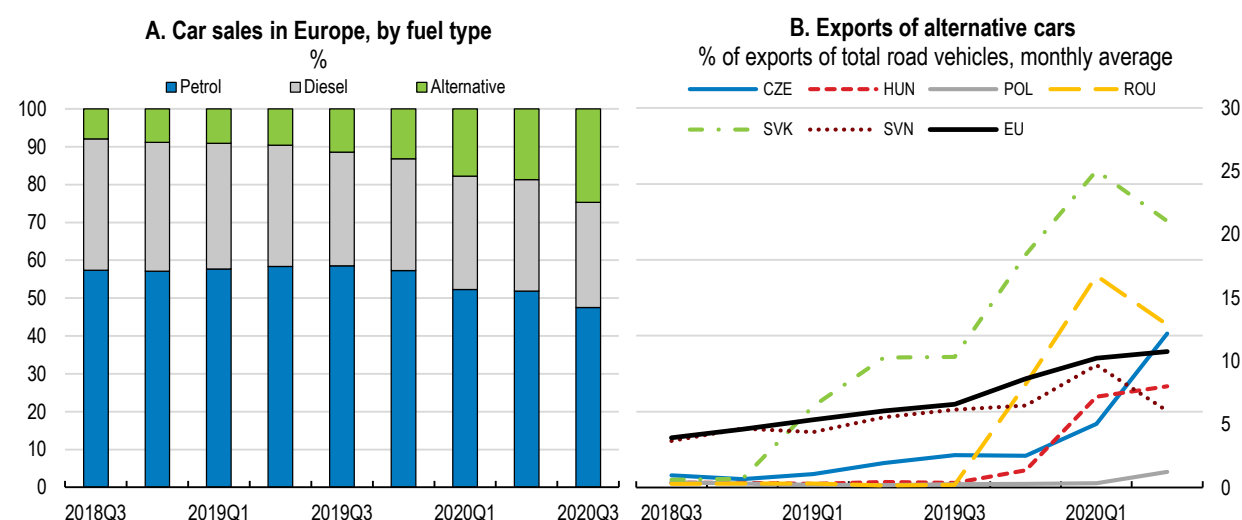
Spain

The Spanish plan for the automotive industry, worth around EUR 3.75 billion (0.3% of Spain's GDP) implies measures for the renewal of the vehicle fleet, extra-spending on R&D and training programs, loans (1.8 billion) and State guarantees (0.5 billion). As for the fleet renewal, the Moves plan promotes electric mobility and encourages the acquisition of alternative energy vehicles. The Park Renovation Program encourages the replacement of polluting vehicles in circulation by zero or low emission vehicles. Other measures also include the replacement of the vehicle fleet of the central administration by ZERO label vehicles and the deployment of infrastructure for charging electric vehicles.

Italy

Direct COVID support to the auto industry in 2020 stood at EUR 500 million. EUR 400 million was allocated to support households' purchases of new cars, with subsidies varying according to four CO₂ emission bands, EUR 90 million to infrastructure in electric charging stations. The auto industry is also eligible for tax write-downs to support investment and to apply for state aid made available to a wide range of companies in response to the pandemic. Fiat received a EUR 6.3 billion loan, repayable in 3 years, through the State Guarantee Fund.

Figure 4. Electric cars account for an increasing share of car demand



Note: The alternative cars category refers to vehicles principally designed for the transport of less than 10 persons, with both spark-ignition internal combustion reciprocating piston engine and electric motor; with both diesel engine and electric motor; and with only electric motor as motors for propulsion.

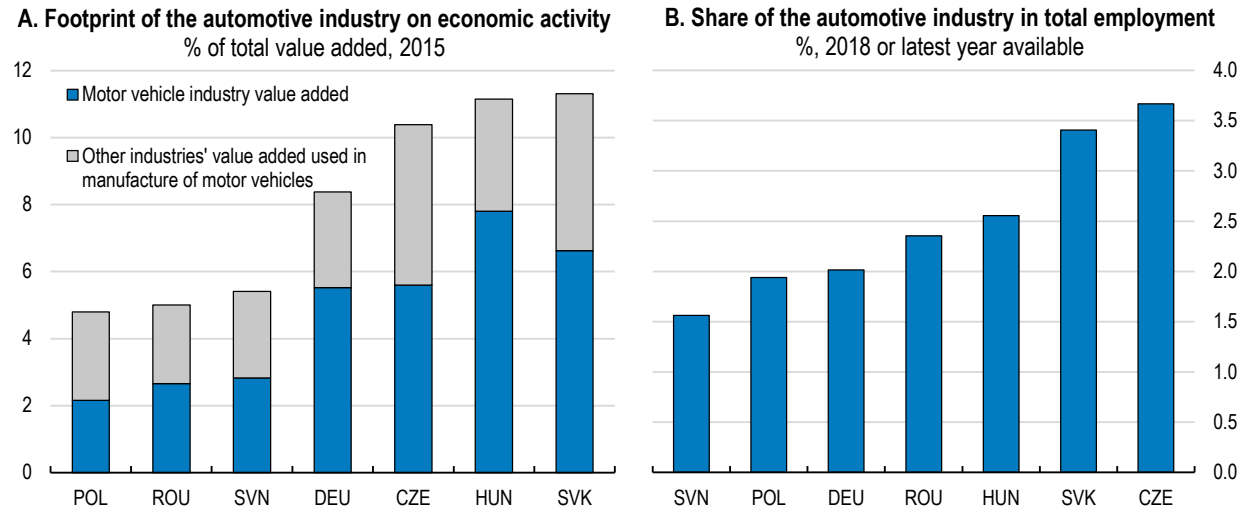
Source: OECD calculations based on ACEA and Eurostat International Trade database.

A durable shift of demand toward electric cars could slow the recovery of car sales in the CEE region, by creating a mismatch between the cars currently produced and those demanded by consumers. Because electric cars contain fewer and simpler parts, fast penetration of electric cars can cause job losses and a decline in activity in countries that are specialised in more traditional market segments, such as Germany (Mönnig et al., 2019^[6]). Technological change towards the electric drive train poses challenges in particular for small and medium-sized companies in the supplier industry. Second or third-tier suppliers in CEE countries could benefit from the electrification of the car fleet to the extent they adapt to the demand of carmakers and gain market shares in the production of components (mainly battery cells required for traction batteries that are largely produced in Asia).

A fall in car demand will have large negative effects on CEE economies

A fall in car demand can have important impact on CEE economies. The automotive industry accounts for around 4% of GDP, 18% of exports of goods, 14% of business R&D and employs almost 1 million people (2.4% of the total number of persons employed in CEE countries in 2017). It is particularly large in the Czech Republic, Hungary and Slovakia (Figure 5). Taking into account links to other sectors of the economy evaluated with input-output matrices, the total value added associated with the automotive sector reaches 7% on average in the region (Figure 5). The footprint of the automotive industry, i.e. the value added generated by the domestic motor vehicle industry and by domestic firms serving domestic and foreign motor vehicle manufacturers, exceeded 10% of GDP in the three largest car producers in the region in 2015.

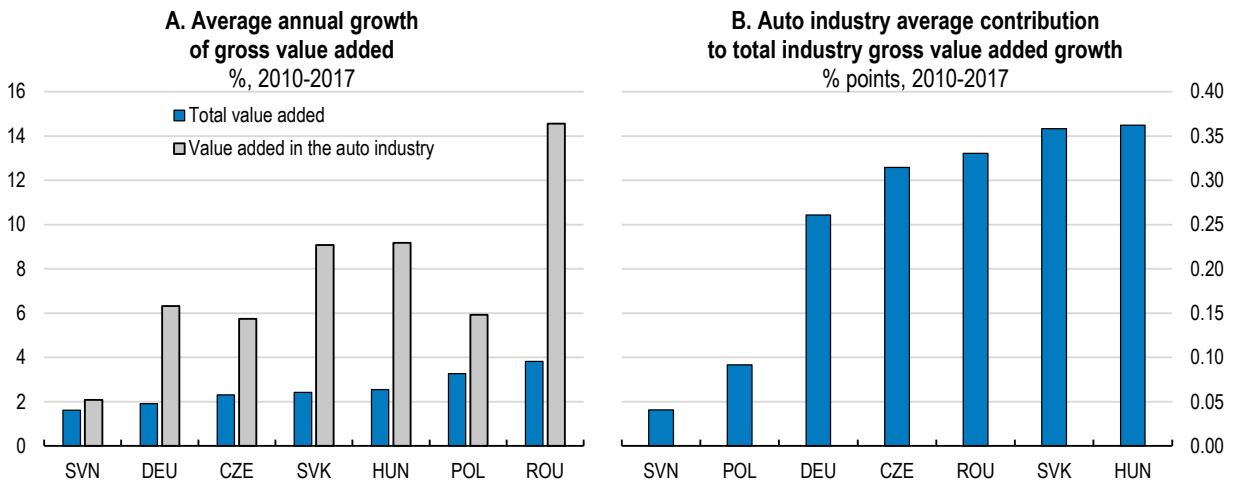
Figure 5. The automotive sector plays an important role in the CEE region



Note: In Panel A, the blue bar represents the value added of the domestic motor vehicle industry to any final destination, while the grey bar represents the value added of domestic non-motor vehicle industries meeting final demand for motor vehicles, both domestic and foreign.
Source: Eurostat National accounts aggregates by industry database; and OECD Trade in Value Added (TiVA) database, 2018, "Origin of Value Added in Final Demand": <http://oe.cd/tiva>

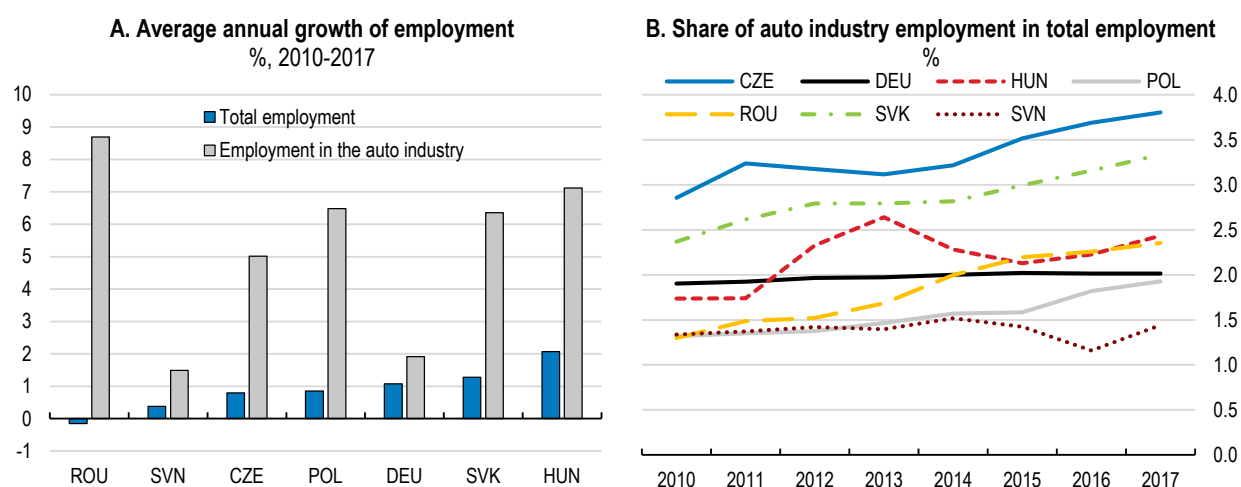
The automotive industry has been an important growth driver after the global financial crisis with a value added that has been expanding faster than GDP (Figure 6). The direct contribution of the automotive sector to GDP growth has been particularly strong in Slovakia and the Czech Republic, partly reflecting the larger size of the sector, but in Hungary and Romania as well. Job creation in the automotive sector has also been relatively high, leading to an increasing employment share in nearly all CEE countries (Figure 7). At the same time, hourly productivity growth has been uneven across CEE countries after 2010 (Figure 8).

Figure 6. The automotive sector has been a growth driver



Note: In the two Panels, auto industry data refers to Motor vehicles, trailers and semi-trailers industry (category 29, according to the ISIC Rev 4 classification).
Source: OECD calculations based on OECD National Accounts database.

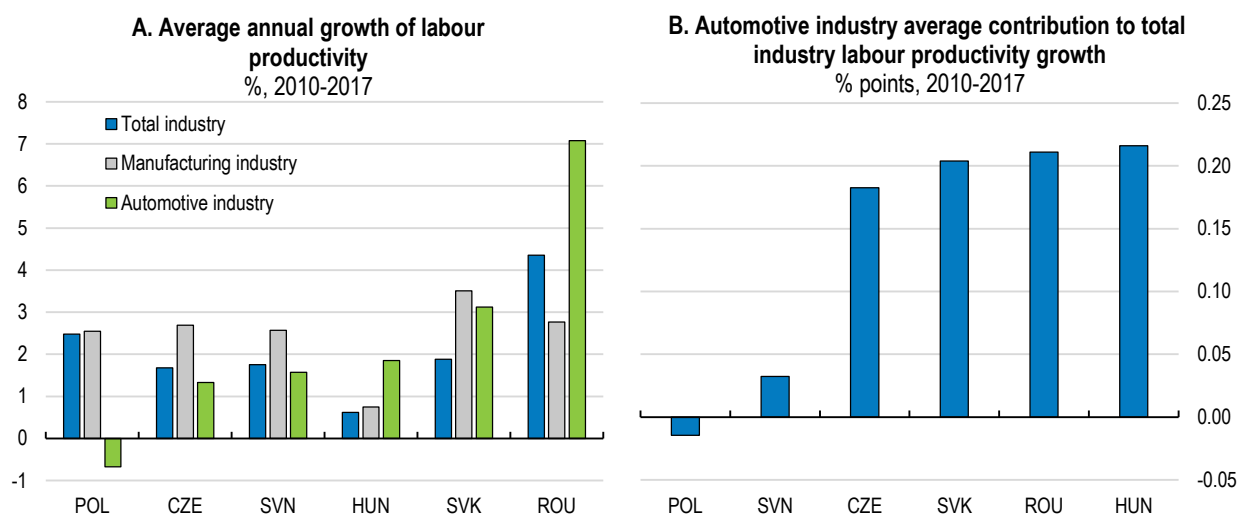
Figure 7. The automotive sector has accounted for an increasing share of total employment in most CEE countries



Note: In the two Panels, auto industry data refers to Motor vehicles, trailers and semi-trailers industry (category 29, according to the ISIC Rev 4 classification).

Source: OECD calculations based on OECD National Accounts database.

Figure 8. Labour productivity growth in the automotive industry has been uneven in the CEE region



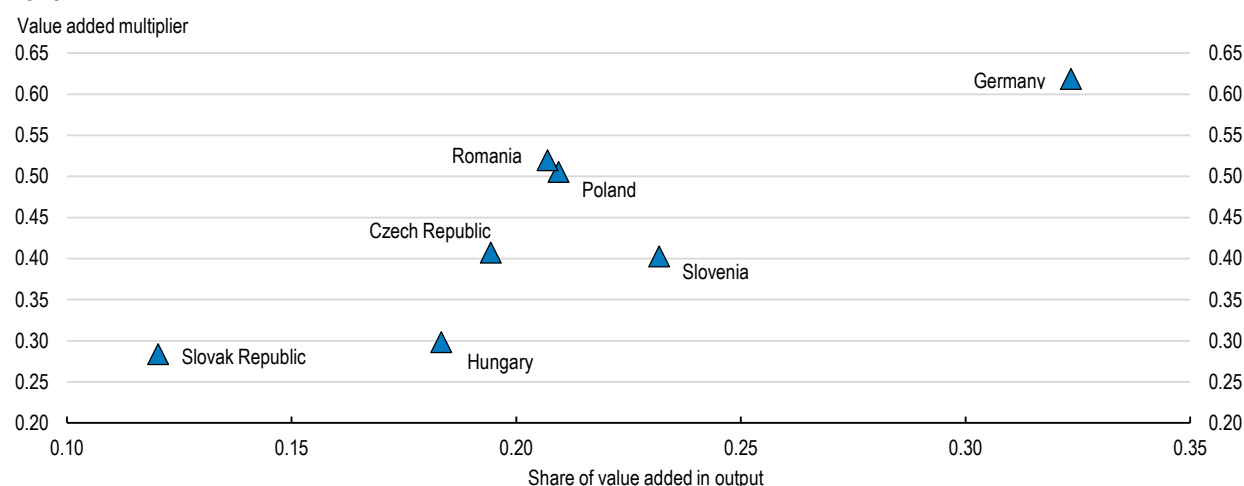
Note: Labour productivity growth by industry is defined as the rate of change of real gross value added per hour worked. The contribution of the automotive sector to labour productivity growth of the total industry is computed as the difference between the growth rate of value added and that of hours worked, with each weighted by the automotive sector's share in total nominal value added and total hours worked respectively.

Source: OECD calculations based on Eurostat National accounts aggregates by industry and Eurostat National accounts employment data by industry.

A fall in car demand will have large negative impacts on overall economic activity, partly due to spillover effects to the rest of the economy. Estimates of domestic output and value-added multipliers suggest that a fall in car demand of EUR 10 million will reduce output by EUR 16 million and value added by EUR 4 million on average in the CEE region (Figure 9). This is less than in Germany where domestic value added is higher. Indeed, the domestic value added content of car production is relatively low in CEE countries. In 2015, value added accounted for less than 20% of total output on average in the region as compared with

one-third in Germany (Figure 9). This reflects a specialisation in relatively low value-added segments of the value chain. The vehicle production in the CEE region is to a large degree based on the downstream activities of value chains, i.e. assembly of imported intermediate goods. Domestic suppliers to the automotive industry also tend to specialise in the supply of simple standardized components, with relatively low value added content (Pavlínek and Žížalová, 2016^[77]).

Figure 9. Multipliers are stronger in countries with higher value added content in car production
2015



Note: The share of value added in output is the ratio of the gross value added to the gross output in percent. The value added multiplier measure the value added content of one unit of output produced in the automotive sector, based on input-output tables.

Source: OECD calculations based on OECD Inter-Country Input-Output (ICIO) Tables, 2018 edition.

The Covid-19 pandemic poses new risks to supply chains

The CEE automotive industry is deeply integrated in global value chains (GVC). Import content of car production is high with domestic suppliers playing a limited role in the production process (Figure 10). The high degree of fragmentation of production implies a large exposure to shocks that arise from multiple points in upstream activities and geographical areas and can create coordination problems. The input-output linkages implied in supply chains propagate and amplify shocks across countries (Carvalho et al., 2016^[83]). At the same time, GVC help firms and countries to recover faster and allow for large efficiency gains (OECD, 2020^[91]).

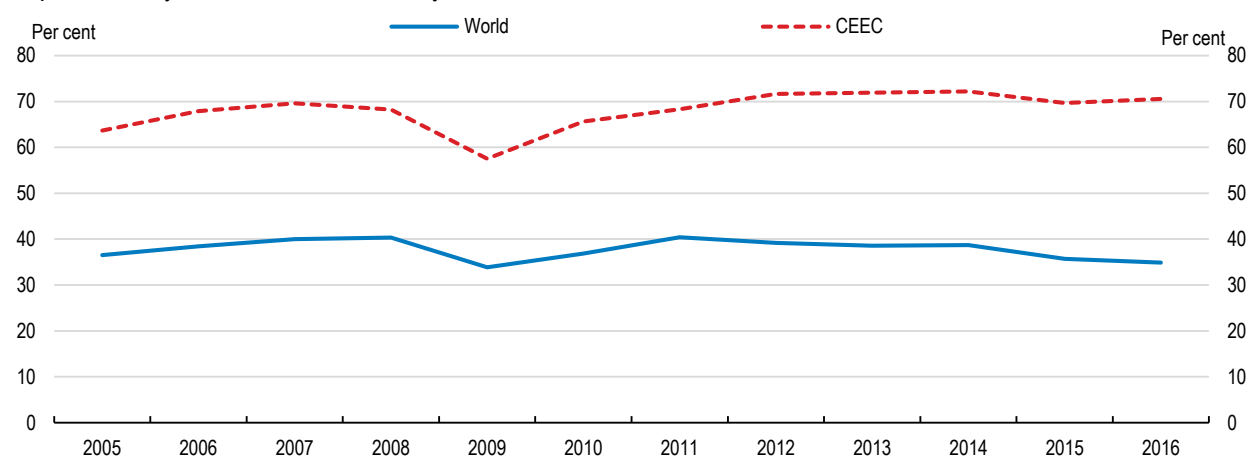
After the lockdown, the re-starting of production has been taking place in a staggered manner. Different lock-down schedules have complicated production restart and hampered the operation of some just-in-time production lines. Differences in safety and health standards across countries have also prevented factories from working at full capacity and created production bottlenecks. Going forward, subdued car demand will raise bankruptcy risks to the supply chains, in particular for small lower-tier suppliers more vulnerable to negative shocks. Widespread bankruptcies among sub-contractors could disrupt production processes. The current industry-wide shock means that production disruptions can be at all levels of production.

More resilient production networks can be achieved through better risk management strategies at the firm level, but features of the automotive production make strategies to improve the resilience of GVC challenging. The very high degree of specialisation in the supply chains and the focus on minimising stocks is a source of vulnerability, as a shock to a key sub-contractor cannot be absorbed by running down stocks or by switching supplier. The supply chains in the CEE automotive sector are based on lean manufacturing techniques, which focuses on a closed-network approach with tight integration of product development

and productions (Schmitt and Van Biesebroeck, 2013^[10]). Carmakers have established distinct and separate supply chains. This has hampered the development of industry-level standards preventing the emergence of readily available market for identifying alternative sub-contractors (Sturgeon, Van Biesebroeck and Gereffi, 2008^[11]). As a result, relatively few products have industry level standards, such as batteries and tyres. In addition, lead firms prefer first-tier subcontractors with a global presence to serve their production across continents, further reducing entry opportunities for new sub-contractors (Sturgeon and Van Biesebroeck, 2010^[12]).

Figure 10. Import intensity of motor vehicle industry has stabilised at high levels

Import intensity of motor vehicle industry



Note: This indicator takes into account all trade flows of intermediates inputs used in any stage of the value chain, and expresses their overall value as a share of the final output. Calculated for the world, it measures the overall level of fragmentation of production. Source: OECD Trade in Value Added (TiVA) database; OECD Economic Outlook: Statistics and Projections database; UN Comtrade; and IMF

Switching sub-contractor is a complicated and time-consuming process, arising from a high degree of search frictions. These comes from identification and validation issues, which requires extensive testing of and documentation from alternative suppliers. In addition, many sub-contractors are highly specialised, reflecting the importance of relation-specific investments along the supply chains (Carvalho et al., 2016^[8]). Diversification would lead to the loss of economies of scale and scope in production. Switching sub-contractor is also complicated because companies wanting to do so would be in sharp competition with other companies with similar objectives to establish contacts with the limited number of specialised sub-contractors.

The Covid-19 crisis could induce profound structural transformation of the GVC. It could accelerate the shortening of GVC observed over the last decade (OECD, 2020^[9]). Since 2011, the expansion of GVC has stopped in the motor vehicle industry; the fragmentation of production across borders and the length of value chains have declined worldwide (Figure 10) (Miroudot and Nordström, 2019^[13]). In the CEE automotive sectors, less fragmentation and shortening of GVC could mean a greater use of local and European sub-contractors. However, this would only materialise if shorter chains were at least as cost-effective as existing arrangements. A recent OECD empirical analysis finds that re-shoring would lead to more stability, but large efficiency losses in the automotive sector (Arriola and al., 2020^[14]).

The Covid-19 crisis adds to pre-existing challenges of the European car industry and can limit needed investment in the sector. Growth in the sector was already slowing down due to trade tensions and overcapacity issues. The transition to alternative powertrains, driven by EU targets for greenhouse gas emissions and related regulatory changes (i.e. the Euro 6d (2021) and 7 (2025) emission standards and a mandatory average fleet CO₂ emissions target for new cars) and the digital transformation of the industry require important investment and restructuring. The Covid-19 crisis might increase pressures to invest in

automation and digitalisation of production, as well as to develop new sales channels, all of which could affect supply chains. At the same time, OECD estimates point to a potential large decline in investment following the Covid-19 shock: debt-overhang can impede investment recovery, due to the ongoing and expected rise in corporate debt to face the economic consequences of the pandemic. Assuming an initial shock on demand of between 45% and 60% during the confinement period in 2020 and a gradual recovery by spring 2021, around 7% of otherwise viable companies in the automotive industry would become distressed and the investment ratio would drop by around 2.7% (Demmou and al., 2021^[15]).

The crisis, by reducing profitability and financial resources of carmakers, can trigger a relocation of production capacities and investment in lower-cost countries. Large restructuring has been announced in Germany, in particular among suppliers to carmakers (Puls and Fritsch, 2020^[16]). This could benefit CEE countries that still have large comparative advantages. At the same time, by limiting the investment capacities of carmakers and possibly triggering a relocation of knowledge-intensive activities (i.e. R&D activities) to core areas, it can undermine potential upgrading of car production in the region. Whether the CEE region would benefit from the transformation of supply chains is highly uncertain. Countries' relative capacity to attract investment and to adapt to innovation will certainly play an important role for the location of car production and suppliers in the future. This hinges on a vast range of factors, including the availability of a skilled labour force and training services, the quality of infrastructure, and policy actions in response to the crisis.

Conclusion and discussion

The impact of the coronavirus pandemic on the automotive industry has rapidly gone from a supply to a demand shock, which is rippling through the industry. In the spring of 2020, CEE countries almost fully stopped car production as lockdown measures disrupted supply chains. Production lines and supply chains have then progressively been re-established. Nevertheless, the Covid-19 crisis poses important challenges to the CEE automotive sectors. First, the economic crisis will likely depress demand for cars and will negatively affect the sector with large spillover effects to the CEE economies. It might increase liquidity and solvency problems for sub-contractors, especially tier 2 and 3 suppliers that are more fragile, thereby raising the risk of bankruptcy-related interruptions in supply chains. Second, lower profitability of carmakers can undermine investment needed for the digital transformation and the adaptation to stricter environmental norms, with unclear consequences for the CEE region.

Government measures can improve the resilience of the automotive sectors to future virus outbreaks. First, governments can support efforts of firms to improve resilience of supply chains (OECD, 2020^[9]). Removing trade barriers and ensuring the smooth functioning of international transport and customs would facilitate exchanges and limit extra delays in deliveries. Second, government can help to maintain production lines and supply chains. The widespread use of business and labour market support measures in the CEE region have weathered the adverse effects of lockdown measures in spring 2020, especially for SMEs (OECD, 2020^[17]).

If the crisis wears on, additional measures need to be considered. In particular, additional support for liquidity-strapped sub-contractors could limit the risk of interruptions in supply chains and contribute to preserving production capacities of distressed but viable firms. By contrast, subsidising car purchases, for instance with car scrapping schemes, might only have temporary effects on car demand as they are found to only shift car consumption in time (Grigolon, Leheyda and Verboven, 2016^[18]; Shanjun Li, 2013^[19]; Haugh, Mourougane and Chatal, 2010^[20]; Mian and Sufi, 2012^[21]). Finally, policies can improve the capacity of CEE economies to attract foreign investors and to reap the benefit of on-going structural transformations of the automotive sector. Policies to improve the investment climate, support digital transformation and adapt to stricter environmental norms are central to sustain the recovery. They should be complemented by policies aiming at addressing large skill shortages, especially in countries where emigration rates are high and the population is ageing fast.

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