

Supply-side disruptions are dragging down the automotive sector

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The car industry has been severely affected by supply-side constraints in recent months. Shortages of semiconductors and other intermediate goods, delays in supplier delivery times and bottlenecks in container shipping have forced car manufacturers around the world to reduce production despite strong global demand.

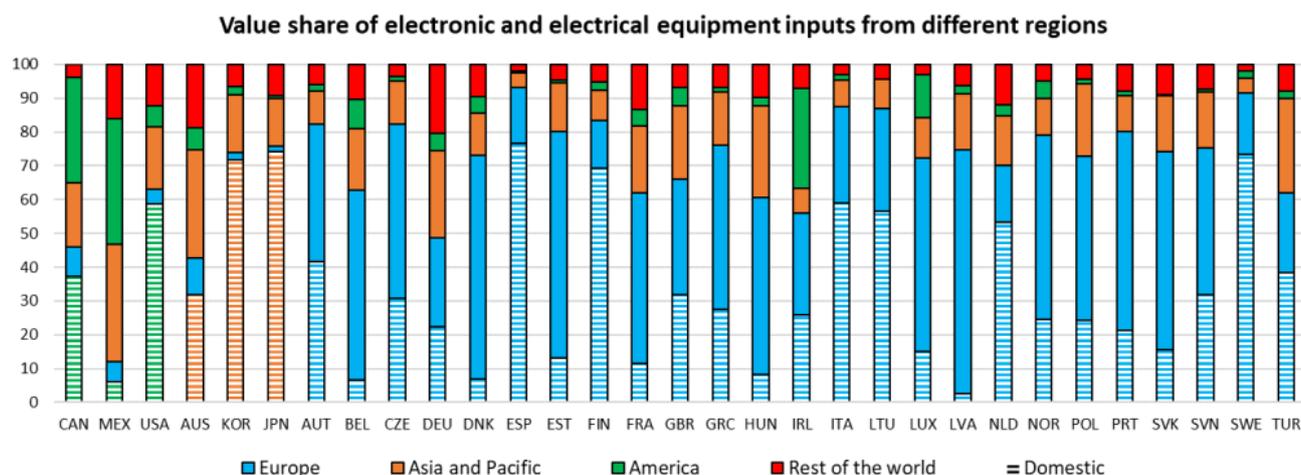
In the first ten months of 2021, motor vehicle production in the euro area was 26% lower than in the same period of 2019, with respective shortfalls of 24% and 9% in Japan and the United States. Inventory levels have also fallen sharply in many countries. In the United States, the auto industry's inventory-to-sales ratio (the number of motor vehicles in stock relative to monthly sales) declined to a low of 0.4 in October 2021, compared to the long-term average of between 2-2.5. The reduced availability of new cars and low inventory levels have hit global car sales, which fell by over 20% between April and September 2021, a pace of decline only seen previously in deep recessions. Strong demand and reduced supply have also led to substantial upward pressure on new and used car prices, contributing to the surge in consumer price inflation in many countries this year.

The transport equipment industry is strongly linked through global value chains, especially in Europe. In 2019, more than 80% of sectoral production in Hungary, Slovakia and Slovenia involved goods that crossed at least two borders along the production process, with this share remaining above 50% for

most European countries.

Globally, electronics and electrical equipment represent 6% of total motor vehicle inputs. These inputs are typically sourced from trade partners in the same country or region (Figure 1). In Japan and Korea, more than 70% of the electronics and electrical equipment inputs in the motor vehicle sector are sourced domestically and 20% from elsewhere in Asia. US and Canadian producers also rely on regional value chains, with about 60-75% of electronics and electrical equipment inputs sourced from the Americas. In many central and eastern European countries, the share of electrical inputs from Europe is above 70%. Although the share of inputs supplied directly from Asia is small in North America and Europe, producers can still be heavily reliant on critical parts and components that are available from only a few suppliers.

Figure 1. Regional value chains are important in the motor vehicle sector



Note: The colours represent the regions from which inputs are sourced. The bars with stripes represent the percentage share of inputs sourced domestically, while the solid-colour bars correspond to the percentage shares of imported inputs. America includes Brazil, Canada, Mexico and United States. Asia and Pacific includes Australia, China, Chinese Taipei, Indonesia, India, Japan and Korea. Based on input data in current prices and expressed in USD terms.

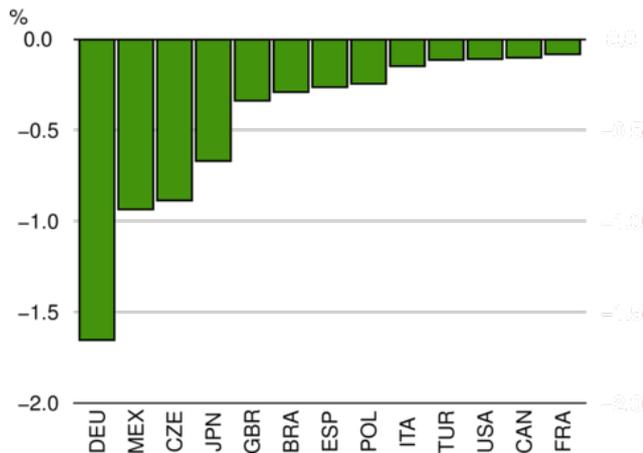
Source: World Input-Output Database (WIOD), 2016 release.

What are the relative contributions of supply and demand imbalances to the decline in motor vehicle production? Econometric estimates show that survey indicators of suppliers' delivery times and new orders (capturing supply disruptions and demand pressure respectively) both have significant effects on motor vehicle production. The estimated relationship can be used to calculate the difference between car production in 2021 and the output level that might otherwise have been expected from demand growth if suppliers' delivery times had remained unchanged from their level in the fourth quarter of 2020. This gap is substantial in a number of countries.

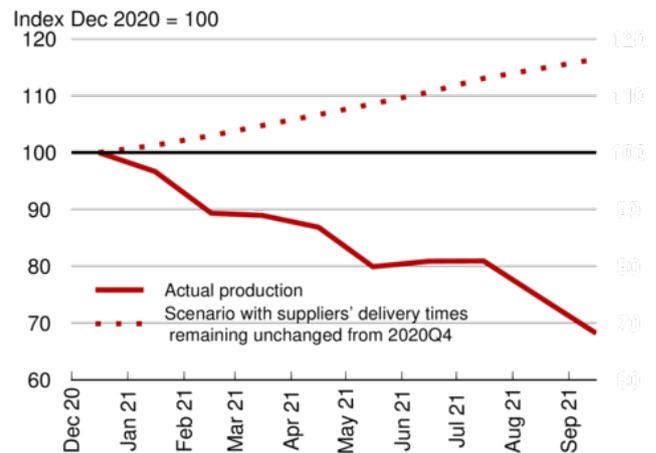
Longer supplier delivery times and other disruptions are found to have reduced motor vehicle production in Germany particularly sharply, by an amount equivalent to over $1\frac{1}{2}$ per cent of GDP in the first nine months of 2021 (Figure 2, Panel A). Production losses due to supply disruptions are also estimated to have been substantial in the Czech Republic, Japan and Mexico, amounting to $\frac{1}{2}$ to 1% of GDP. In many other countries, the impact of supply constraints on production is smaller, and motor vehicle production represents a lower share of overall activity, but there is still a noticeable drag on GDP in 2021. Aggregating across countries, there is a growing gap between actual car production and the level that might have been reached in the absence of supply constraints (Figure 2, Panel B). Overall, actual production has been around 25% lower this year than in the scenario with no additional supply constraints in 2021.

Figure 2. Supply-side constraints are depressing car production in 2021 and weighing on GDP

A. GDP loss in 2021 from supply disruptions in the motor vehicle industry



B. The impact of supply constraints on global motor vehicle production in 2021



Note: Panel A shows the implied impact on GDP from the gap between actual motor vehicle production in the first nine months of 2021 and production in a scenario in which new orders follow their actual path in 2021, while suppliers' delivery times are held at their 2020Q4 level. Panel B shows the overall gap between scenario and actual production, across countries accounting for 85% of global motor vehicle production. Based on estimates for a panel of 30 OECD and emerging economies, over April 1996 to December 2019, with monthly growth rates of car production regressed on country-specific manufacturing PMI indices weighted by the share of motor vehicles output, lags of the dependent variable and fixed effects.

Source: Markit; Eurostat; OECD Structural Analysis database; OECD Trade in Value Added database; and OECD calculations.

Supply-side strains are expected to persist. At the onset of the pandemic, automotive producers cut orders for chips in anticipation of lower demand and semiconductor producers shifted supply to meet soaring demand for computers, webcams, tablets and other electronic and communication equipment. This redirection of supply has contributed to the current shortages faced by carmakers. In 2020, the automotive industry represented around one-tenth of global semiconductor demand while communication and computers, the two largest semiconductor markets by end-use, jointly accounted for two-thirds of total demand, giving them relative priority with suppliers. In this context, the current supply shortage for motor vehicle manufacturers may continue well into 2022.

Additional precautionary demand from manufacturers, in order to rebuild stock levels, could also exacerbate demand/supply imbalances (Rees and Rungcharoenkitkul, 2021).

References

Rees, D. and P. Rungcharoenkitkul (2021), "Bottlenecks: causes and macroeconomic implications", *BIS Bulletin*, No. 48.

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