

THE POTENTIAL IMPACT OF GLOBAL SUPPLY CHAIN BOTTLENECKS ON THE SPANISH ECONOMY IN THE COMING QUARTERS

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In recent quarters global supply chains have been significantly disrupted, which has affected the strength of the recovery in activity in the main world economies.¹ In particular, these bottlenecks have affected various sectors of activity very unevenly and have had a particularly severe impact in those industries located in the upstream stages of the value chain, i.e. in those sectors supplying goods for use in other industries. Thus, for example, the major imbalances between supply and demand recorded recently in the semiconductor and integrated circuit industry² have had a very significant adverse impact on the motor vehicle industry, where many manufacturers have been forced to halt or cut their production plans. Likewise, the strains observed in various energy and commodity markets have also had a negative impact on numerous manufacturing sectors, such as those that make intensive use of natural gas – like the production of fertilisers and plastics – or magnesium –which is needed to produce aluminium alloys–.

The purpose of this box is to offer an initial quantitative assessment of the impact that these bottlenecks could have, should they persist, on Spanish economic activity in coming quarters. An analytical framework is considered for this purpose,³ based on the World Input-Output Database (WIOD), which enables the consequences of different types of shocks on a very granular set of sectors to be explored, identifying both their direct and indirect effects – i.e. the spillover effects between sectors –, whether domestic or international. Given the economic interconnections existing at the global level, a precise assessment of the true exposure of domestic industries to diverse shocks requires that the way in which such shocks

also affect the dynamics of activity in our main international trading partners be explicitly incorporated into the analysis.

To estimate the above-mentioned effects quantitatively, the first step is to identify the main sectors affected by global supply chain bottlenecks. The manufacturing industries considered to be under most strain are those that historically record a very low level of inventories of final goods and, at the same time, report relatively significant shortages of materials.⁴ As seen in Chart 1, and in line with the foregoing, these industries include notably the production of motor vehicles, rubber and plastic products, paper products, electrical equipment, IT and electronics, and metal products.

The second step is to quantify the extent to which these bottlenecks are constraining activity in each of these sectors and to assess the persistence of these shocks.

The size of a shock is determined as follows. In the case of the automotive sector, the scale of the shock is defined as the difference between IHS Markit's average 2021 and 2022 global vehicle production forecasts from the first half of 2021 and from October 2021.⁵ The result is a shock to the global industry of around -9% in the second half of 2021 and -7% in 2022. For the purposes of the analysis described in this box, this negative shock is distributed among the main advanced economies in line with their share of production.⁶ In the case of other sectors, for which such detailed information on changes to projected production is not available, the size of shocks is calculated on the basis of the historical relationship between industrial output and the indicator of shortages of material

1 For further details on the drivers of this disruption and the impact that these bottlenecks have had on prices and activity in different sectors and economies, see, for example, "Euro area manufacturing bottlenecks", Box 3, "Quarterly report on the Spanish economy", *Economic Bulletin* 3/2021, Banco de España, "The impact of supply and demand shocks on recent economic developments and prices", Box 3, "Quarterly report on the Spanish economy", *Economic Bulletin* 4/2021 of the Banco de España, and D. Rees and P. Rungcharoenkitkul (2021), "Bottlenecks: causes and macroeconomic implications", *BIS Bulletin*, No 48.

2 The main factors explaining these imbalances are the sharp increase in the demand for electronic products during the pandemic, the energy crisis in China (the world's main supplier of silicon, a basic component of these products and whose production is energy intensive), and the limited spare capacity in the production of microchips.

3 For a description of this analytical framework, see "The heterogeneous economic impact of COVID-19 among euro area regions and countries", Analytical Articles, *Economic Bulletin* 2/2020, Banco de España and M. Izquierdo, E. Moral, E. Prades and J. Quintana (2021), "The propagation of worldwide sector-specific shocks", forthcoming.

4 Information obtained from the European Commission's Business and Consumer surveys. The latest data available for the indicator of shortages of material and/or equipment corresponds to 2021 Q4 and for the stock of final products to October 2021. In the case of stocks, their deviation from the 10th percentile of their historical distribution is considered, while the deviation from the 90th percentile is considered for the shortages of material and/or equipment.

5 For further details on these forecasts, see "Worsening run rate, but 2022 global light vehicle production outlook intact".

6 The projected output of the leading emerging economies has barely changed. These scenarios involve a drop in the output of the advanced economies (including Spain) of 16% in the second half of 2021 and of 13% in 2022.

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and/or equipment in such industries. This relationship (estimated using panel data and accounting for a set of control variables) suggests that, on average, a 1 pp increase to the material and/or equipment shortage indicator leads to a fall in output of around 2.3 pp after 3-4 quarters. Thus, given currently measured shortages, this means a negative global shock to the activity of such sectors in the range of 5-6% of the output projected in the absence of shocks.

In terms of their duration, the shocks estimated above are expected to persist throughout the fourth quarter of 2021 and the first three quarters of the coming year. With this in mind, it is worth noting that, while there is considerable uncertainty as to how long these bottlenecks might last, the scenario considered in this box is relatively in line with the time frame in which Spanish firms expect the current supply problems to persist, according to the latest wave of the Banco de España Business Activity Survey (EBAE) (see Chart 2).⁷

Chart 1
MANUFACTURING SECTORS AFFECTED BY A SHORTAGE OF MATERIAL/EQUIPMENT AND LACK OF INVENTORIES (a)

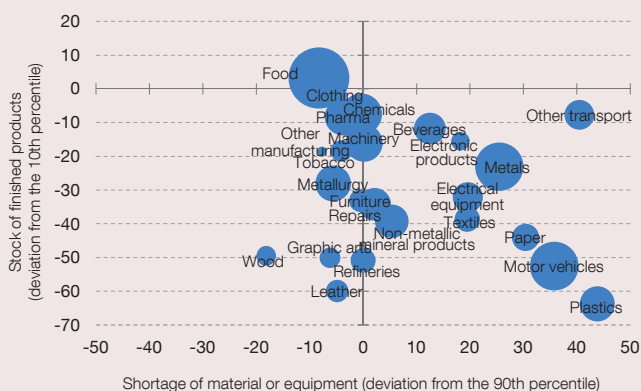


Chart 2
ESTIMATED DURATION OF SUPPLY DIFFICULTIES (b)

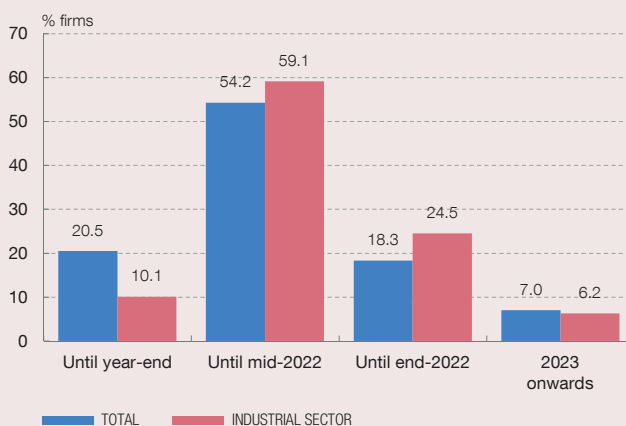


Chart 3
IMPACT OF BOTTLENECKS ON SPANISH GDP GROWTH

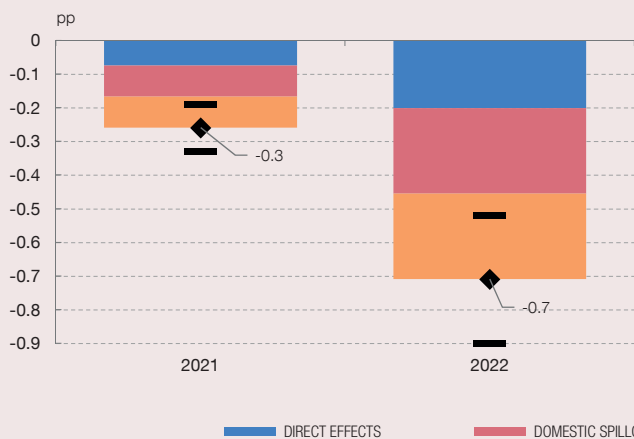
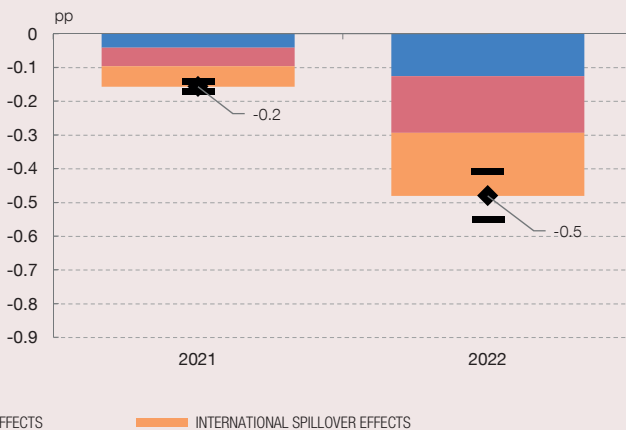


Chart 4
IMPACT OF BOTTLENECKS IN THE MOTOR VEHICLE INDUSTRY ON SPANISH GDP GROWTH



SOURCES: European Commission and Banco de España, based on WIOD data.

- a For each sector, the size of the bubble reflects its percentage share of manufacturing value added.
- b Banco de España Business Activity Survey: November 2021.

7 See “Banco de España Business Activity Survey: November 2021”, Economic Notes, *Economic Bulletin*, Banco de España, forthcoming.

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The third and final stage of this analysis calls for an estimate of how the projected contraction (over the period identified) in the activity of each of the sectors directly affected by the bottlenecks impacts the output of other sectors of the economy. In other words, the aim is to quantify all of the sector-specific spillover effects, at both domestic and international level, so as to be able to determine how such bottlenecks may ultimately impact the Spanish economy's overall level of activity in the coming quarters. To this end, the sectoral relationships inferred from the World Input-Output Database are taken into account.

As can be seen in Chart 3, it is estimated that global supply chain disruptions could result in a significant slowdown in the Spanish GDP growth rate over the final stretch of 2021 (of 0.2-0.3 pp) and in 2022 (of 0.5-0.9 pp), an adverse impact in which international spillover effects would play a pivotal role. At an industry level, Chart 4 shows that the adverse effect of such bottlenecks can for the most part be attributed to their negative impact on the automotive industry, as is to be expected given the sector's considerable size and importance for the country's economy.