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ECONOMIC CONSEQUENCES OF A HYPOTHETICAL SUSPENSION OF RUSSIA-EU TRADE

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ABSTRACT

A hypothetical interruption of energy commodity imports from Russia could significantly affect the Spanish economy. The difficulty of replacing these products in the short term would reduce the energy supply and compound the current inflationary episode, both of which would weigh on economic activity. However, since Spain is less energy dependent on Russia than other European economies, the effects on the Spanish economy would be notably smaller. Lastly, the impact would be amplified due to the shock propagating through global production chains, with a particularly marked effect on certain sectors of activity. The interruption of exports or imports of other goods would also adversely affect the European economies, although it would have a more limited impact than in the case of energy commodities.

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Introduction

In addition to causing a grave humanitarian crisis, the Russian invasion of Ukraine has significantly disrupted economic activity. Specifically, the economic consequences of the conflict may shape the course of the Spanish and European economies through various channels. Included here are rising energy commodity prices, a reduction in trade flows, and confidence, associated with the heightened economic uncertainty, which could act as a drag on households' and firms' consumption and investment decisions, in addition to leading to a tightening of financial conditions.[1] As a result, in its latest projections for the Spanish economy published in April 2022[2] (the first since the outbreak of war), the Banco de España has revised economic growth for 2022 downwards and inflation upwards in comparison with the previous December 2021 projections.

But the economic costs of the invasion of Ukraine may be even higher. In particular, the adverse effects may be compounded by a hypothetical escalation of tensions prompting either the Russian or the European authorities to suspend European energy commodity imports from Russia.[3] Although plans geared towards energy saving and diversification are in place (e.g. the European Commission's REPowerEU programme), a sudden supply cut-off would result in less energy being available and energy prices rising further. This would have an uneven impact on the European Union (EU) countries, depending on their energy dependence on Russia. For example, around 18% of mined energy products (gas and coal) and 9% of oil derivatives consumed in the EU are imported from Russia, compared with 3% and 2.5%, respectively, of those consumed in Spain. Also, when quantifying the economic consequences of a hypothetical cut-off in the Russian energy supply, it is essential that both the direct impact and its propagation through global production chains be taken into account. That is to say, the direct effect of the higher energy cost for a specific sector in a given country would lead to the prices of its products increasing

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1 See Box 2, "Possible channels through which the war in Ukraine may impact the euro area economy", "Quarterly report on the Spanish economy", *Economic Bulletin* 1/2022, Banco de España.

2 See Box 1, "Macroeconomic projections for the Spanish economy (2022-2024)", "Quarterly report on the Spanish economy", *Economic Bulletin* 1/2022, Banco de España.

3 Since the war broke out, the EU has imposed sanctions limiting the operations of Russian financial institutions and restrictions on transport and trade in certain sectors. For more details, see https://www.piie.com/blogs/realtime-economic-issues-watch/russias-war-ukraine-sanctions-timeline.

somewhat, which, in turn, would affect its customers in other sectors and countries, including Spain.

To approximate the potential economic impact of this scenario on Spain, this article considers a multi-country sectoral model, based on that of Baqaee and Farhi (2021), that takes into account customer-supplier relationships in production processes and the geographical origin of the different inputs. This model is thus particularly appropriate for quantifying the effects that a cut-off in the energy supply from Russia would have on other productive sectors in different countries. It also allows various assumptions to be considered regarding the adaptability of production processes to the limited energy supply and the ability to replace Russian energy imports, according to the empirical evidence available (for example, Boehm, Levchenko and Pandalai-Nayar (2021)).

On the results obtained, a hypothetical interruption of energy imports from Russia would have an impact of between 0.8% and 1.4% on Spanish GDP in the first year, depending on the assumption considered regarding the European economies' ability to replace Russian energy sources. Turning to other European economies, it would have an impact of between 1.9% and 3.4% for Germany, 1.2% and 2% for France and 2.3% and 3.9% for Italy. The impact on the EU as a whole would range between 2.5% and 4.2% of GDP. These values should be regarded as short-term impacts and would gradually decrease as the ability to replace Russian energy imports increases. These results are within the range of estimates available for other countries such as Germany, where the issue has sparked a growing debate given the country's relatively high energy dependence on Russia.[4] Moreover, the sectors most affected would broadly speaking be the most energy-intensive ones, such as transport, the basic metals industry and the chemical industry, whereas the impact on the services sectors would be more limited. Lastly, a hypothetical suspension of other trade flows with Russia would further adversely affect the European economies, albeit to a far lesser degree than a suspension of energy commodity imports.

Modelling the suspension of Russia-EU trade flows

To assess the impact of a hypothetical cut-off in the supply of energy commodities from Russia, a multi-sector production network model with open economies, based on Baqaee and Farhi (2021), is considered. In this model, each sector uses for its output capital and labour, in addition to other intermediate inputs and energy obtained from suppliers in other domestic and international sectors.[5] In this setting,

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4   This matter has been the subject of various recently published studies considering the case of Germany. Bachmann et al. (2022) estimate that suspending Russian energy imports would have an impact of between 0.2% and 2.2% on Germany's GDP. Bundesbank (2022) estimates the annualised effect of a restriction on such imports at around 4% of GDP.

5   The trade flows between sectors and countries that are needed to calibrate each sector's production requirements and the input-output relationships are identified by drawing on the Organisation for Economic Co-operation and Development's 2018 Inter-Country Input Output (ICIO) tables. These tables contain information on purchases and

a supply cut-off or suspension of trade is simulated by halting the import or export of specific goods vis-à-vis the Russian economy. This model is especially appropriate for exercises of this nature, as it captures both the direct impact on the sectors affected by the trade restriction and its propagation to the rest of the economy through customer-supplier (or input-output) relationships.

The results of these simulations hinge chiefly on two of the model's parameters: the elasticities of substitution between factors of production and the trade elasticities. These reflect the different sectors' ability to respond to shocks, such as a cut-off in supplies from Russia, by adjusting the combination of factors of production in their production processes and by replacing Russian imports with those from elsewhere. In the real world, this adaptability would depend on numerous technical parameters that, a priori, are difficult to ascertain. Moreover, the short-term impact would be softened by the existence of energy reserves and by any measures set in place by European governments to facilitate this replacement upon the entry into force of the restrictions. Similarly, stockpiling by other sectors may limit production chain disruptions. With the dual aim of reflecting the uncertainty about the real values of these elasticities and approximating the impact over a short-term horizon, a range of relatively low values is considered, based on the empirical evidence available, reflecting firms' limited ability to respond to the shock in the more immediate future.[6]

In this respect, the scale of the economic impact of a cut-off in Russian supplies would vary according to the time frame considered. While the economies are likely to be able to replace their Russian imports and adapt their production processes in the medium and long run, this may prove more difficult and entail significant costs in the short term. Accordingly, the figures presented in this article can be interpreted as the expected impacts during the first year of a trade suspension. Over a longer time frame, and assuming that the trade restrictions were permanent, the effects would tend to lessen gradually, reflecting the European economies' increasing adaptability in replacing Russian imports.

Restrictions on imports of Russian energy commodities

Russian energy commodities are the products where import restrictions could hit activity and prices in European economies harder, for three main reasons. First, the EU's imports of Russian energy products account for a sizeable share of its trade flows with Russia (72% of total imports and 51% of total imports and exports).

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sales between 44 sectors for the 65 countries in the sample (plus a "rest of the world" aggregate) and on their sales to final consumers in each country.

6   The estimates are based on three alternative values for trade elasticity: 0.75, 1 and 1.25. These values are in line with the short-run estimates of Boehm, Levchenko and Pandalai-Nayar (2021), as compared with the long-run elasticities determined at over 15 and 50 for natural gas and oil imports over a 12-year horizon according to Caliendo and Parro (2015). The elasticities of substitution between factors of production are 0.2 and 0.9, in line with Baqaee and Farhi (2021).

Chart 1
IMPACT OF RESTRICTING RUSSIAN ENERGY IMPORTS

GDP (L-H PANEL) AND INFLATION (R-H PANEL)

█ NATURAL GAS AND COAL   █ OIL
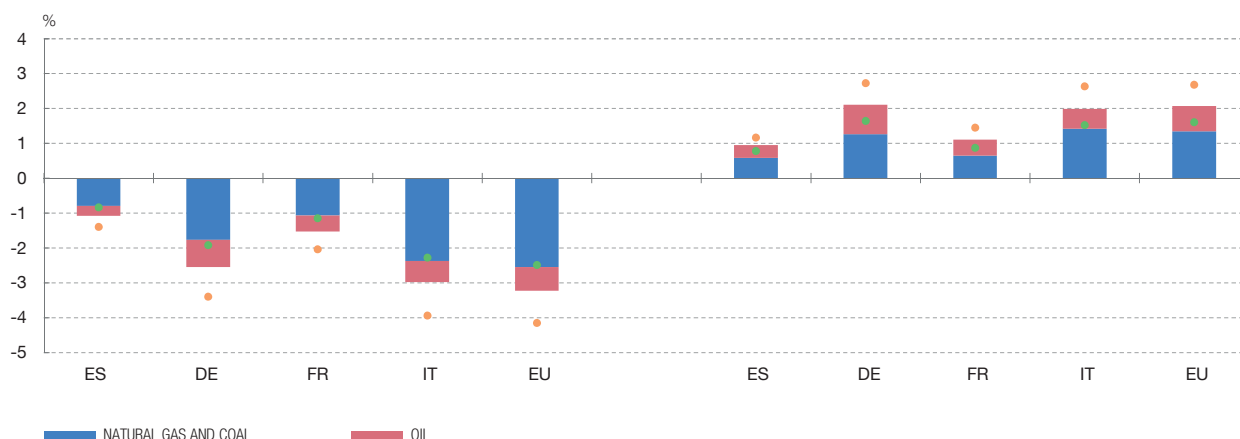
SOURCE: Banco de España.
NOTE: The bars show the impact on GDP and inflation of a cut-off in the supply of energy commodities from Russia, assuming a trade elasticity equal to 1. The yellow and green dots show the impact when considering trade elasticities equal to 0.75 and 1.25, respectively.

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Moreover, such imports represent a significant percentage of the total consumption of the EU's energy sectors (18% in the case of mined energy products, including gas and coal, and 9% in the case of refined oil products). Second, on the evidence available (Boehm, Levchenko and Pandalai-Nayar (2021)), the European economies' ability to replace Russian energy imports is likely to be limited in the short term. Thus, a hypothetical cut-off in supply would significantly reduce the energy available, while considerably increasing production costs. A restricted energy supply would curb sectors' productive capacity and at the same time drive up the price of other available energy sources, where demand would then be concentrated. Third, as energy is an essential input in the productive processes of most sectors, an increase in its cost would spread across all sectors of the economy, not only directly – owing to its use in their productive processes –, but also indirectly – and to a greater degree than in the case of other, less essential inputs – through customer-supplier relationships across different sectors.

With all of this in mind, the estimated impact on the Spanish economy of a suspension of Russian energy imports, based on the elasticities considered, would entail a fall in GDP of between 0.8% and 1.4% and a rise in inflation of between 0.8 and 1.2 percentage points (pp) over the first year, when compared with a scenario without such restrictions. In the scenario deemed most likely, the impact would take the form of a 1.1% drop in GDP, and a 0.9 pp increase in inflation (see Chart 1). With respect to the other EU economies, the impact would be significantly larger in the euro area's three main economies (Germany, Italy and France) and in eastern European countries,

given their greater dependence on Russian energy. Specifically, GDP in Italy, Germany and France would fall by an estimated 3%, 2.6% and 1.5%, respectively. The GDP of the EU as a whole would decline by between 2.5% and 4.2%, with the inflation rate rising by between 1.6 pp and 2.7 pp (see Chart 1). In any event, the scale of such impacts must be assessed with the utmost caution, given the enormous uncertainty over the future course of geopolitical events and the response of the European economies.

These impacts refer to a cut-off in the supply of all energy commodities from Russia. However, if the interruption of imports were to affect only mined energy products (which includes both natural gas and coal), the repercussions would be greater than in the case of a suspension of oil derivatives. Specifically, each sector would account for approximately 70% and 30%, respectively, of the total impact (see Chart 1).
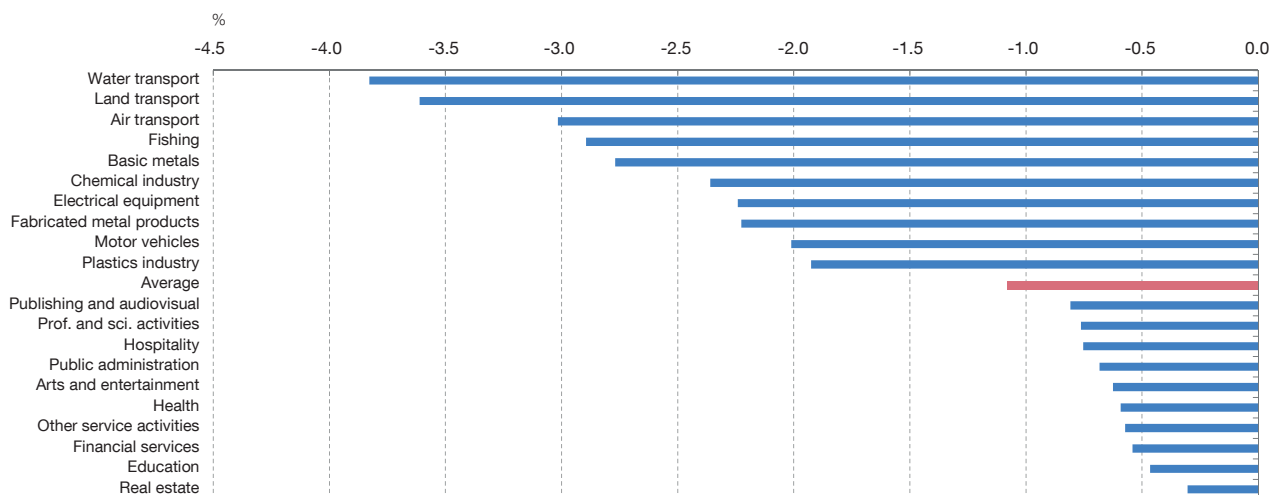
The impact would be smaller in the case of a suspension of the purchase of refined oil products, for various reasons. First, as noted above, Europe's dependence on Russian imports is greater in the case of natural gas than in that of oil. Moreover, when compared with oil, the available replacements for Russian natural gas are more limited. Infrastructure limitations restrict the EU's ability to replace the gas received via pipelines with imports of liquefied natural gas. Also, Russia has a more dominant position in the natural gas market than in the oil market, where competition is greater. Lastly, a third, highly relevant factor is worth noting, concerning the role of each of these different energy inputs in production chains. Natural gas and coal are inputs used more intensively in industries to be found at the start of production chains, such as the chemical industry, whereas oil products are consumed more by sectors positioned at the end of production chains (or even by final consumers). The impact of a reduction in the supply of natural gas is therefore reinforced as it spreads to other sectors along the production chain.

In sectoral terms, some of the more energy-intensive sectors of the Spanish economy, such as transport, heavy manufacturing and the chemical industry, would suffer a sharper fall in output (see Chart 2). At the other extreme, the activity of certain services sectors, such as real estate, would barely be affected. Nonetheless, as indicated above, the contraction in value added in each sector is due not only to the direct impact of rising energy costs, but also to the spillover of such direct effects through production chains. Thus, rising costs in certain sectors with a central role in production chains, such as transport and the chemical industry, would also be felt across all other sectors, regardless of their energy intensity.

Moreover, the propagation of such effects through production chains is not limited solely to sectors in the same country. Rather, the shocks suffered by the European suppliers of Spanish industries would also impact Spain's GDP and price levels. For instance, certain sectors of the Spanish economy, such as motor vehicle manufacturing and pharmaceuticals, are heavily dependent on customers and

Chart 2
SECTORAL IMPACT OF RESTRICTING RUSSIAN ENERGY IMPORTS

%

-4.5	-4.0	-3.5	-3.0	-2.5	-2.0	-1.5	-1.0	-0.5	0.0

Water transport
Land transport
Air transport
Fishing
Basic metals
Chemical industry
Electrical equipment
Fabricated metal products
Motor vehicles
Plastics industry
Average
Publishing and audiovisual
Prof. and sci. activities
Hospitality
Public administration
Arts and entertainment
Health
Other service activities
Financial services
Education
Real estate

SOURCE: Banco de España.
NOTE: The bars show the impact on the real GVA of the 10 most affected sectors and 10 least affected sectors in Spain if energy imports from Russia were suspended. The effects are simulated with a trade elasticity equal to 1.

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suppliers based in other EU countries. These sectors would therefore be indirectly exposed to output limitations on account of energy restrictions in other countries. Specifically, around half of the estimated decline in Spain's GDP as a result of the suspension of energy imports from Russia would be attributable to the impact via trade flows with other EU countries (see Chart 3).

Suspension of all other imports and exports between Russia and the European Union

Lastly, an additional exercise has been considered which assumes that, in addition to a hypothetical interruption of Russian energy commodity imports, the geopolitical tensions associated with the war lead to a complete cessation of Russia-EU trade. In such case, a suspension of EU exports to Russia is likely to have a smaller impact on the GDP of Spain and of other European countries than a cessation of imports. There are two reasons for this. First, the nominal value of the goods and services the EU buys from Russia is higher than the value of the goods and services it sells to that country (1% and 0.6% of GDP, respectively, albeit with notable differences across the different European economies). Second, unlike energy imports, a suspension of exports would not have any spillover effect through production chains attributable to a rise in the cost of intermediate inputs and the ensuing cascade effects. Indeed, the inflationary impact of a complete suspension of trade flows would be due to the import side, whereas an interruption of exports would have no significant impact on prices in the EU.

Chart 3
INTERNATIONAL PROPAGATION OF THE EFFECTS OF RESTRICTING ENERGY IMPORTS

GDP (L-H PANEL) AND INFLATION (R-H PANEL)
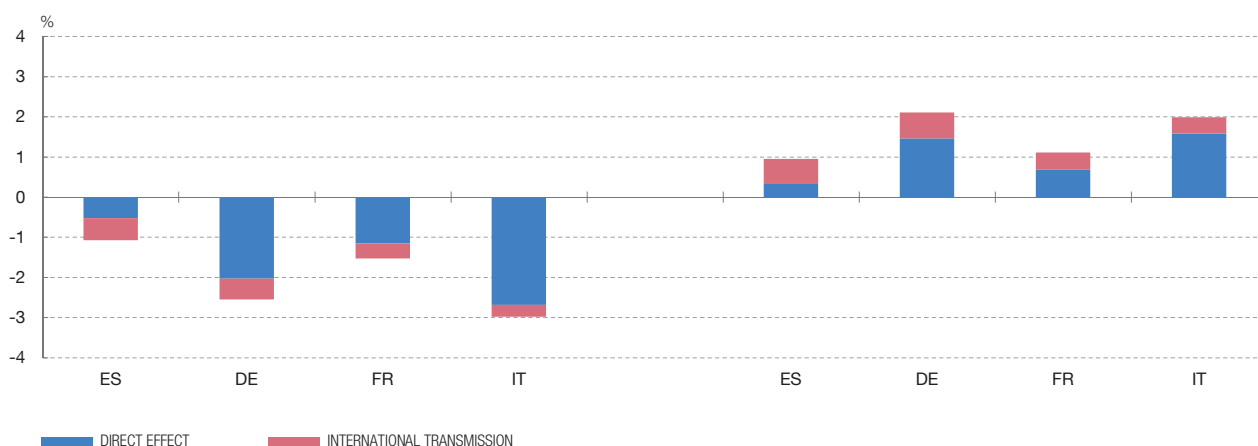
■ DIRECT EFFECT   ■ INTERNATIONAL TRANSMISSION

SOURCE: Banco de España.
NOTE: The bars show the impact on GDP and inflation of each respective component with a trade elasticity equal to 1. The red bars show the impact deriving from the imposition of sanctions between Russia and the other EU countries, excluding the country corresponding to each bar. The blue bars show the difference between international transmission and the total effect.

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In the case of Spain, the impact on GDP of a hypothetical total suspension of trade between Russia and the EU would be -1.8%.[7] In other words, it would entail a further drop of 0.7 pp with respect to the scenario in which energy imports are suspended. The suspension of all other imports and of exports would account for 0.3 pp and 0.4 pp, respectively, of this impact (see Chart 4). In terms of inflation, the total impact would stand at 1.4 pp, i.e. an additional effect of 0.5 pp with respect to the initial scenario, due entirely to the suspension of all other imports, given the above-mentioned absence of cascade effects in the case of exports. If the most restrictive scenarios in terms of the ability to replace imports and exports are considered, the total impact on the Spanish economy could entail a fall in GDP of up to 2.4% and a 1.7 pp increase in inflation (see Chart 4).

A qualitatively similar effect can be seen in the other EU economies. Nonetheless, as in the case of a suspension of energy imports, the impact would be significantly smaller in Spain. For instance, the additional negative impact on GDP of a suspension of all other imports from Russia would be 1.2 pp for the EU overall, as compared with 0.3 pp in the case of Spain. This difference would be relatively smaller as far as

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7   Note that this figure refers to a comparison with a scenario without armed conflict over one year as from the date on which trade flows cease, unlike the impact detailed in the sensitivity exercise in the Banco de España's latest projections, referring to a comparison with the baseline scenario over the course of 2022, which already factored in the effect of a slight rise in energy prices as a result of the Ukraine war, in line with the futures markets. For further details, see Box 1, "Macroeconomic projections for the Spanish economy (2022-2024)", "Quarterly report on the Spanish economy", *Economic Bulletin* 1/2022, Banco de España.

Chart 4

IMPACT OF A RESTRICTION OF ALL IMPORTS AND EXPORTS BETWEEN THE EU AND RUSSIA

GDP (L-H PANEL) AND INFLATION (R-H PANEL)
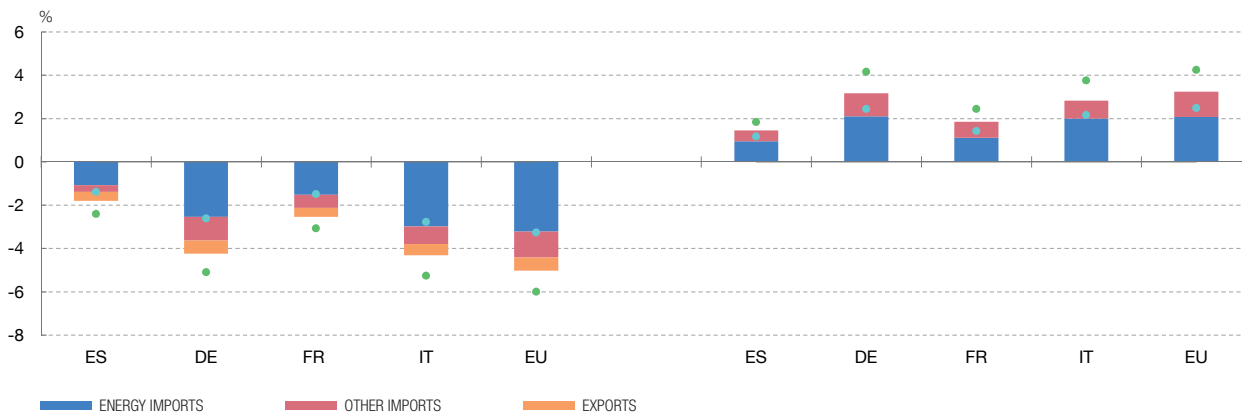
Legend: ENERGY IMPORTS | OTHER IMPORTS | EXPORTS

SOURCE: Banco de España.
NOTE: The bars show the impact on GDP and inflation of each respective component with a trade elasticity equal to 1. The blue and green dots show the total impact with trade elasticities equal to 0.75 and 1.25, respectively.

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exports are concerned, since the disparity across countries in the weight of sales to Russia is comparatively smaller than in imports of goods produced in that country. Specifically, the additional impact in GDP terms of a suspension of exports would be 0.6 pp in the EU overall, as opposed to 0.4 pp in Spain (see Chart 4).

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