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# Recent developments in goods imports in light of certain determinants

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## Rationale

Spanish goods imports grew in 2022 above what could be expected based on their traditional determinants (final demand and price competitiveness). It is therefore worth studying which additional elements underpinned purchases abroad.

## Takeaways

- Energy market tensions caused by the Russian invasion of Ukraine boosted energy imports, due to stockpiling strategies against possible supply problems and for re-export to other EU countries.
- Imports of goods with energy-intensive productive processes appear to have benefited from the loss of competitiveness of domestic production resulting from higher energy commodity prices.
- The strong import growth also seems to have stemmed from the shift in industrial production towards sectors with a higher import content, the demand for which would have increased due to changes in habits in the wake of the pandemic (e.g. pharmaceuticals, IT and telecommunications) and the recovery in mobility (e.g. textiles).

## Keywords

Imports, energy crisis, import penetration.

## JEL classification

F10, F14.

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## Introduction

Spanish imports of goods in real terms grew at a significant pace in 2022 overall (5.5%) after the 13.8% rebound in 2021, which followed the sharp 11.3% contraction recorded in 2020 at the height of the pandemic.[1] The strong dynamism of Spanish imports in 2022 was underpinned by the increase in final demand, against a background of recovering industrial production and gradually easing supply chain bottlenecks, while imports' loss of price competitiveness in 2022 appears to have made a negative contribution to import growth (see Chart 1.a). In particular, this loss of competitiveness reflected the stronger increase in import prices than in the GDP deflator, largely as a result of the sharp rise in the price of the energy commodities that the Spanish economy imports from abroad.[2] In any event, the impact of these relative price developments on the dynamism of imports in real terms appears to have been contained by the limited short-term capacity to replace imported energy commodities (Quintana, 2022). In fact, based on Customs data, energy products made a significant contribution to the growth of purchases abroad (see Chart 1.b).

In this setting, the contributions of final demand and price competitiveness to import growth in 2022 can be estimated based on the Banco de España External Sector Satellite Model (García, Tello, Gordo and Martínez, 2009).[3] Thus, final demand would have contributed 5.3 pp to the increase in imports, while the loss of competitiveness of imports would have subtracted 1.5 pp (see Chart 1.c). Imports appear to have risen 1.7 pp more than can be explained by final demand and price competitiveness developments alone. In other words, a positive and significant residual has been estimated for 2022, in contrast to the slightly negative residuals estimated for the years prior to the pandemic.[4] The remainder of this article analyses the different factors that could have contributed to goods imports increasing in 2022 by more than would be expected based on their traditional determinants.

## Additional elements underpinning goods imports in 2022

The growth of Spanish goods imports above that implied by their traditional determinants in 2022 appears to be the result of a set of relatively persistent, interrelated factors. In particular, three

1 This article focuses on real purchases of goods, which account for the bulk of total imports (84% of the total in 2022). Moreover, growth in aggregate imports of goods and services yielded a very small negative residual, against a background of a more gradual pick-up in tourism payments.

2 Another factor behind these changes in competitiveness was the depreciation of the nominal effective exchange rate of the euro.

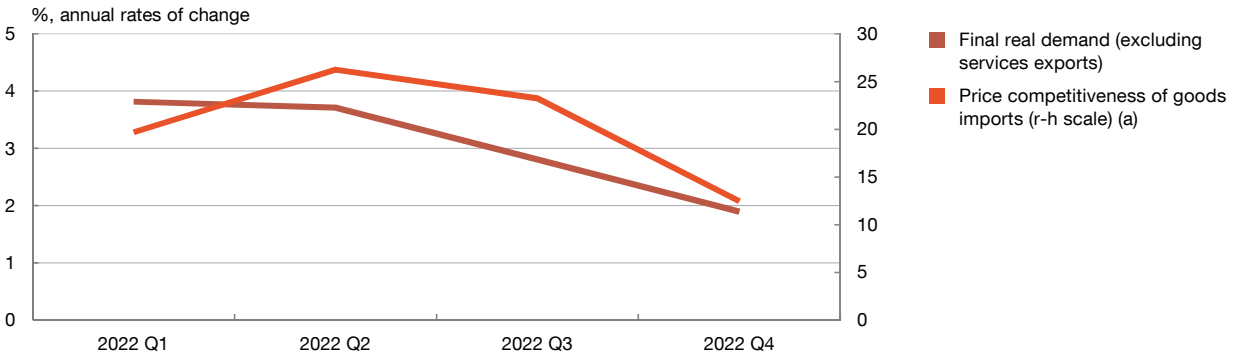
3 The determinants of goods imports in the External Sector Satellite Model are final demand (domestic demand and exports) and price competitiveness, defined as the ratio between the import deflator for goods and the GDP deflator. To estimate the equation, an error correction mechanism (ECM) is applied in a single stage using non-linear least squares. This method is based on the simultaneous modelling of the equilibrium relationship between the dependent variable and its long-term determinants and a correction mechanism for the temporary deviations from that equilibrium. In order to improve the fit of the equation, seasonal dummies and other dummies relating to periods of sharp exchange rate movements or structural changes are included.

4 During the health crisis, the residuals of the import equation were also positive, although the exceptional nature of the health shock and the highly volatile trade transactions in 2020 and 2021 warrant a cautious interpretation of these results.

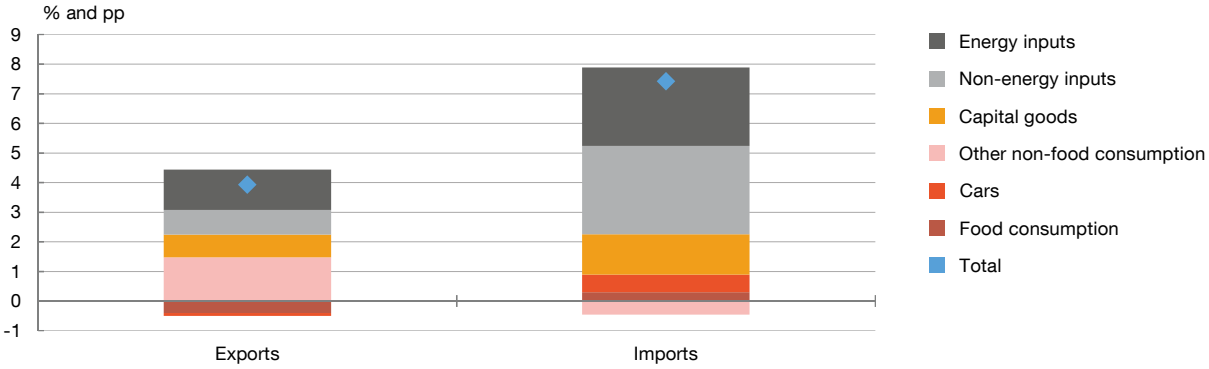
Chart 1

## Spanish goods imports grew more than would be expected based on their key determinants

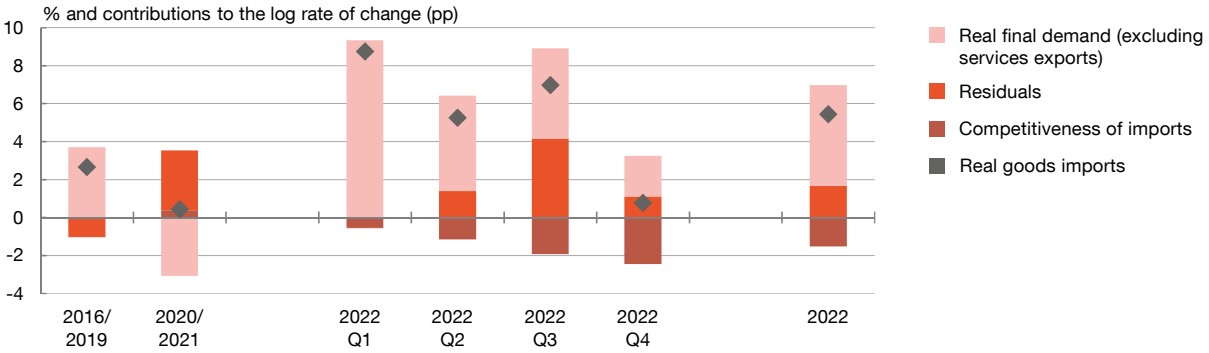
### 1.a Goods imports. Demand and price competitiveness




### 1.b Real goods exports and imports
Contributions to the real rate of change in 2022




### 1.c Real goods imports
Log rate of change



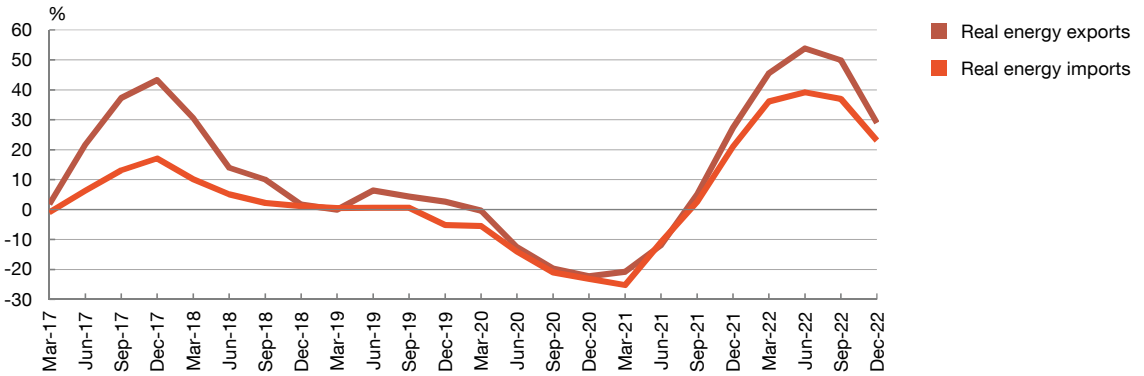

**SOURCES:** INE, Customs Department, Ministerio de Asuntos Económicos y Transformación Digital, and Banco de España.

**a** Positive (negative) rates of change indicate losses (gains) of competitiveness of imports vis-à-vis domestic production.

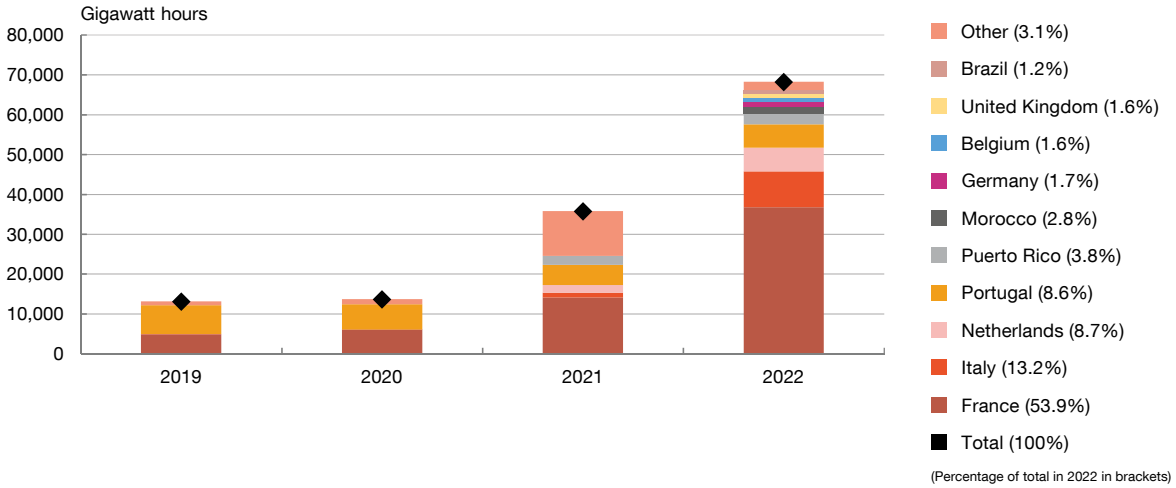
Chart 2

**Real energy commodity imports surged, partly on the back of re-exports of natural gas to Europe**

2.a External trade in energy products, in real terms (a)
Year-on-year rates of change based on four-quarter cumulative data




2.b Natural gas exports




**SOURCES:** Customs Department, Ministerio de Asuntos Económicos y Transformación Digital, and CORES.

**a** According to the external trade classification by usage groups of the Ministry of Economic Affairs and Digital Transformation.

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main factors can be identified based on the available evidence: (i) the buoyancy of energy imports, driven by stockpiling and re-export strategies in response to energy market tensions, (ii) the at least partial substitution of domestic production by imports in the most energy-intensive sectors, and (iii) the shift in industrial production towards sectors of activity with a higher import content.

First, the high dynamism of Spanish purchases of energy products in 2022, which increased by 23.1% in real terms, appears to have been an additional factor underpinning imports of goods (see Chart 2.a).[5] Part of the rise in energy imports owed to the recovery in activity and mobility, which in principle would be captured by the demand variable in the import equation. However, in

5 This rise allowed energy imports at end-2022 to substantially exceed pre-pandemic levels (by 27.6%), a significantly wider gap than for total goods imports (5.2%).

addition to these determinants, other developments appear to have boosted energy imports further and would explain, at least in part, the positive residual estimated in the import equation for 2022. In particular, the energy crisis, caused by the Russian invasion of Ukraine, led to a surge in energy prices and an unprecedented heightening of the risk of disruptions in Russian energy supplies, particularly natural gas supplies (Alonso, López, Santabárbara and Suárez-Varela, 2022). This encouraged EU countries to adopt stockpiling strategies and search for alternative supply sources. Against this backdrop, Spain has a certain advantage as an alternative source of supply for the European countries most dependent on Russian gas. First, its geographical location between the Atlantic and the Mediterranean allows for the supply of natural gas by sea from different international producer areas (e.g. Algeria). Second, Spain is the leading EU country in terms of availability of liquefied natural gas transport, storage and treatment infrastructures (Enagás, 2022). This comparative advantage boosted Spain's energy goods exports over 2022, with a particularly strong increase in re-exports of natural gas to other European countries (see Chart 2.b). Since Spain barely produces hydrocarbons, the spillover effect of these exports on imports is greater than for goods overall. Thus, these re-exports further buoyed purchases from abroad.

Second, imports may have received an additional boost from the (at least partial) replacement of domestic production by imports in the most energy-intensive manufacturing sectors, such as the chemical industry and manufacturing of metal products and non-metallic mineral products. Specifically, energy market tensions, exacerbated by the Russian invasion of Ukraine, affected European economies particularly strongly. European firms lost competitiveness vis-à-vis their non-euro area peers, less dependent on energy imported from Russia (Chiacchio, De Santis, Gunnella and Lebastard, 2023). Although Spain's energy dependence on Russia was relatively lower than that of other European countries, the global surge in energy prices also undermined Spanish firms' competitiveness vis-à-vis other non-European countries less dependent on energy imports (Quintana, 2022). Moreover, the pass-through of wholesale gas price rises to electricity prices was particularly marked in Spain during the first months of the war, due, at least in part, to the characteristics of Spain's electricity pricing system (Pacce, Sánchez and Suárez-Varela, 2021).[6]

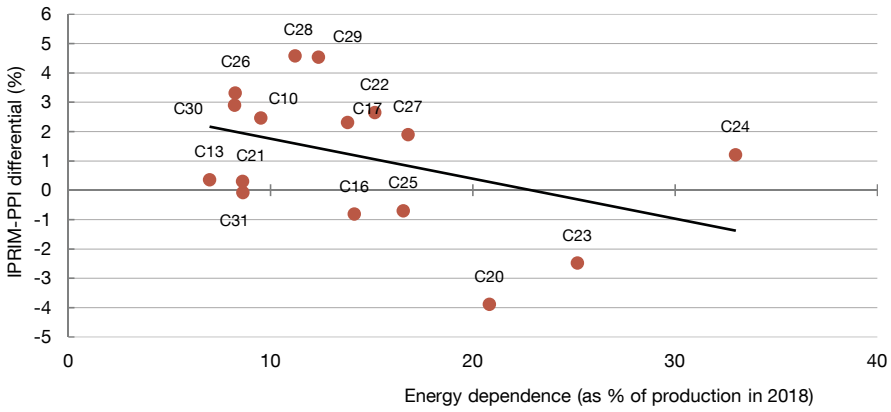
This loss of competitiveness could make it more profitable to substitute domestic production with imports manufactured using cheaper energy, thus reducing production in the more energy-intensive manufacturing sectors. On the available evidence, this substitution does indeed appear to have taken place in the Spanish economy, with imports growing faster than their usual determinants would suggest. The competitiveness of non-energy manufacturing sectors in Spain, estimated by the growth differential between industrial import prices (IPRIM, by its Spanish abbreviation) and domestic producer prices (PPI), deteriorated in the more energy-dependent sectors (see Chart 3.a). Further, looking at the sectors that lost competitiveness in 2022 and posted a negative IPRIM-PPI differential, it can be observed that the greater the loss of competitiveness, the less buoyant industrial production is in Spain (see Chart 3.b), and the higher the growth of imports (see Chart 3.c).

6 However, the adoption of the Iberian Mechanism and the deceleration of energy commodity prices, which in Spain is passed through more rapidly to consumer prices, has allowed the loss of competitiveness to be partly reversed in the last months of 2022.

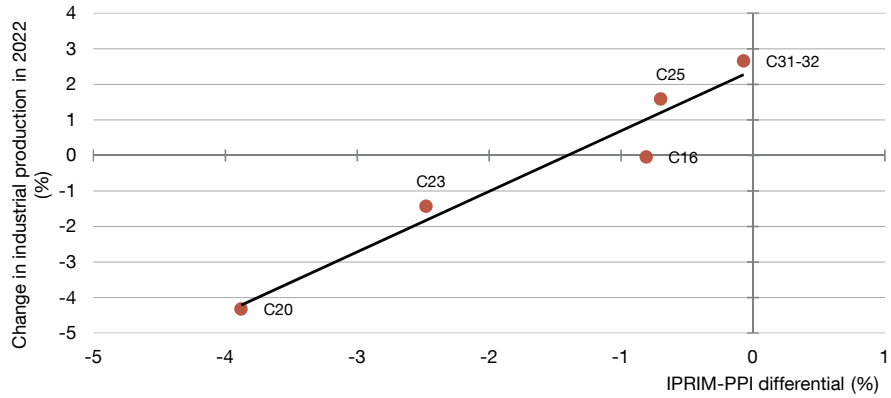
Chart 3

## Import competition increased in the more energy-dependent sectors (a)

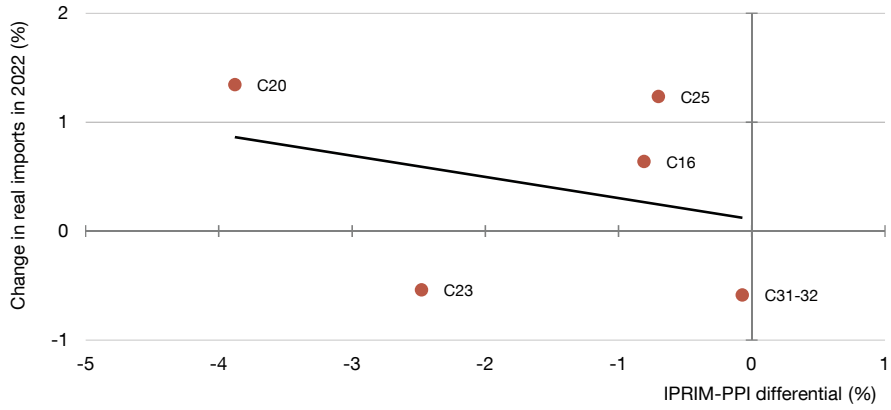
### 3.a IPRIM-PPI differential in 2022 vs. energy dependence




### 3.b Rate of change of IPI vs. IPRIM-PPI differential in 2022




### 3.c Rate of change of real imports vs. IPRIM-PPI differential in 2022




**SOURCES:** INE, Customs Department, Ministerio de Asuntos Económicos y Transformación Digital, and Banco de España.

**a** The following non-energy manufacturing sectors are included: C10: Food industry; C13: Textiles; C16: Wood and cork products; C17: Paper industry; C20: Chemicals and chemical products; C21: Pharmaceuticals; C22: Rubber and plastic products; C23: Other non-metallic mineral products; C24: Basic metals; C25: Fabricated metal products; C26: Computer, electronic and optical products; C27: Electrical equipment; C28: Other machinery and equipment; C29: Vehicles; C30: Other transport equipment; C31: Furniture; C32: Other manufacturing.

Third, another factor that appears to have contributed to imports growing above what their usual determinants would suggest is the greater buoyancy of industrial production in sectors with a high import content[7] (see Chart 4.a). This behaviour appears to have been driven by a variety of factors, including the gradual easing of supply-chain disruptions over the course of 2022, which prompted a recovery in the imports of inputs required for the production of goods with a higher import content. In addition, the demand for some of these goods has grown since the pandemic, which brought an increase in the consumption of pharmaceuticals and spurred the digitalisation of firms and home improvements to create more liveable spaces (García, Martín and Viani, 2020). Moreover, the end of the pandemic-related containment measures boosted the demand for textile products. Thus, imports were more buoyant in the manufacturing sectors whose production grew more strongly (see Chart 4.b), and had a higher import content (see Chart 4.c).

However, goods imports, which performed better, on aggregate, than predicted by their traditional determinants in 2022, mask a high degree of heterogeneity across different non-energy sectors, associated with the above-mentioned underpinning factors: import growth, industrial production growth, growth differential between industrial import prices and domestic producer prices, energy intensity and import content. Specifically, using cluster analysis techniques,[8] three groups of sectors can be identified on the basis of how these factors have behaved (see Table 1). The first group comprises sectors with the most energy-intensive production processes, which posted strong import growth but less buoyant domestic production, as part of this production was substituted by imports, given the competitiveness lost vis-à-vis other countries (wood and cork products, chemicals and chemical products, other non-metallic mineral products, basic metals, manufacture of fabricated metal products). The second group comprises sectors with a higher import content, in which domestic production and imports grew strongly owing to pandemic-related changes in habits and the subsequent return to normal activity (computer, electronic and optical products, pharmaceuticals and textiles), or the recovery in investment and production as bottlenecks eased (manufacture of electrical equipment and materials, machinery and equipment, transport equipment and vehicles). Lastly, the third group is more heterogeneous, with moderate changes in imports and industrial production (food, furniture, paper and plastics).

## Final remarks

Imports of goods in Spain grew more strongly in 2022 than would be expected based on aggregate changes in final demand and price competitiveness. According to the analysis set out in this article, the buoyancy of imports owes to three interrelated factors that present a high degree of heterogeneity across sectors. First, the growth in energy purchases abroad against a backdrop of energy market tensions which have prompted the re-export of energy products, in part thanks

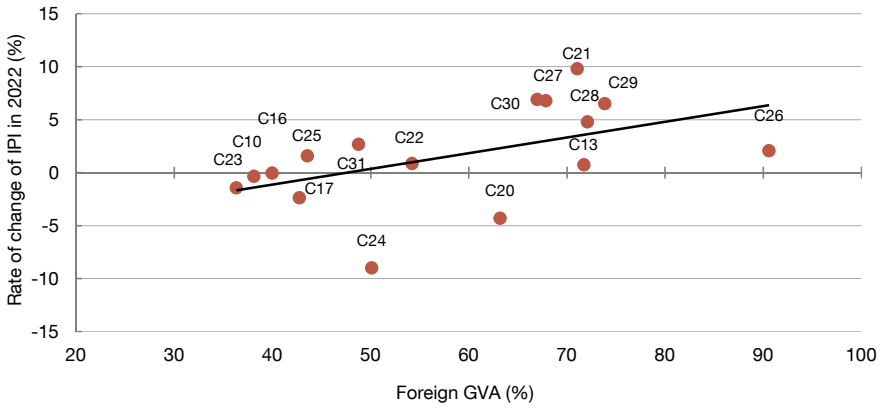
7 The import content of each manufacturing sector is obtained from the OECD's Trade in Value Added (TiVA) database, which provides the percentage of each sector's value added originating from abroad.

8 The groups are created using the "k-means" method, by which the 16 subgroups of non-energy manufactured goods are split into k groups or clusters. Each group has a centre of gravity that enables the observations closest to its centre and furthest from the rest to be identified. Elements are thus divided into groups whose elements are very similar to each other and very different from those in other groups. The "silhouette score" method is used to select the optimal number of clusters.

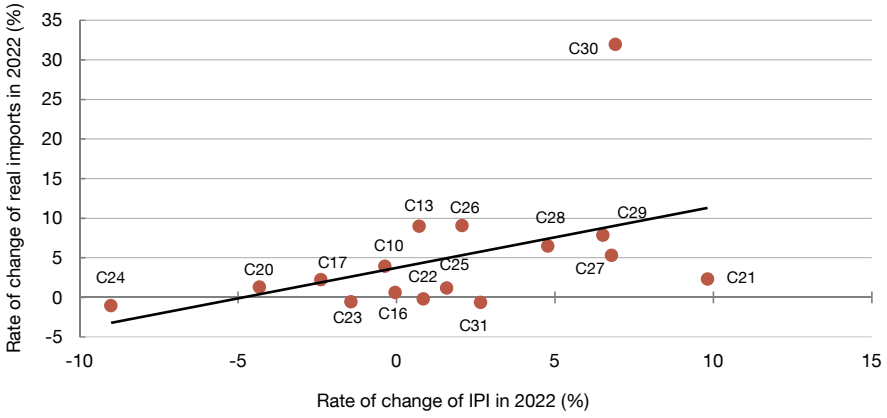
Chart 4

## Goods imports were boosted by the shift in production towards sectors with a higher import content (a)

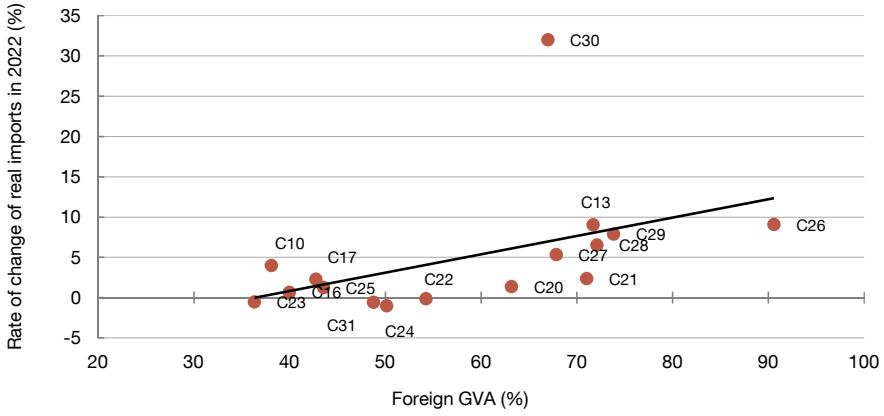
4.a Change in IPI in 2022 vs. imported content of non-energy manufacturing industries




4.b Change in real imports of non-energy manufactured goods in 2022 vs. change in IPI in 2022




4.c Change in real imports of non-energy manufactured goods in 2022 vs. imported content




**SOURCES:** INE, OECD, Customs Department, Ministerio de Asuntos Económicos y Transformación Digital, and Banco de España.

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Table 1
**Groups of non-energy manufacturing sectors based on cluster analysis (a)**

| Number of clusters | | Manufacturing sectors by national classificacion of products by activity (CPA) divisions |
|---|---|---|
| 3 | Group 1 | 16 Wood and cork products |
| | | 20 Chemicals and chemical products |
| | | 23 Other non-metallic mineral products |
| | | 24 Manufacture of basic metals; iron, steel and ferro-alloys |
| | | 25 Manufacture of fabricated metal products, except machinery and equipment |
| | Group 2 | 13 Textiles |
| | | 21 Manufacture of pharmaceutical products |
| | | 26 Manufacture of computer, electronic and optical products |
| | | 27 Manufacture of electrical equipment |
| | | 28 Machinery and equipment |
| | | 29 Vehicles |
| | | 30 Other transport equipment |
| | Group 3 | 10 Food industry |
| | | 17 Paper industry |
| | | 22 Rubber and plastic products |
| | | 31 Manufacture of furniture |

**SOURCE:** Banco de España.

**a** The groups have been identified using the "k-means" method, by which the 16 subgroups of non-energy manufactured goods are split into k groups or clusters. Each group has a centre of gravity that enables the observations that are closest to its centre and furthest from the rest to be identified. Elements are thus divided into groups whose elements are very similar to each other and very different from those in other groups. The “silhouette score” method is used to select the optimal number of clusters.

to Spain’s comparative advantages in terms of infrastructure and geographical location. Second, the substitution of domestic production by imports in the more energy-intensive sectors, given their loss of competitiveness vis-à-vis non-euro area countries less dependent on imported energy and, particularly in the case of Spain, due to the quick pass-through of wholesale energy prices to retail prices. Third, the shift in production towards products with a higher import content, where purchases abroad were more buoyant.

Looking ahead, there is great uncertainty as to how persistent these factors will be, mainly because of the geopolitical tensions and their impact on energy and commodities markets. In any event, the two energy-related underpinnings are expected to be relatively temporary. This diagnosis is based on the moderation in energy prices observed since the autumn of 2022, which is expected to continue in the coming quarters, according to futures market expectations. Indeed, the final quarter of 2022 saw a significant slowdown in energy imports, which fell in real terms with respect to the previous year, and continued to do so in early 2023. By contrast, the third element underpinning import growth discussed in this article could prove to be more persistent, since the demand for certain goods with a high import content, particularly IT and telecommunications products, will foreseeably continue in light of the growing digitalisation of the productive system and the expansion of the technology sector.

In any event, in the long term, import trends will be shaped by future developments in the global value chains. In particular, strategies aimed at pushing through the energy transition and achieving strategic autonomy could result in some regionalisation of global value chains, with greater diversification and proximity of foreign suppliers, more emphasis on supply-chain security and less on efficiency (Hernández de Cos, 2023). That said, these aspects are surrounded by considerable uncertainty and their potential impact on Spanish imports and exports, a priority area for the Banco de España,[9] is difficult to gauge.

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9 See https://www.bde.es/wbe/en/areas-actuacion/analisis-e-investigacion/contexto-y-prioridades/