Box. Imported inflation – How important is it?

Introduction

The multiple inflationary shocks that affected the domestic economy over the past few years were mainly ascribable to some transnational events, yet the local impact was strong, given the openness of Romania's economy. The extent to which these shocks altered domestic production processes, the inflationary impact of imported goods, as well as the changes in consumer preferences for domestic and imported goods are useful information for monetary policy makers, even if the available data stop at 2021.

This analysis aims to identify the origin of goods in the consumer basket, attempting to gain insight on imported inflation in 2018-2021. The endeavour cannot be all-encompassing, as the limited data availability does not allow an exact replication of consumer prices as shown by the CPI, but it is useful for drawing some general coordinates. The methodology applied is based on the decomposition used by Carluccio, Gautier, and Guilloux-Nefussi[1] to explain the disinflationary impact of France's imports from low-wage countries.

Theoretical framework

The consumer price index is compiled based on a basket comprised of products purchased by resident households in Romania for their final consumption. This contains goods, which are generally considered tradable between the domestic market and foreign markets, and services (usually provided locally), which cannot be imported or exported (non-tradables)[2]. Depending on the structure of household expenses, each good and service included in the consumer basket is assigned a weight that is directly proportional to the relative importance of that element for final consumption. The consumer price index can be written in a simplified form as:

$$p_t = \beta_t p_t^T + (1 - \beta_t) p_t^{NT} \quad (1)$$

where β_t is the share of goods, while p_t^T and p_t^{NT} are the logarithms of the price indices of goods and services respectively in the consumer basket. Goods can be divided further into domestic goods (D) and foreign goods (F), the latter holding the share η_t:

$$p_t^T = \eta_t p_t^F + (1 - \eta_t) p_t^D \quad (2)$$

To obtain the CPI inflation rate, the general price index is differentiated with respect to time:

1 Carluccio Juan, Gautier Erwan, Guilloux-Nefussi Sophie – "Impact des importations des pays à bas salaire sur l'inflation française", Document de travail no. 672, Banque de France, April 2018.

2 For the purpose of this analysis, all manufactured goods in the consumer basket are considered tradable, whereas all services are non-tradable.

$$\frac{\partial p_t}{\partial t} = \frac{\partial \beta_t}{\partial t} p_t^T + \beta_t \frac{\partial p_t^T}{\partial t} + \frac{\partial p_t^{NT}}{\partial t} - \beta_t \frac{\partial p_t^{NT}}{\partial t} - \frac{\partial \beta_t}{\partial t} p_t^{NT} = \beta_t \left(\frac{\partial p_t^T}{\partial t} - \frac{\partial \beta_t}{\partial t} p_t^{NT} \right) + \frac{\partial \beta_t}{\partial t} (p_t^T - p_t^{NT}) + \frac{\partial p_t^{NT}}{\partial t} \quad (3)$$

By replacing $\frac{\partial p_t^T}{\partial t}$ with a similar derivation of (2) and rearranging the terms, the following results are obtained:

$$\frac{\partial p_t}{\partial t} = \underbrace{\beta_t \frac{\partial \eta_t^T}{\partial t} (p_t^F - p_t^D)}_{substitution} + \underbrace{\beta_t (1 - \eta_t) \frac{\partial p_t^D}{\partial t}}_{domestic} + \underbrace{\beta_t \eta_t \frac{\partial p_t^F}{\partial t}}_{foreign} + (1 - \beta_t) \frac{\partial p_t^{NT}}{\partial t} + \frac{\partial \beta_t}{\partial t} (p_t^T - p_t^{NT}) \quad (4)$$

In this representation, the first three terms are the channels of interest for this analysis, whereby goods, imported or not, can drive inflation in Romania:

- the substitution channel measures how changes in consumer preference between domestic goods and foreign goods (change in the η coefficient) affect inflation;
- the domestic channel reflects the dynamics of prices for locally produced goods; these, however, can have various causes, including external ones, for example in response to the competitive pressure exerted by imports or to the fluctuation of prices for some imported inputs;
- the foreign channel is the result of the actual change in imported goods prices, proportional to the share they hold in customer preferences.

The other two terms in equation (4), which are not addressed in this box, encapsulate the effects of the change in services prices (the non-tradable CPI component), and of households' shift from the consumption of goods to that of services, respectively. This last channel is all the more important in the case of emerging economies, where generally there is a trend of consuming more services to the detriment of goods, as the purchasing power increases.

Database

This analysis uses information (values and quantities) from the Prodrom database on the production of industrial goods in Romania in 2018-2021, as well as the Comext/Prodcom database, from which imports of each good were extracted for the same period. The calculations were made at the most disaggregated level of the statistical classification of products by activity (CPA), correlated with the statistical classification of economic activities in the European Community (NACE). The goods covered are related to NACE activities 10-33 (corresponding to manufacturing), which discards from the outset most energy and agricultural goods.

The Prodrom database contains approximately 2,500 products made in Romania for each year in the period under review. The only goods retained were those that can be used for final consumption, i.e. between 1,400 and 1,500 goods each year.

The goods considered as intended for consumption were those contained in the CPA-COICOP correspondence scheme[3]; although some of them can also be used as intermediate goods, the distinction by use is not possible, so that all goods that could go into final consumption were considered to have that purpose[4].

The next step consisted in harmonising the units of measurement for each good in the two databases and keeping the products that allowed expressing the quantities produced and traded in the most common units of measurement (kilograms/tonnes, pieces, litres, pairs, square metres, and cubic metres), thus making it possible to compute a price. The sample resulting from this data processing contains, each year, over 1,000 consumer goods for which domestic production, imports or both exist, and for which average prices per physical unit of measurement can be calculated (Table A). It is worth mentioning that the prices thus obtained are not the final prices paid by consumers for those goods, but producer or import prices. The final price includes, in addition, the costs and mark-ups in the distribution chain, fees, and excise duties.

Table A. Structure of the sample of goods

CPA code	Group	No. of products	Share in HICP basket (2021)
10-12	Food products, including beverages and tobacco products	248	20.1%
13-15	Textiles, wearing apparel, and leather and related products	235	5.1%
16-18	Wood and products of wood, paper and paper products, and printing and recording services	76	0.9%
19	Coke and refined petroleum products	11	1.7%
20-21	Chemicals and chemical products, and basic pharmaceutical products and pharmaceutical preparations	88	5.1%
22-23	Rubber and plastic products, and other non-metallic mineral products	113	1.3%
25	Fabricated metal products, except machinery and equipment	120	0.9%
26-27	Computer, electronic and optical products, and electrical equipment	124	1.7%
28	Machinery and equipment n.e.c.	39	0.3%
29-30	Motor vehicles, trailers and semi-trailers, and other transport equipment	37	1.5%
31-32	Furniture and other manufactured goods	88	1.2%

The domestic consumers' propensity for imports (the η coefficient in equation 2) can be determined by using the quantities produced and those imported for each product in the sample. To establish a connection between goods in the economy and the HICP consumer basket[5], each product was assigned a share depending on the CPA-COICOP correspondence table, while some working hypotheses needed to be imposed. Specifically, when several goods are classified under a single COICOP code and, conversely, when a product falls within several consumption purposes, the shares shall be attributed evenly. For example, the consumption group

3 Available at https://showvoc.op.europa.eu/

4 Provided that the consumption of any type of good will be divided between final and intermediate in a similar way regardless of origin, this assumption should not bias the results.

5 There is no such detailed weighting structure available for CPI.

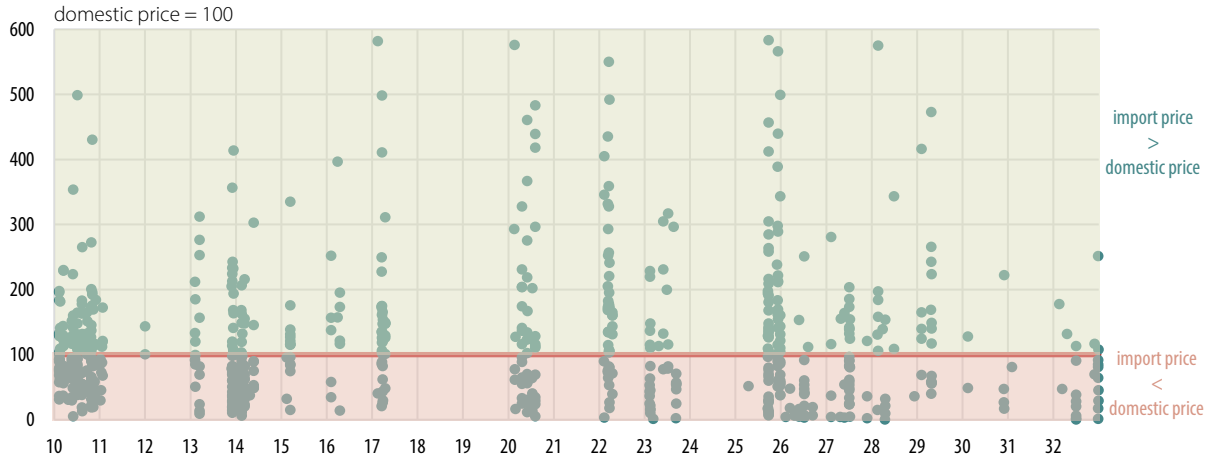
05.3.2.1 "Food processing appliances" includes products manufactured under CPA codes 25.99.12 "Table, kitchen or household articles and parts thereof, of iron, steel, copper or aluminium" and 27.51.21 "Electro-mechanical domestic appliances, with self-contained electric motor". Hence, each of the two products shall be assigned half of the HICP share for COICOP 05.3.2.1.

The industrial goods in the sample cover, according to the weights thus distributed, approximately 40 percent of the HICP basket for 2018-2021. Out of the 1,000 products, approximately a quarter belong to the food and beverages segment and account for more than a third of the consumption share covered by the sample in accordance with the harmonised structure; a similar number of goods are manufactured in the light industry, but their share in the consumer basket is significantly lower. In the other half of the sample, numerous goods are manufactured by the fabricated metal products subsector, yet they have little relevance for consumption; chemical products (detergents, cleaning products, cosmetics, etc.) and pharmaceuticals hold a larger share in this respect.

Results

Looking at their levels, import prices of food are overall slightly lower than domestic prices in all the four years under review; at group level, import prices are generally higher in the manufacture of oils and milling and bakery products, relatively similar to domestic prices for dairy products and lower than domestic prices in the processing of meat, fish, fruit and vegetables or in the manufacture of sugar. In the light industry, import prices are considerably lower than domestic prices of wearing apparel, but closer in the manufacture of footwear. As for the other non-food items, imports are generally more expensive (chemicals, fabricated metal products or the automotive industry)[6] (Chart A).

Chart A. Average prices of consumer goods (2021)



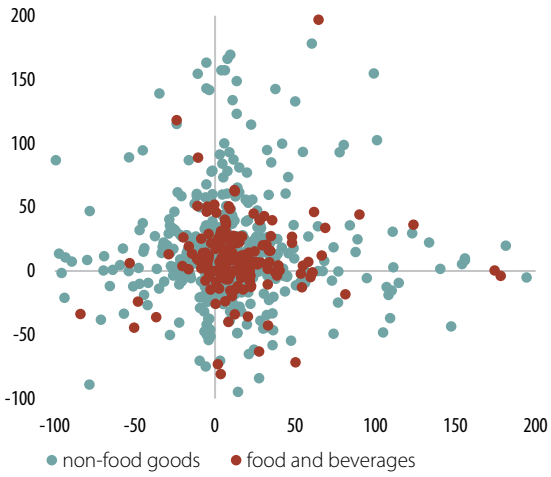
Note: The OX axis shows the CPA code of the product; the sample includes goods for which both domestic and import prices could be calculated; prices are calculated in EUR/kg, EUR/l, EUR/piece, EUR/pair, EUR/sqm or EUR/cbm; values below 100 on the OY axis indicate that the import price is lower than the domestic price and vice versa; for a better representation, products with import prices over six times higher than domestic prices were excluded.

Source: NIS, Eurostat, NBR calculations

6 The results, currently calculated at disaggregated level, are broadly in line with those presented in Box 1. "External influences on the inflation rate in Romania – several coordinates" in the November 2022 *Inflation Report*.

In terms of dynamics, price developments show increased homogeneity from one year to the next. In this case, the average rates of change (for the product sample as a whole) are higher for imported goods in 2019 and 2021, but significantly lower in 2020 (an atypical year, marked by the outbreak of the COVID-19 pandemic). The trend was chiefly ascribable to the evolution of food items, as for 60 percent of products in the sample, those with domestic origin recorded higher price hikes in 2020 than import prices, possibly on account of the more fragile domestic supply chains as compared to international supply chains of main retail networks. As for non-food items, trends are not clear and persistent in terms of price dynamics, the rates of change of domestic and external prices being relatively similar (Chart B).

Chart B. Price dynamics in 2018-2021



Note: The OX axis shows the domestic price dynamics in the 2018-2021 period, while the OY axis shows the import price dynamics; the sample includes goods for which there are both domestic and import prices in 2018 and 2021.

Source: NIS, Eurostat, NBR calculations

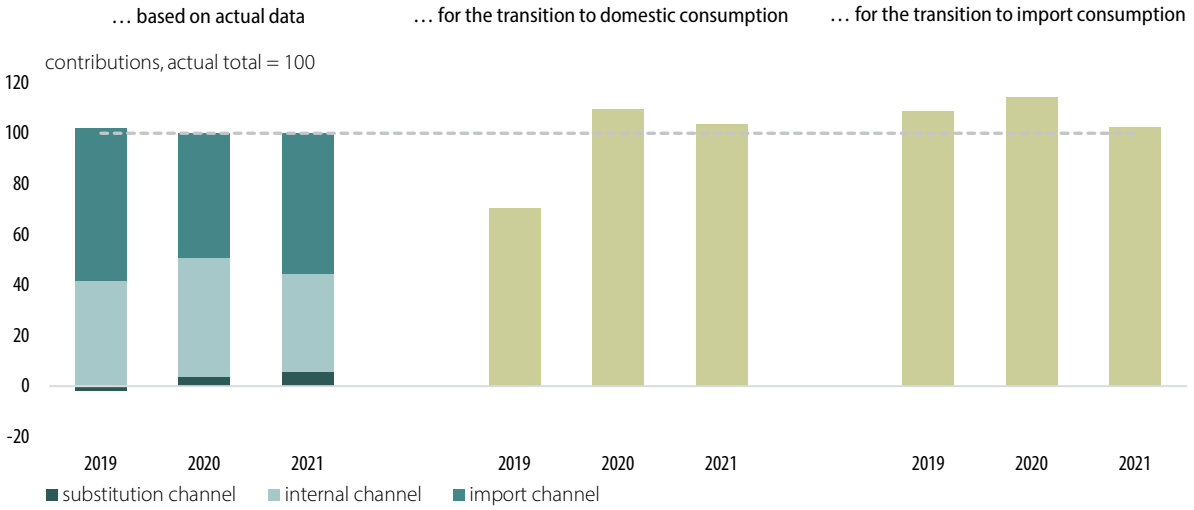
In what concerns the preference for imports, this was calculated for each individual good as a ratio of the imported quantity, in physical units of measurement, to the sum of the imported quantity and the domestic supply of that specific product[7]. In the food industry, despite the prevalence of locally produced goods, it is worth noting that the preference for imports rose steadily from one year to the next, highlighting the importance of the price factor in the consumption decision. In the light industry, the import propensity is clear, hovering around 75 percent (slightly higher for wearing apparel than for footwear). The propensity for imports of other non-food items is also, in general, significantly above 50 percent, despite the higher prices; this is indicative of non-price competitiveness issues of domestic products, which probably do not meet consumers' quality requirements appropriately.

These elements can be used to approximate a decomposition of consumer goods inflation according to the methodology presented in the first section. The three-year results are highly robust: in line with expectations, out of the three matters of interest, the substitution channel makes the lowest contribution (less than 7 percent of their amount), being positive in 2020 and 2021 and slightly negative in 2019. The negligible effect is due to the very slow change in preferences in favour of imported goods, in other words, the item $\frac{\partial \eta_t^T}{\partial t}$ in equation (4) has low values, but also to the fact that, at aggregate level, the differential between import prices and domestic prices is broadly offset – negative for food items and wearing apparel, positive for the other goods. The domestic channel contributes by almost 40 percent to the inflation thus calculated, whereas the foreign channel makes contributions in a range from 50 percent to 60 percent. In the latter case, the contribution was expected to be higher, given the larger

7 This calculation method will probably overestimate the import propensity, as it cannot separate the imported goods intended for re-exportation.

share in HICP. The sum of contributions of the three channels is slightly higher than that of the goods component of the adjusted CORE2 basket for each of the three years, but the emergence of discrepancies was predictable, given the limited sample, as well as the assumptions made, in the absence of concrete information, to determine the propensity for imports and their shares in the consumer basket.

Chart C. Contributions to inflation in the consumer goods segment…



Note: Tobacco, motor fuels and medicines were excluded, in an attempt to replicate the structure of the adjusted CORE2 basket (goods) but also due to the particular nature of the final price-setting mechanism for these goods (excise duties, regulations, etc.).

Source: NIS, Eurostat, NBR calculations

Finally, a counterfactual exercise was carried out to assess a decision on the transition to the exclusive consumption of imported goods and domestically produced goods respectively (inflation developments are analysed solely in the year the transition takes place; in the following years, it is very likely that the additional demand surplus/deficit would change the observed prices substantially). In order to ensure the comparability of products in terms of quality, the transition was carried out only for goods whose average domestic price/import price is equal to at least half of the other price, thus excluding the products for which substitution is not feasible (for instance, the average import price for printers is nearly four times higher than the average domestic price; in this case, it is almost certain that the difference of quality will not allow import replacement)[8].
The results suggest that such a decision mainly has inflation-fuelling effects. Assuming a migration to consumption based exclusively on imports, the counterfactual inflation rate would be between 2 percent to 14 percent higher than the actual one. The substitution towards domestically produced goods has similar results for 2020 and 2021 – a rate that would be higher by 3 percent and 9 percent[9]; in 2019, the inflation corresponding to the decision on the consumption of domestically produced goods would have been lower than the actual inflation – an explanation may lie with consumers' propensity at the time for

8 Implicitly, the substitution covers only those goods both traded internationally and produced locally, so that unit prices can be calculated in both cases.

9 The positive percentage differences correspond to increases in goods inflation of up to 0.5 percentage points (for the substitution to both locally produced goods and imported goods).

imported goods, which are better in qualitative terms, in line with the positioning of the economy at the peak of the business cycle. As a result, having the option to choose between imported goods and domestically produced goods, consumers have the opportunity to optimise, to a certain extent, the structure of expenses, while also taking into account the quality differences, which leads to a generally lower inflation rate (Chart C).

Conclusions

This exercise was aimed at presenting some characteristics of consumer goods inflation in Romania, with a focus on the origin of the products and the differences between domestically produced and imported goods. The findings based on the available data pointed to a price differential in favour of imported goods manufactured by the food and light industries, and opposite differentials in the other cases. In terms of dynamics, no systematic differences were seen in price developments, whereas the propensity for imports follows a slightly upward trend in the period under review. Contributions to inflation rate, albeit marginally higher for imports, are generally proportional to consumers' preference for the origin of goods (domestically produced/imported). A counterfactual exercise showed that the change in consumer behaviour consisting in replacing the actual basket composition with one based exclusively on locally produced goods or imported goods would not be beneficial, leading, in most cases, to a higher inflation rate in the year the transition would take place.

Future research avenues include the analysis of the other two inflation components, linked to non-tradables in the consumer basket, the breakdown of the influence of imported goods by country of origin and its level of development or the adjustment of produced and imported quantities based on their destination, an endeavour that will be possible once with the publication of the symmetrical inflow-outflow tables for the 2016-2020 period.