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# How globalisation affects inflation

Inflation is accelerating sharply in France and the euro area (5.8% year-on-year and 8.1% respectively in May 2022), and even more so in the United States and the United Kingdom, under the influence of global variables, mainly energy and food prices, and disruptions in global value chains. This article discusses the causes of inflation by re-examining the relationship between inflation and globalisation. Globalisation exerted downward, but quantitatively limited, pressure on average euro area inflation up to 2019. Nevertheless, the influence of external shocks on the volatile components of the consumer price index has increased over the last decade. The current strong inflationary pressures appear to constitute a continuation of the globalisation process that began in the 1990s. In the longer term, the question of whether the globalisation process will continue to progress and what impact it will have on inflation remains open.

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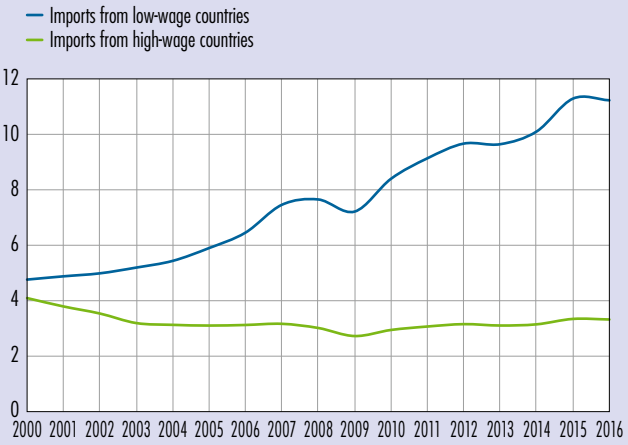
JEL codes
E52, F41,
F44, F62

**9% in 2000; 15% in 2016**
share of imported goods
in euro area household consumption

**8.1%**
year-on-year inflation rate in the euro area
in May 2022

**Share of imported goods in euro area household consumption, 2000-16**

(%)




Source: European Central Bank (2021a).

Inflation started to rise in 2021 in most countries, following almost two decades of moderation. There is consensus that the main drivers of current inflation are related to global variables, in particular disruptions in global value chains, input shortages in key manufacturing sectors, and rising energy and food prices. Aside from current discussions about whether these shocks are temporary in nature and whether inflation will normalise once the effects of the pandemic and geopolitical tensions have subsided, the question of the medium-term impact of globalisation on price dynamics remains open (Blanchard, 2020)

This article aims to contribute to current debates by re-examining the relationship between globalisation and inflation. In an open economy, external shocks affect domestic economic and financial conditions. Therefore, the question of whether the globalisation process will continue to progress and what long term impact will it have on inflation remains crucial. In order to shed light on this issue, this article discusses the following questions: what are the channels through which globalisation affects inflation? To what extent was globalisation responsible for the pre-pandemic low levels of inflation? What can we learn from the past to better understand the current situation?

## Globalisation exerted downward pressure on inflation between 1995 and 2019

We illustrate the discussion with an analysis of euro area countries' inflation dynamics during 1995-2019. We study the extent to which globalisation explains the particularly low levels of inflation recorded during the last decade. This has been a long-standing concern for central banks, as exemplified by the fact that the European Central Bank (ECB) devoted attention to globalisation in the context of its 2021 monetary policy strategy review (ECB, 2021a).

There is a widespread view among economists, confirmed by the findings of this article, that globalisation has had a negative but quantitatively small impact on headline euro area trend inflation over 1995-2019. The impact of globalisation has however been larger on short-term business cycle fluctuations. Importantly, the influence that global variables exert on inflation in euro area countries increased after the Great Financial Crisis of 2008-09. In particular, external shocks in the form of movements in oil prices, exchange rate shocks and global value chains had a greater impact for the 2008-19 sub-period than for 1995-2007 (in technical terms, our estimates show a higher transmission of these shocks to euro area inflation).[1] Our panel data approach confirms previous results on the role of oil prices while highlighting the additional impact of global variables, resulting from the increasing openness of economies. Global variables affect headline inflation but have a smaller impact on core inflation (i.e. excluding energy and food), indicating that openness affects the most volatile components of the price index.

Therefore, the current strong inflationary pressures linked to rising global commodity prices and disruptions in global value chains (Akinci et al., 2022) appear to be a natural continuation of the process of openness that started in the late 1990s and has gathered momentum over the past decade. Conversely, in the case of "de-globalisation", the upward pressure on inflation in the medium term is expected to be modest, also because certain effects linked to the digitalisation of economies, which is itself related to globalisation, would likely not revert.

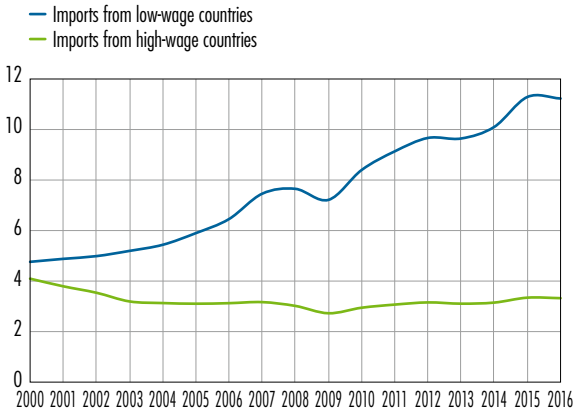
## 1 The "hyper-globalisation" of the early 2000s

The globalisation process that took place in the early 2000s has been described as the era of "hyper-globalisation". Growing global trade integration (a landmark of which was the creation of the World Trade Organisation – WTO – in 1995), the reduction in transport and communication costs, the massive development of global value chains and the increasing role of multinational companies have all contributed to this development. The structure of international trade has changed dramatically, with emerging economies, particularly in Asia, accounting for an unprecedented share of world trade values. These structural changes have profoundly affected production processes and consumption patterns worldwide.

1 Diev, Kalantzis, Lalliard and Mogliani (2021) also highlight the role played by oil and agricultural prices in explaining the difference in inflation between before and after the 2008-09 crisis using aggregate euro area data.

C1 Share of imported goods in euro area household consumption, 2000-16

(%)



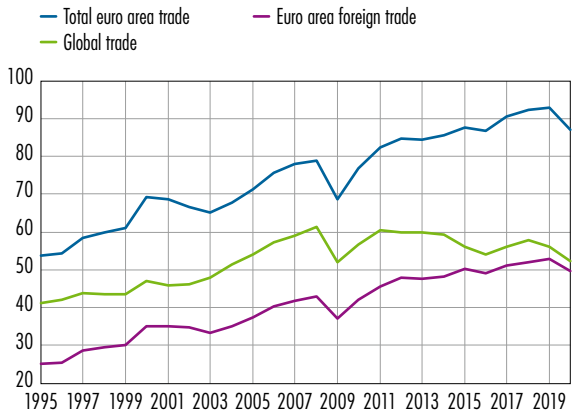

Source: European Central Bank (2021a).

Chart 1 shows that the share of imported products in total euro area consumption expenditure on goods almost doubled, from 9% to 15% between 2000 and 2016. All of this increase concerned goods from "low-wage" countries (see the blue curve).

Global trade flows (see Chart 2) have increased substantially since the late 1990s, and much faster than GDP in the early 2000s, to stabilise in the aftermath of the Great Financial Crisis of 2008-09. The crisis seems to mark a regime change, with consequences for the inflation process, in particular by displaying a stronger correlation between the inflation rates of different countries after the 2008-09 crisis (Cirarelli and Mojon, 2010; Forbes, 2019; ECB, 2021a). Despite a certain slowdown in globalisation due to protectionist tendencies with the US-China trade war, the legacy of the period of hyper-globalisation has been a deeper and lasting degree of openness in most economies.

C2 Trade openness of the euro area and global trade, 1995 2020

(%)




Sources: European Central Bank and World Development Indicators; authors' calculations.
Notes: Trade openness is calculated as the ratio of imports and exports of goods and services to GDP of the area in question.
For the euro area, the "foreign trade" curve includes only non-euro area trade.
"Total euro area trade" also includes foreign trade between euro area countries.

## 2 Globalisation and inflation: mechanisms

It is useful to organise the discussion by distinguishing two types of effect:

- **direct effects**, resulting from the increased availability of new and cheaper consumption goods;
- **indirect effects**, affecting the price-setting behaviour of firms through changes in the competitive environment, the availability of production inputs, and the impact on labour markets.

### Direct effects: access to imported consumer goods

Lower trade barriers provide consumers with access to new and cheaper goods, being the main source of welfare gains from international trade (Costinot and Rodriguez-Clare, 2014).[2] Chart 1 shows that there has been a massive shift in spending towards goods from low-wage countries. To what extent has it contributed to the changes in euro area consumer price dynamics?

The direct effect of the increase in imports can itself be broken down into two components:

1) An **imported inflation effect**, measured by the difference between domestic and imported goods' inflation rates. The greater the weight of imported goods in the consumer basket, the more their inflation rates will affect euro area inflation;
2) A **substitution effect** stemming from differences in price levels between domestic and imported goods. When euro area consumers continuously shift their spending towards cheaper goods, such price differences affect

2 Fontagné (2021) notes that the Eurobarometer (2019) indicates that globalisation is seen as offering a greater diversity of goods and services (54% of respondents) and cheaper products (49% of respondents).

the growth of the average price level (see Appendix 1 for the derivation of the relevant formulas).

In previous research we found that **the effect of imported inflation** has been positive but close to zero over the last two decades, both for the euro area (ECB, 2021a) and for France individually (Carluccio et al., 2018a and b). The reason for this result lies in the fact that prices of imported goods from low-wage countries have risen at a very similar, though slightly faster, pace than those of domestically produced goods, leading to an inflation differential close to zero. Such adjustments can be seen as the result of a catching-up process whereby prices in low-income countries converges to those of higher-income countries as these economies integrate into the world economy.

The substitution effect was much larger, given the large differences in price levels between domestic and low-wage country goods (ECB, 2021a). Carluccio et al. (2018a), for France, estimate that the impact on headline inflation was of around 0.12 percentage point (pp) per year on average for the period 1994-2014.[3] Bai and Stumpner (2019) estimate that a tradable good' price index fell by 0.19 pp per year for US consumers over the 2004-15 period due to the increased availability of product varieties stemming from imports originating in China. These figures are significant given the level of inflation (close to 1% per year) in these economies during the relevant periods. Note that measuring the substitution effect requires making strong assumptions about consumer preferences. Thus, the above figures should be interpreted as depending on the specific utility function used in those studies (see the papers for details).

The euro area Harmonised Index of Consumer Prices (HICP) inflation mainly captures the impact of imported inflation. Indeed, by construction, HICP inflation is a weighted sum of the inflation of its different components. Change in the structure of consumption (i.e. a higher share of imported goods) only affect changes in the index if the inflation rates of each type of good (local or imported) differ. This implies that, even if the HICP is a chained index,[4] thereby preventing the even larger biases for fixed structure indices (Boskin Commission, 1996),[5] the change in the index between two periods t and t+1 results from fluctuations in inflation rates. In addition, the inclusion of new goods in the index is taken into account in such a way that their impact is likely to be underestimated (Lequillier, 1997).

## Indirect effects: costs, wages and price-setting behaviour

The **indirect effects** affect inflation through the way in which the price of goods produced by euro area firms respond to foreign shocks.

Globalisation allows firms' participation in global value chains to import intermediate inputs and facilitates the import of capital goods. Both of these factors are associated with increases in productivity (see for example Halpern et al., 2015). At the same time, precisely because integration allows firms to relocate parts of the production process to countries with lower wages, it reduces the bargaining power of domestic workers and tends to moderate wage increases (Carluccio et al., 2015). Both effects reduce production costs. Moreover, economic integration increases competitive pressures for domestic firms, causing smaller firms to exit and limiting the ability of surviving firms to raise prices (Amiti et al., 2019). Both of these effects imply that price-setting strategies are partly determined by the behaviour of foreign suppliers and competitors, thus creating a link between domestic prices and overseas economic developments. The data show that the competition effect has reduced producer price inflation in the United States (Auer et al., 2013), France (Carluccio et al., 2018a) and the euro area (ECB, 2021a), in this latter case with estimates close to 0.16 percentage point per year on average over the 2000-16 period.

3 These price differences should be considered as upper bounds, as they can be determined to some extent by quality differences.

4 The shares of expenditures are revised annually for the calculation of this weighted sum.

5 More technically, a distinction is made between HICP-type indices and "cost of living" indices. The latter are derived from economic theory and provide the difference in money required to obtain the same level of utility between two periods, thus taking into account substitution effects and also other sources of welfare such as access to a larger number of varieties. For a discussion in the context of imports, see Box 6 of ECB (2021a) and for a overall discussion Chapter 5 of ECB (2021b).

Box 1

### The Phillips curve

In order to obtain a more complete understanding of the effects of globalisation on inflation, both direct and indirect, we use the standard tool for analysing the determinants of inflation: the Phillips curve It is a reduced form equation relating inflation to the level of economic activity. It can be represented by:

$$\pi_t^{EA} = a\, E_t\pi_{t+1} + b\, \pi_{t-1} + \kappa(y_t - \bar{y}) + \gamma_t \qquad (3)$$

Where $\pi_t^{EA}$ is euro area headline inflation, $E_t\pi_{t+1}$ are inflation expectations, $(y_t - \bar{y})$ is the "output gap", i.e. the ratio of actual output to potential output in a given period. $\kappa$ is the slope of the Phillips curve, which measures the sensitivity of inflation to business cycle fluctuations, and $\gamma_t$ is a residual, which includes all variables that affect inflation through channels other than demand, including supply shocks such as oil prices, global value chains and exchange rate movements.

Globalisation affects the Phillips curve in two ways. Competition and wage moderation can weaken the link between domestic activity and inflation (smaller parameter), generating a "flattening of the Phillips curve" (Bianchi and Civelli, 2015; Guilloux-Nefussi, 2019).[1] Cost fluctuations arising from developments in the global economy, such as value chain productivity effects or international prices, appear in the residual as they constitute supply shocks for euro area firms.[2]

1 Other factors causing the Phillips curve to flatten are discussed in Obstfeld (2020).
2 Openness can lead to the emergence of "superstar" companies that benefit from market power and high margins. When faced with cost shocks, these companies can adjust their margins and thus create a weaker price response.

## Estimates of the Phillips curve using panel data for the euro area

The regression table in Appendix 2 presents the results obtained when estimating equation (3) (see Box 1) for a panel of euro area countries (details of the data are provided in Appendix 2). Column (1) estimates a standard Phillips curve with long-run expectations, where all variables have the usual signs; in particular, an increase in the domestic output gap is associated with faster domestic inflation. Column (2) shows the relationship between the output gap and the share of imports in GDP: the regressions indicate that more open economies have a flatter Phillips curve (e.g. the slope of the curve for a country with the median import/GDP ratio is about 0.43, while a country with a value one standard deviation higher has a slope of 0.30). Next, we consider the role of global variables. In column (3), we add the import price deflator, which is found to be significant and positive: imported inflation is transmitted to headline inflation. Column (4) adds a set of global variables that attempt to measure supply shocks arising from access to foreign inputs and cost shocks. These are taken from Forbes (2019): global oil prices, nominal exchange rates, the global output gap and a measure of global value chains. As expected, their inclusion reduces the statistical residual, thereby improving the explanatory power of the model. Forbes (2019) reached the same conclusions for a more heterogeneous panel of 40 economies.

## Greater impact of global variables since 2008

When we divide the sample between before and after the beginning of 2008 (columns 5 and 6 respectively in the table in Appendix 2), we find that the magnitude of the coefficients is greater for the 2008-19 period, and that the model with global variables explains inflation better during this period. Consistent with previous studies (Diev et al., 2021), the price of oil is the most relevant global variable. Our estimates show that its impact is greater in the post-crisis period, due to a higher elasticity of inflation to oil prices. Our simple exercise shows that this is also the case for the other global variables. When the exercise is repeated using underlying inflation as the dependent variable, we find that the global variables have a smaller impact. This suggests that global variables have a stronger impact on the more volatile parts of the price index, notably energy and food commodities.

# References

Akinci (O.), Benigno (G.), Heymann (R.), di Giovanni (R. C.), Groen (J. J.), Lin (L.) and Noble (A. I.) (2022)
"The Global Supply Side of Inflationary Pressures", *Liberty Street*, New York, 28 January.

Amiti (M.), Itskhoki (O.) and Konings (J.) (2019)
"International Shocks, Variable Markups, and Domestic Prices", *The Review of Economic Studies*, Vol. 86, No. 6, pp. 2356-2402.

Auer (R. A.), Degen (K.), and Fischer (A. M.) (2013)
"Low-Wage Import Competition, Inflationary Pressure, and Industry Dynamics in Europe", *European Economic Review*, Vol. 59, Numéro C, pp. 141-166.

Bai (L.) and Stumpner (S.) (2019)
"Estimating US Consumer Gains from Chinese Imports", *American Economic Review: Insights*, Vol. 1, No. 2, pp. 209-224.

Bianchi (F.) and Civelli (A.) (2015)
"Globalization and Inflation: Evidence from a Time Varying VAR", *Review of Economic Dynamics*, Vol. 18, No. 2, pp. 406-433.

Blanchard (O.) (2020)
"Is there deflation or inflation in our future?", *VoxEU*, 24 April.

Boskin Commission (Advisory Commission to Study the Consumer Price Index) (1996)
*Towards a More Accurate Measure of the Cost of Living: Final Report to the Committee on Finance of the US Senate.*

Carluccio (J.), Fougere (D.) and Gautier (E.) (2015)
"Trade, Wages, and Collective Bargaining: Evidence from France", *The Economic Journal*, Vol. 584, pp. 803-837.

Carluccio (J.), Gautier (E.) and Guiloux-Nefussi (S.) (2018a)
"Dissecting the impact of Low-wage countries on French Consumer Prices", *Working Paper*, No. 672, Banque de France.

Carluccio (J.), Gautier ( E.) and Guiloux-Nefussi (S.) (2018b)
"Importations des pays à bas salaire : quels gains pour les ménages ?", *Eco Notepad*, Post No. 61, Banque de France.

Ciccarelli (M.) and Mojon (B.) (2010)
"Global inflation", *Review of Economics and Statistics*, Vol. 92, No. 3, pp. 524–535.

Costinot (A.) and Rodriguez-Clare (A.) (2014)
"Trade Theory with Numbers: Quantifying the Consequences of Globalization", Chapter 4, *Handbook of International Economics*, pp. 197-261.

Diev (P.), Kalantzis (Y.), Lalliard (A.) and Mogliani (M.) (2021)
"What explains the persistent weakness of euro area inflation since 2013?", *Banque de France Bulletin*, No. 234/7, March-April.
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European Central Bank – ECB (2021a)
"The implications of globalisation for the ECB monetary policy strategy", *Occasional Paper Series*, No. 263.

ECB (2021b)
"Inflation measurement and its assessment in the ECB's monetary policy strategy review", *Occasional Paper Series*, No. 265.

Fontagné (L.) (2021)
"La feuille de paye et le caddie", *Les Presses de Sciences Po.*

Forbes (K. J.) (2019)
"Inflation dynamics: dead, dormant, or determined abroad?", *Brookings Papers on Economic Activity*, prepared for the conference of 5 and 6 September in Washington.

Guilloux-Nefussi (S.) (2020)
"Globalization, market structure and inflation dynamics", *Journal of International Economics*, Vol. 123.

Halpern (L.), Koren (M.), and Szeidl (A.) (2015)
"Imported Inputs and Productivity", *The American Economic Review*, Vol. 105, No. 12, pp. 3660-3703.

Lequillier (F.) (1997)
"L'indice des prix à la consommation surestime-t-il l'inflation ?", *Économie et Statistique*, No. 303, March.

Obstfeld (M.) (2020)
"Global Dimensions of U.S. Monetary Policy", *International Journal of Central Banking*, February, pp. 73-132.

# Appendix 1
## Impact direct de la mondialisation sur l'IPCH total

In order to measure the direct impact of globalisation, we start by expressing the aggregate price level of the euro area as a weighted average of the prices of domestic goods (DOM) and imported goods from low-wage countries (LWC). For simplicity, we combine imports from high-wage countries and domestic goods in $p_t^{DOM}$:[1]

$$p_t^{EA} = (1 - \gamma_{t-1})p_t^{DOM} + \gamma_{t-1}p_t^{LWC} \quad (1)$$

Lower case variables are in logarithms. The parameter $\gamma_{t=1}$ is the share of goods from low-wage countries in total consumption. It is lagged by one period, as this is how the Harmonised Index of Consumer Prices (HICP) is constructed in practice. Taking the first differences to measure the inflation rate of the euro area $\pi_t^{EA}$ the contribution to inflation of imports from low-wage countries, which is higher than that of all other origins, can be expressed by the last two components on the right-hand side in equation (2):

$$p_t^{EA} - p_{t-1}^{EA} = \pi_t^{EA} = \pi_t^{DOM} + \gamma_{t=1}\,(\pi_t^{LWC} - \pi_t^{DOM}) + \Delta\gamma_t(P_t^{LWC} - P_t^{DOM}) \quad (2)$$

The direct effect of imports on the HICP is expressed as:

(i) the inflation differential between imports from low-wage countries and consumer goods produced in the euro area, for a given share of imported goods, $\gamma_{t=1}(\pi_t^{LWC} - \pi_t^{DOM})$;

(ii) and the substitution effect, measured by the change in the share of spending multiplied by the price differential, $\Delta\gamma_t(P_t^{LWC} - P_t^{DOM})$.

1 This seems reasonable given the price levels and inflation rates from the two sources, which were very similar over the period under review.

# Appendix 2
## Empirical analysis of the determinants of headline inflation in the euro area by means of a panel estimate of the augmented Phillips curve

### 1 Data

The analysis of the Phillips curve presented in the table below uses a balanced panel data set for 15 euro area economies over the period 1995-2019. The countries in the list are : Austria, Belgium, Cyprus, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal, Slovenia and Spain. We exclude the following euro area countries from the analysis due to data unavailability : Estonia, Latvia, Lithuania and the Slovak Republic.

We run regressions on a quarterly basis. Where data are available at an annual frequency, we interpolate to a quarterly frequency. Estimation method : panel data with country fixed effects, estimated by ordinary least squares (within estimator).

#### Definition of variables

- **Headline inflation :** Harmonised Index of Consumer Prices (HICP) for each country. Source : Eurostat, seasonally adjusted, measured in year-on-year terms (four quarters).
- **Inflation expectations :** five-year inflation forecasts, interpolated to quarterly data Source : International Monetary Fund, World Economic Outlook (October 2021 version of the database).
- **Oil prices** Crude Oil BFO M1 Europe FOB in USD/barrel, expressed in EUR using the exchange rate of the last day of the quarter. Source : Datastream.
- **Domestic output gap :** Source : European Central Bank.
- **Share of imports :** share of total imports (goods and services) in GDP, both expressed in nominal terms. Source : European Central Bank.
- **Global output gap :** a measure of the output gap, weighted by GDP at purchasing power parity. Source : International Monetary Fund, World Economic Outlook (October 2021 version of the database).
- **Global value chains :** first principal component of the following series : weight of traded intermediate goods in world GDP, calculated from World Bank Development Indicators data ; relative growth rate of trade in goods to world GDP ; standard deviation of producer price inflation for a group of 40 countries, obtained from the International Monetary Fund's World Economic Outlook (October 2021 version of the database).
- **Import price deflator :** including goods and services. Source : International Monetary Fund, World Economic Outlook (October 2021 version of the database).
- **Nominal effective exchange rate** trading partners by the consumer price index. Source : International Monetary Fund (IMF) - International Financial Statistics (IFS) database.

## 2 Empirical results

Phillips curve estimates for the euro area economies, 1995-2019, at quarterly frequency

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| **Dependent variable: Year-on-year headline inflation** | | | | | | |
| 5-year inflation expectations | 0.590*** | 0.685*** | 0.441** | 0.473*** | 0.469* | 0.355* |
| | (0.130) | (0.133) | (0.180) | (0.137) | (0.263) | (0.194) |
| Inflation lagged by 4 quarters | 0.318*** | 0.332*** | 0.306*** | 0.377*** | 0.160* | 0.408*** |
| | (0.075) | (0.075) | (0.099) | (0.066) | (0.088) | (0.046) |
| Domestic output gap | 0.120*** | | 0.113*** | 0.080*** | 0.204*** | 0.074*** |
| | (0.021) | | (0.022) | (0.018) | (0.029) | (0.021) |
| Nominal effective exchange rate | | | | -0.060*** | -0.038*** | -0.125*** |
| | | | | (0.011) | (0.012) | (0.014) |
| Global output gap | | | | 0.084** | 0.051 | 0.225*** |
| | | | | (0.031) | (0.076) | (0.035) |
| Oil price inflation in euros (quarter-on-quarter) | | | | 0.041*** | 0.030*** | 0.051*** |
| | | | | (0.004) | (0.005) | (0.005) |
| Global value chains measures | | | | 0.117 | 0.272* | -0.199* |
| | | | | (0.071) | (0.143) | (0.104) |
| Domestic output gap * x imports/GDP | | 0.227*** | | | | |
| | | (0.044) | | | | |
| Import price deflator | | | 0.077*** | | | |
| | | | (0.024) | | | |
| Observations | 1.402 | 1.398 | 1.344 | 1.402 | 700 | 702 |
| R2 | 0.223 | 0.225 | 0.240 | 0.378 | 0.169 | 0.389 |
| Number of countries | 15 | 15 | 15 | 15 | 15 | 15 |

Robust standard errors in brackets, clustered at country level. *** Value p < 0,01, ** Value p < 0,05, * Value p < 0,1
Source: Authors' calculations.
Note: Country panel Phillips curve estimates for euro area countries (columns 1, 2, 3 and 4: 1995-2019; Column 5 1995-2007; Column 6 2008-2019).

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