

GLOBAL FACTORS AND THE INTERDEPENDENCE OF INFLATION

Recent decades have witnessed an increase in the degree of interdependence among the various economies, which is associated with growing economic and financial integration between countries. This globalisation process is impacting not only real but also nominal macroeconomic variables, such as inflation.

There are different factors which prompt some interdependence between the different countries' inflation rates:

Fluctuations in commodity prices which are determined in global markets and affect many countries simultaneously.

Since inflation rates are connected, inflation expectations in the different economies and monetary policies will also be connected.

The global synchronisation of the different economies' business cycles results in some interrelationship of inflation fluctuations through the Phillips curve mechanism, which relates inflation to national business cycles.

The above-mentioned mechanism is strengthened when the inflation of an economy not only hinges on national business cycles but also on the global business cycle.

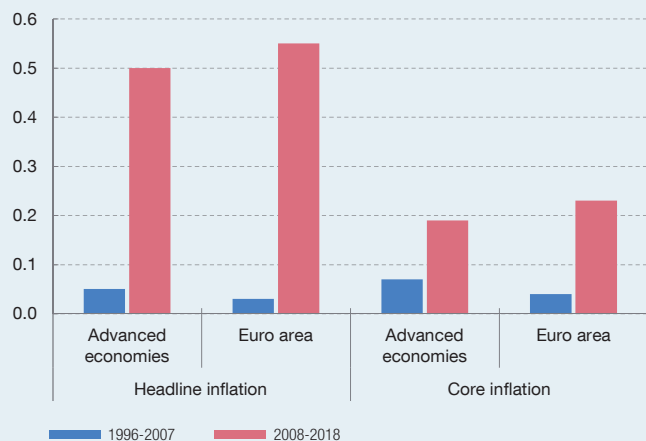
Some technological innovations may simultaneously bring about productivity gains in different economies.

To illustrate changes in the interdependence of inflation rates, Chart 1 shows a measure of this interconnection for a broad range of advanced economies and for the euro area economies.¹ The upper bound of this measure is 1 and the lower bound is 0 and, the higher its value, the

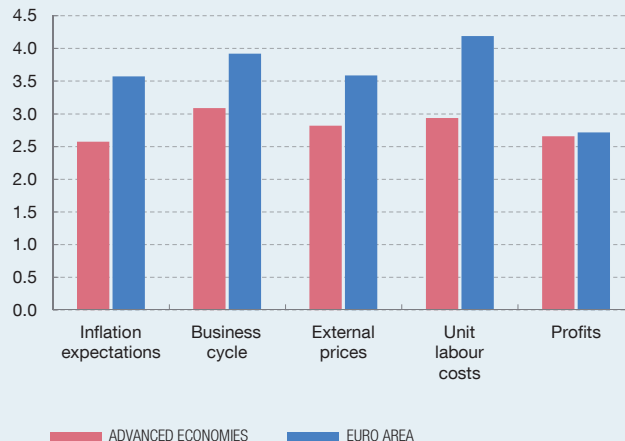
Chart 1
THE INTERDEPENDENCE OF INFLATION

The interdependence of inflation between countries is estimated to have increased significantly in the post-crisis period and would be higher for headline inflation than for core inflation. The interdependence could be attributed to comovements of inflation expectations, the economic cycle, external prices and unit labour costs.

1 GLOBAL INTERDEPENDENCE OF INFLATION RATES (a)



2 DETERMINANTS OF THE INTERDEPENDENCE OF INFLATION (b)



SOURCES: Eurostat, OECD and Banco de España.

a Estimates for different sample periods.

1 For more details see L. J. Álvarez, L. Gadea and A. Gómez-Loscos (2019b), *Inflation Interdependence in Advanced Economies*, Banco de España Working Paper (forthcoming). A sample of 24 advanced economies is used for the period 1996-2018. The measure of interdependence used is that proposed in J. Stock and M. Watson (2018), "The Evolution of National and Regional Factors in US Housing Construction", in T. Bollerslev, J. Russell and M. Watson (Eds.), *Volatility and Time Series Econometrics: Essays in Honor of Robert F. Engle*, Oxford University Press. See also M. Carney (2017), *Globalisation and Inflation*, speech given at the 2017 IMF Michel Camdessus Central Banking Lecture.

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greater the degree to which the inflation rates are interconnected. As the chart shows, interdependence in the period before the global financial crisis was very small, both in the advanced economies as a whole and in the euro area countries. However, in the post-crisis period, the interdependence of inflation between countries has increased significantly. In addition, a reflection of the greater trade and financial integration of euro area countries is that the degree to which they are interconnected is higher than in the advanced economies as a whole. Also, the degree of interdependence observed is higher for headline inflation than for core inflation since the former includes food and energy product prices, which are more closely linked to prices in global commodity markets.

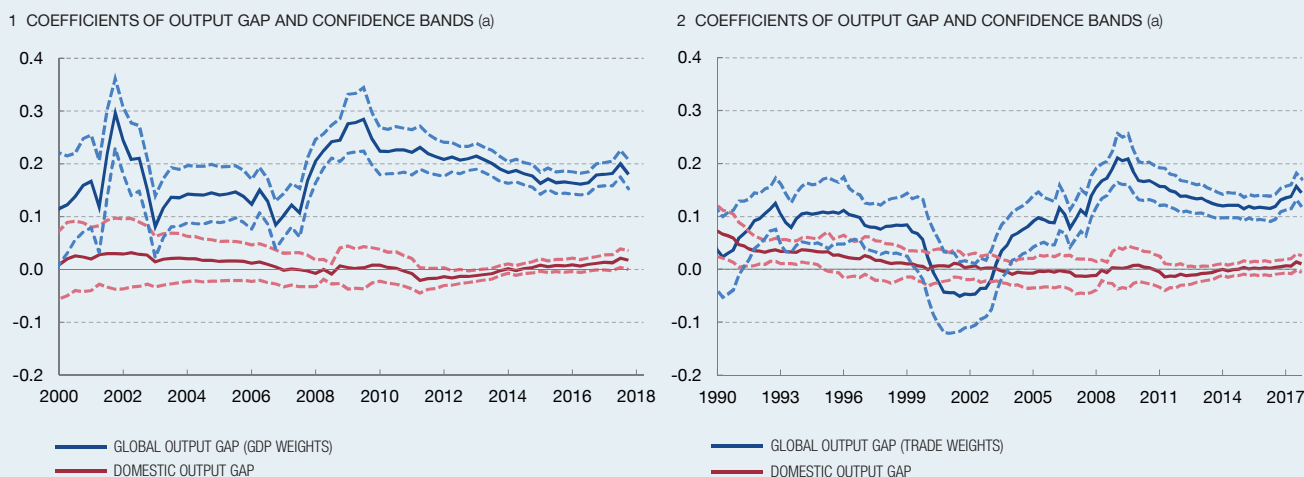
To shed some light on the macroeconomic variables which explain the degree of interdependence, Chart 1

shows the findings of a statistic which determines whether the interdependence between the variables is similar to that observed in headline inflation. Specifically, the findings obtained identify five significant variables, which include the three usual variables in neo-Keynesian open-economy models (i.e. inflation expectations, slack and external prices), together with unit labour costs and profit margins. Similarly, it can be seen that these variables explain the interconnection of inflation in euro area countries more accurately than in advanced economies as a whole.

As regards the significance of global factors in explaining national inflation rates, the globalisation hypothesis assumes that, as countries increase their economic integration, the global business cycle may be an increasingly important factor in determining national inflation.² In order to take into account the impact of

Chart 2
IMPACT OF GLOBAL FACTORS ON PHILLIPS CURVE

Global output gap measures have gained relatively more importance with respect to the domestic output gap in determining inflation, especially since the beginning of the 21st century. The impact is greater when we calculate the global output gap weighted by the PPP based GDP weights, which suggests that large emerging low-cost economies are gaining importance in determining domestic inflation.



SOURCES: Datastream and Banco de España.

a The coefficients are estimated on the basis of a sample of 22 OECD countries and China.

2 See J. Ha, M. A. Kose and F. Ohnsorge (2018), *Inflation in Emerging and Developing Economies: Evolution, Drivers and Policies*, World Bank; C. Borio and A. Filardo (2007), *Globalisation and Inflation: New Cross-country Evidence on the Global Determinants of Domestic Inflation*, BIS Working Paper, 227; and I. Mikolajun and D. Lodge (2016), *Advanced Economy Inflation: the Role of Global Factors*, ECB Working Paper, 1948.

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global phenomena, Phillips curves have been estimated³ considering measures of global output gaps and external prices (see Chart 2). Specifically, measures of global output gaps specific to each economy are used. The weights are derived from the breakdown of foreign trade by country,⁴ and, alternatively, from the importance of each country in the global economy, in terms of GDP expressed in purchasing power parities. The results obtained show that global slack measures are significant for determining short-term inflation and that their importance in comparison with the domestic output gap has increased over the present century. In addition, the relative importance of global slack measures for inflation increases when the second weighting method is used

(based on the weights in global GDP), which suggests that competition from large emerging low-cost economies, such as China or India, might be exerting downward pressure on global inflation.

It should be noted that the importance of global factors such as those presented in this box has implications for monetary policy. On the one hand, the importance of these factors requires monetary authorities to pay increasing attention to activity and to international prices. On the other, in a world where economies are increasingly interconnected and where inflation largely responds to global factors, the effectiveness of the different central banks' monetary policies in controlling national inflation might be hampered.

3 The specification is a Phillips curve with adaptive expectations where the dependent variable is quarter-on-quarter percentage changes in the CPI and our variables of interest are the domestic and global output gaps, the latter with weights deriving both from trade relationships and from GDP weights in the purchasing power parity. Regressions are estimated using a ten-year window and country fixed effects. Quarter-on-quarter percentage changes of import, food and energy prices, the real and nominal exchange rate and four inflation lags, which were selected based on information criteria, were introduced as control variables. The sample used comprises 23 countries and the sample period ranges from 1980 to 2017.

4 See Borio and Filardo (2007), *op. cit.*