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Globalisation and industry concentration: What are the consequences for inflation dynamics?

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Since the mid-1980s, there has been a weakening of the correlation between inflation and output in advanced countries. Why? One of the prime suspects is globalisation. Aside from the well-known effects of lower wages abroad and cheaper imported goods, globalisation may also encourage concentration at home and allow the most efficient domestic firms to grow larger by accessing international markets. In addition, large companies have room to actively adjust their markup in order to keep relative prices low and preserve their market share. This strategic behaviour may have dampened the response of inflation to domestic slack over the last 30 years even if the process may have stabilised over the last decade.

In the aftermath of the global financial crisis, movements in inflation have proven to be only weakly correlated with large output swings. In Europe, the Vice President of the European Central Bank (ECB), Vítor Constâncio (2015), has referred to a twin puzzle: "first, missing disinflation in 2009-11, and second, excessive disinflation after 2012." This puzzle has sparked renewed interest in the Phillips curve relationship, a key notion in economists' toolbox relating the dynamics of inflation to real activity. A loosening of the link between inflation and real activity has been observed in advanced countries since the mid-1980s and the underlying causes are not fully understood. This *Rue de la Banque* provides a structural explanation whereby globalisation increases the proportion of firms that can apply higher markups and are able to shield their prices from economic fluctuations.

Understanding the inflation process through the lens of the Phillips curve

Inflation tends to co-move with economic activity. This statistical correlation, commonly referred to as the Phillips curve, has proven robust over time. In its original version, established by the economist A.W. Phillips in 1958 using UK data, it depicts a negative link between wage inflation and unemployment.

Edmund Phelps (1967) pointed out that current inflation depends not only on unemployment but also on inflation expectations. This relationship stems from the stickiness of prices. Firms set their prices to maximise their expected profit, taking into account the probability of being unable to reset them in the future. This forward-looking behaviour gives rise to the aggregate "expectation-augmented Phillips curve" or "New Keynesian Phillips curve", which relates contemporaneous inflation (π_t) to expectations about future inflation $(\mathbb{E}_t\pi_{t+1})$, and a measure of domestic slack (χ_t).

$$\pi_t = \beta\mathbb{E}_t\pi_{t+1} + \kappa\chi_t \qquad (1)$$

Domestic slack is captured either by the unemployment gap, the output gap, or, in New Keynesian models, by the real marginal cost of production (which measures the cost for a firm of producing an additional unit of

a good and typically depends on capacity utilisation). The basic intuition, whatever the measure of slack used, is that inflation rises when the economy overheats and decreases when the economy slows down. Indeed, when demand exceeds the supply of domestic factors, then firms transmit higher costs into higher prices. In addition, inflation increases when expected inflation goes up, since higher expected prices tomorrow make firms raise their prices today.

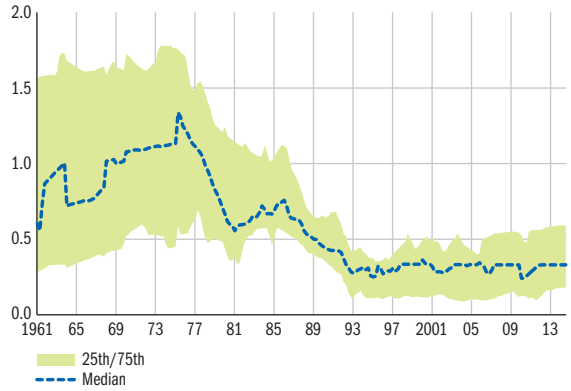
Is the Phillips curve still alive? Weakening of the inflation-domestic slack link since the 1980s

The recent empirical literature shows that the influence of domestic slack on inflation (controlling for inflation expectations) significantly weakened in advanced countries from the mid-1970s to the late 1980s, but has remained relatively stable since then[1] (see Chart 1).

What explains the sharp flattening in the slope of the Phillips curve? We suggest that globalisation might account for the change. More specifically, as in the paper by Guilloux-Nefussi (2016), we focus on how globalisation alters the pricing behaviour of firms in the product market. We show that (1) the slope of the Phillips curve is flatter when the economy comprises a high proportion of large firms that are typically more productive; and (2) globalisation might actually favour the selection of large firms.

C1 Slope of the Phillips curve

(x-axis: time; y-axis: slope of the Phillips curve (κ))



Source: Blanchard, Cerutti and Summers (2015).
Note: The slope of the Phillips curve corresponds to K in equation 1. Phillips curves are estimated separately for 20 countries using quarterly data, allowing for time-varying coefficients. The chart shows the median and interquartile range of estimates across the 20 countries.

How is the Phillips curve related to market structure?

The response of inflation to slack is low when firms are reluctant to change prices. In effect, under certain circumstances, it is optimal for firms to only partially transmit shocks to production factors to prices. Thus, prices remain more stable and inflation is smoother. These rigidities may arise, inter alia, from decreasing returns to scale, real wage rigidity or variable markups, i.e. when firms absorb shocks into their markups instead of adjusting prices. More specifically, these variable markups can be a strategic response by large firms, aimed at preserving their market share.

The specific behaviour of large firms compared to small firms is crucial for understanding the change in inflation dynamics. Empirical evidence shows that large firms have, on average, high markups. Therefore, they have scope to actively play with them and do not fully pass shocks through to prices. By contrast, small firms' markups are typically narrow and offer only limited room for strategic adjustments.

Consider the example of a decrease in the marginal cost of production. A big firm already attracts a large share of demand. Hence, the additional gain from reducing its price is lower than for small firms. Thus, when hit by the same cost shock, large firms only partially transmit the shock to their prices, and instead tend to adjust their markup. At the aggregate level, therefore, the higher the weight of large firms (with elastic markups and therefore inelastic prices) in output, the lower the response of inflation to domestic slack. In other words, the slope of the Phillips curve may be flatter when the economy is more concentrated.

Globalisation modifies the structure of the market and might favour concentration via a selection effect

Globalisation can give rise to two forces that have opposite effects on competition. On the one hand, assuming a constant set of domestic firms, the entry of foreign competitors into the market mechanically reduces domestic firms' market shares. As a result, the scope for strategically adjusting markups is

1 *See also* Rue de la Banque *No. 37 (Chatelais and Schmidt, 2017) for Phillips curve estimates over the last decade using French data.*

reduced and firms transmit cost fluctuations more fully to prices. At the macro level, this purely *pro-competitive* impact of globalisation makes prices more flexible and tightens the link between inflation and domestic slack.

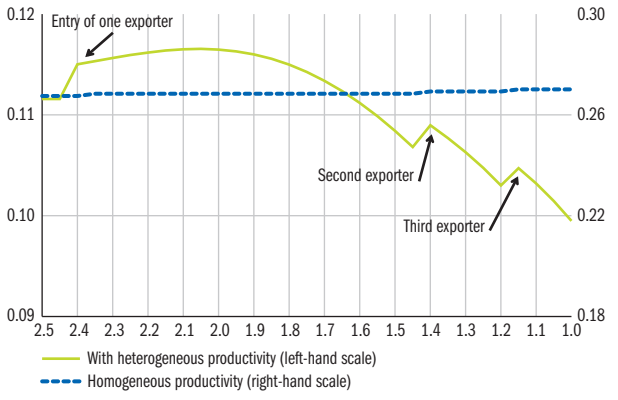
On the other hand, as globalisation is a long-run process, the set of domestic producers endogenously evolves over time. With globalisation, the share of exporting firms increases, and those firms happen to be among the largest and most productive. Why is this? The answer is that accessing a foreign market is expensive and involves paying both a fixed "entry cost" and a variable "per-unit" trade cost.[2] As a result, it is only profitable for the most productive firms to pay these costs and export their goods.

Hence, in response to globalisation, the weakest (also the smallest) firms lose market share in the domestic market due to tougher competition and cannot access new markets. By contrast, large firms can take advantage of globalisation to grow internationally. In the end, the share of domestic output produced by large firms increases, and prices on these goods are more rigid. If this *concentration* force outweighs the *pro-competitive* one, then globalisation strengthens the overall degree of real rigidities, which translates into a lower response of inflation to domestic slack.

Chart 2 shows how the slope of the Phillips curve (y-axis), i.e. the strength of the response of inflation to economic activity, might decline when trade is conducted by a few star exporters. On the x-axis, per-unit trade costs are falling from left to right, which induces the economy to open up.[3]

C2 Simulated responses of the slope of the Phillips curve to globalisation

(x-axis: per-unit trade cost; y-axis: sensitivity of Inflation to domestic slack)



Source: Guilloux-Nefussi, 2016.

The blue dotted line represents the slope of the Phillips curve for an economy composed of firms that are all identical, while the green line corresponds to an economy with heterogeneous firms. In the heterogeneous-productivity case, the *concentration* channel is at work (due to the self-selection of larger firms) and offsets the *pro-competitive* one. As a result, the sensitivity of inflation to marginal cost can drop substantially when the share of exporters rises.

At the same time, going back to the estimates of Blanchard et al. (2015), we see that the flattening of the Phillips curve took place mostly in the 1980s. Other factors may also have influenced it over that period, in particular the disinflation observed worldwide. Low inflation prevailed thereafter when inflation targeting, implemented in an increasing number of countries in the early 1990s, helped to anchor inflation expectations. More stable expectations in turn stabilise actual inflation, regardless of the fluctuations in real activity. The two explanations (globalisation and better anchoring of inflation expectations by monetary policy) are not mutually exclusive and have probably both contributed to a weakening in the inflation/activity link. Note that globalisation seems to have slowed down over the last decade, in the aftermath of the global financial crisis and with the rebalancing of Chinese growth towards domestic demand,[4] which is consistent with the greater stability observed in the slope of the Phillips curve since then.

What are the consequences for the conduct of monetary policy?

If the slope of the Phillips curve is structurally and permanently flat (or flatter than in the past), then domestic slack only has a small impact on inflation.

2 *For instance, tariffs and transport costs depend on the quantity of exported goods. Hence they are labelled as* variable *or* per-unit *costs. Costs related to complying with different regulations or learning about new distribution channels abroad do not depend on quantities and can be interpreted as* fixed costs.

3 *The chart is really an illustration of the possible consequences of globalisation, but should not to be taken as a quantitative evaluation. It is based on a very stylised model in which all sectors of the economy are symmetric. The goal is to unveil the role of concentration in shaping inflation dynamics, but not to strictly quantify the impact.*

4 *See* Rue de la Banque *No. 30 (Gaulier, Steingress and Zignago, 2016) on "The role of China in the trade slowdown".*

As a consequence, inflation can take longer to stabilise as the economy would have to remain below potential output for a prolonged period of time before inflation could converge back to target. In the current low inflation context, a structurally flat Phillips curve environment would imply that policy-makers have to maintain a very accommodative monetary policy since larger output gap movements are needed to spur inflationary pressures.

As a simple illustration, let us strip out the most volatile components of inflation and focus on euro area core inflation (i.e. excluding energy and food). It stood at 0.9% in December 2016 and January 2017. What are the consequences of a relatively flat Phillips curve? According to the European Commission's forecasts, the output gap in the euro area is expected to contract by about 0.5 pp in 2017 and 0.6 pp in 2018. Assuming that inflation expectations remain unchanged, and using the sensitivity of inflation to slack estimated by Blanchard et al. ($\kappa \approx 0.3$), then the Phillips curve equation (1) states that the implied impact on inflation should be 0.5*0.3=+0.15 pp in 2017 and then 0.6*0.3=+0.18 pp in 2018, hence core inflation should reach 1.1% in 2017 and 1.3% in 2018. In other words: inflation is on its way back to target but the adjustment might take time.

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