Impact of Imported Goods Inflation in Brazil

The Central Bank of Brazil (BCB) uses several structural models with the aim of identifying and assessing the transmission mechanisms of the monetary policy. In this sense, the Phillips curve performs a relevant role in relating current inflation to variables of concern – for instance, measurements of imbalance in real economy, past inflation, inflation expectations, and foreign inflation. Regarding the last variable, it is worth mentioning the significant volatility, observed in the latest quarters, of the U.S. Producer Price Index (PPI), the international prices of the main commodities and the nominal exchange rate. Given the importance and contemporariness of the subject, this Box assesses the recent behavior of foreign inflation and their potential effects on inflation dynamics in Brazil.

According to Batini & Haldane (1999), a Phillips curve for an open economy may be represented by means of the following reduced form:

$$\pi_t = \chi_0 E_t(\pi_{t+1}) + (1-\chi_0)\pi_{t-1} + \chi_1(y_t + y_{t-1}) + \mu[(1-\chi_0)\Delta c_t - \chi_0 E_t(\Delta c_{t+1})] + \varepsilon_t \quad (1)$$

where π_t represents the domestic inflation rate; E_t represents the expectation operator; y_t is the real output; Δ is the difference operator;$c_t \stackrel{\text{def}}{=} e_t + p_t^* - p_t$ is the real exchange rate; e_t is the nominal exchange rate; p_t^* is the price level of imported goods expressed in foreign currency; p_t is the domestic price level, and ε_t represents a supply shock. In addition, note that all the variables are considered as (logarithm) deviations from the respective equilibrium values. Theoretically, this specification can be justified by means of a micro-founded framework, such as the neo-Keynesian Phillips curve proposed by Woodford (2003) for an open economy with full capital mobility.

In addition, one theoretical feature usually incorporated into the Phillips curve is the long-term verticality, which implies neutrality of the monetary policy on this time horizon. In practice, the adoption of this restriction in empirical investigations generally leads to more stable parameters of the Phillips curve, as well as to more intuitive specifications. In Batiti & Haldane (1999), where foreign inflation is transmitted to domestic inflation through a real exchange measure, the verticality restriction can be easily interpreted in terms of inflation. To do so, one can isolate the domestic prices term and rearrange the Phillips curve in order to obtain inflation as a function of the foreign inflation.

Regarding the Phillips curve specifications estimated by BCB, it is worth mentioning that, in most cases, market prices inflation is considered as a dependent variable[1], following the general form below:

$$\pi_t^{livres} = \sum_{k>0} \alpha_k \pi_{t-k} + \sum_{k>0} \beta_k \, E_t(\pi_{t+1}) +$$

$$+ \left(1 - \sum_{k>0} \alpha_k - \sum_{k>0} \beta_k - \sum_{k>0} \gamma_k\right)\left(\Delta e_t + \pi_t^*\right) +$$

$$+ \textstyle\sum_{k>0} \gamma_k \left(\Delta e_{t-k} + \pi_{t-k}^*\right) + \sum_{k>0} \theta_k \, h_{t-i} + \varepsilon_t \quad (2)$$

where all the variables are in logarithm form, π_t^{livres} representing market prices inflation; π_t is the headline inflation measured by IPCA; π_t^* is inflation of imported goods measured in foreign currency, and h_t is the output gap. Estimations for the pass-through coefficient in Equation (2) suggest that the impact of foreign inflation on domestic inflation has diminished in the last years, period in which the credibility of the Brazilian inflation targeting system has been consolidated.

In this sense, the evolution of the pass-through coefficient can also be inferred from Figure 1, for the period 2002-2008, which presents the two components of foreign inflation: the U.S. Producer Price Index related to all commodities – PPI-all commodities – and the nominal exchange rate R$/US$. It should be mentioned that both the PPI-all commodities and the nominal exchange rate

1/ Regulated prices inflation is separately modeled due to its particular features.

Figure 1 – Nominal exchange rate (R$/US$) and PPI *all commodities*

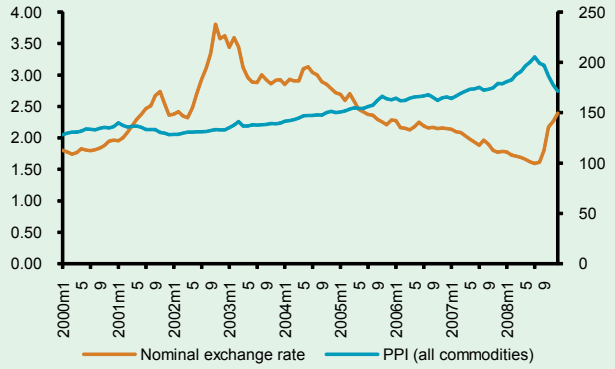
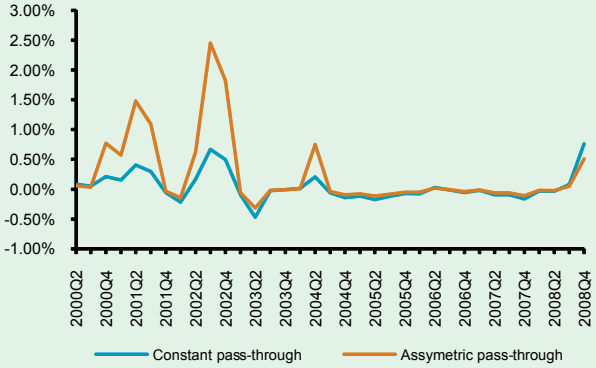


Figure 2 – Evolution of pass-through



constitute proxies, respectively, for the imported goods inflation, in terms of foreign currency, and for the exchange rate, which effectively impact CPI inflation in Brazil. Based on Figure 1, the dynamics of PPI-all commodities has apparently been important in attenuating the effects of exchange rate variations on inflation and *vis-a-vis*. In particular, since mid-2002, these two series exhibit opposite movements, with correlation equal to -0.92. In fact, from the third quarter of 2002 up to the third of 2008, the average quarterly change of nominal exchange rate and PPI-all commodities reached, respectively, -1.63% and 1.71%, which leads to a net impact of only 0.08%.

Nonetheless, from the point of view of the impact of foreign inflation on domestic inflation, besides the movements of PPI-all commodities and nominal exchange rate, one must also consider the dynamics of the pass-through coefficient. In order to assess how the interaction of these three effects (changes in nominal exchange rate, the dynamics of the imported goods inflation in foreign currency and the evolution of the pass-through coefficient) could have impacted the domestic inflation in recent years, the following exercise is conducted: Following Correa & Minella (2006), an asymmetric pass-through coefficient is adopted, with differentiated regimes for periods of exchange rate appreciation/depreciation. As depicted in Figure 2, the mechanism of asymmetry is expressed in a more pronounced manner in periods of high exchange rate volatility, such as in 2002.

Therefore, the exchange rate dynamics observed in the latest years, in a certain way counterbalanced by the movements of imported goods inflation (in terms of foreign currency), gives support to the hypothesis of impact attenuation of the foreign inflation on domestic inflation.

References

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