# BOX I.4:

## Pass-through of nominal exchange rate appreciations to prices

Since October 2019, the nominal exchange rate (NER) has been characterized by high volatility, going from just over CLP 700 per dollar to peaks above CLP 1,000 in July 2022. Comparing the statistical close of this Report and that of December, the peso has appreciated nearly 11.5%. Exchange rate movements of this magnitude affect inflationary dynamics considerably throughout the monetary policy horizon. Their effect is measured through the pass-through coefficient (PTC) from the NER to domestic prices. Based on past estimates, the average PTC in Chile is between 0.1 and 0.2 after one year. This means that, over a one-year period, a 1 percentage point (pp) change in the NER is passed through, on average, to a change in the same direction of between 0.1 and 0.2pp in inflation[1].

Evidence has it that the magnitude and timing of this pass-through depends on multiple factors, including the intensity of NER movements, their sign and the nature of the originating shocks[2]. Therefore, to inform inflation projections, in addition to the estimation of an average PT coefficient, it is necessary to study the particular coefficient at some point in time. The literature based on non-linear empirical models allows investigating the dependence of the coefficient on the intensity and sign of the exchange rate movement, while methodologies based on dynamic and stochastic general equilibrium models allow identifying the origin of the exchange rate movement.

Studies for several countries find that the pass-through is greater for depreciations than for appreciations, and is also greater in the face of strong exchange rate movements. This literature has drawbacks because it is based on aggregate measures that do not always meet the exogeneity conditions necessary for an appropriate identification of causal effects. To overcome these problems, recent methodologies have been oriented towards studying the PTC and its determinants based on micro data[3].

Estimates using the administrative data of companies available at the Bank allow investigating the hypothesis of whether the PTC is higher in the face of a depreciation than in the face of an appreciation of the NER (figure I.28). The results show that, for the average firm, around eight months the PTC is 0.13 for depreciations and 0.07 for appreciations[4]. After one year, however, the pass-through measures converge at similar levels. In other words, appreciations take longer to pass through to lower prices, but after one year, the cumulative pass-through is already very similar to that of depreciations.

Based on the stochastic and dynamic model XMAS[5], the effects of exchange rate movements observed as from the last quarter of 2022 were studied. This exercise yields a PTC of 0.055 by mid-2023 and 0.07 by the end of 2023. This contrasts with the average (or unconditional) measure which is close to 0.1 according to the same model[6]. However, it coincides with estimates of the effect of appreciations based on micro data. The model also identifies the factors that explain recent movements in the NER. These are changes in international prices, interest rate parity and external interest rates. The first two have generated appreciations and have also been associated with significant pass-through. The latter has depreciated the NER and has mitigated the effects on the coefficient.

[1]/ For related discussions in previous Reports, see box IV.1 in March 2018 Report and box IV.1 in March 2016 Report.

[2]/ The pass-through coefficient may also depend on the country's inflation level and the monetary policy regime in place.

[3]/ For a more detailed discussion and examples for Chile, see Arenas et al. (2023) and the literature cited therein.

[4]/ A regression is estimated of a monthly price index by firms against an interaction between an import intensity variable with the change in the multilateral exchange rate (MER), controlling for import intensity, time and firm effects. Monthly data are considered for formal firms, from January 2014 to February 2023. For more details, see Arenas et al. (2023).

[5]/ The model is described in detail in the document "Use of Macroeconomic Models in the Central Bank of Chile 2020."

[6]/ See Garcia-Cicco and Garcia (2020) for the methodology and an application for Chile.

## Conclusions

The nominal exchange rate has appreciated significantly with respect to the statistical close of the December 2022 Report. The central scenario of this Report assumes that, in the short term, the pass-through to prices will be lower than usual. However, at the one-year horizon, a PTC close to its historical estimates for Chile is anticipated, that is, around 0.1.

**FIGURE I.28** ESTIMATES OF THE PASS-THROUGH COEFFICIENT BASED ON MICRODATA, DISTINGUISHING BETWEEN APPRECIATIONS AND DEPRECIATIONS (*)

(percentage change in prices in response to a +-1% change in the exchange rate)
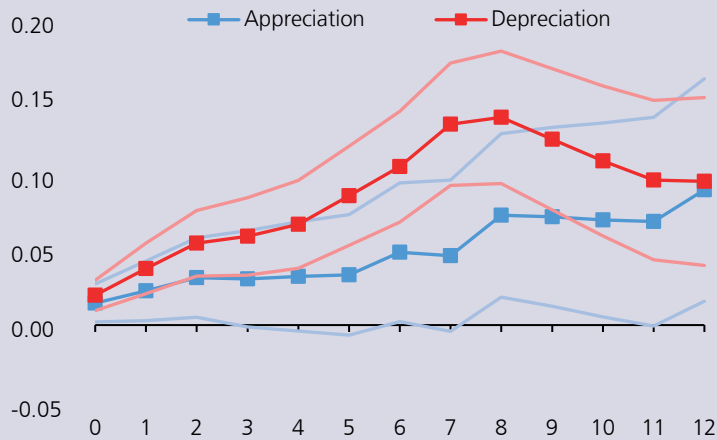


(*) The graph displays 95% confidence intervals based on standard errors clustered by firm. The plotted coefficient corresponds to that of the average company with an intensity level of 0.12.
Source: Arenas et al. (2023).