



Exchange Rates, Markups and Inflation: Evidence from Colombia

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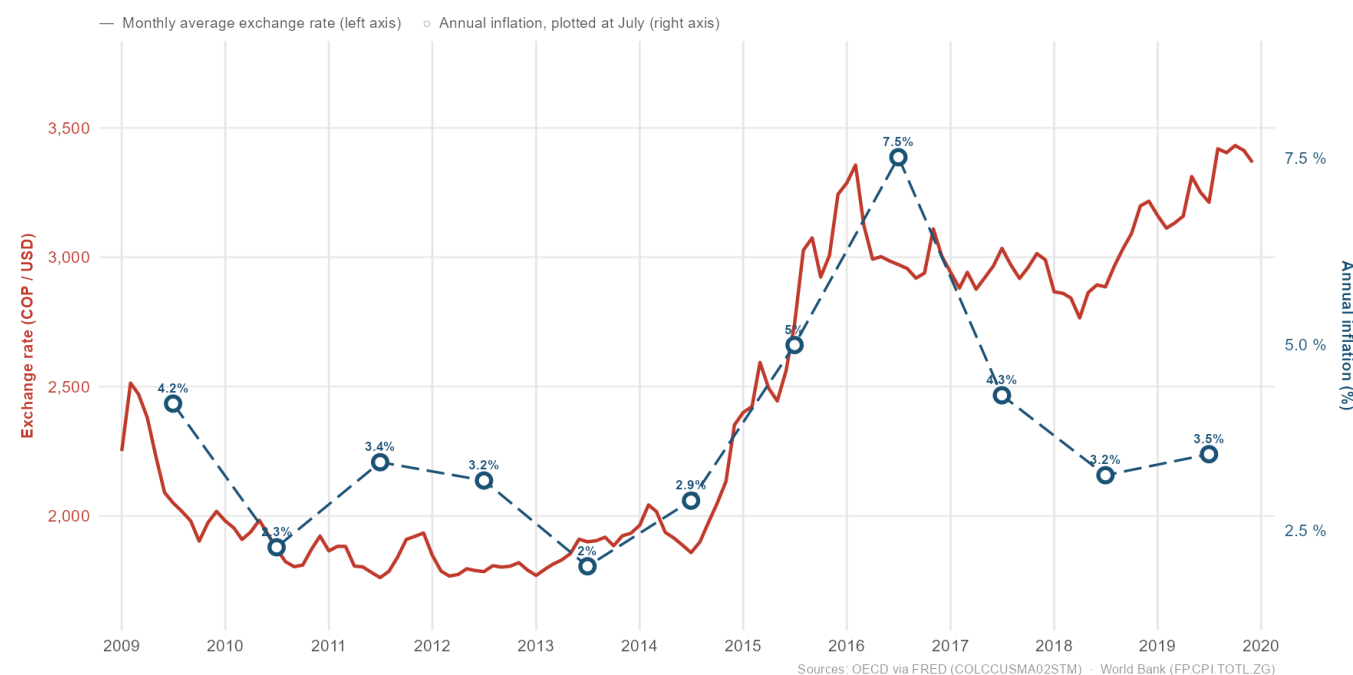
On 7 March, the Paris Trade Seminar at the Paris School of Economics hosted Natalie Chen (University of Warwick) to present work on how exchange rate movements affect domestic prices. Using detailed firm-product data for Colombian manufacturing over 2009–2019, and a large depreciation episode starting in 2014, the study decomposes prices into marginal costs and markups. It shows that a depreciation operates through two opposing channels. Higher imported input costs raise marginal costs, but prices increase less than marginal costs because firms compress their markups. At the same time, weaker import competition allows firms to increase markups. Quantitatively, a 10 percent depreciation raises marginal costs by about 3 percent and prices by about 2 percent, implying a decline in markups through the cost channel, while the competition channel increases markups by about 0.8 percent. Overall, the cost channel dominates, leading to a net reduction in markups. The results show that exchange rate pass-through is incomplete and depends both on firms' cost exposure and on changes in competitive pressure, with direct implications for inflation dynamics.

Exchange Rates, Global Integration and Domestic Inflation

The sharp depreciation of the Colombian peso after mid-2014 provides a clear illustration of a broader question at the intersection of trade and macroeconomics: how does global integration shape domestic inflation after an external shock? In an open economy, a weaker currency affects firms through at least two trade-related channels. It raises the cost of imported inputs, but it also changes the competitive pressure exerted by foreign producers.

As shown in **Figure 1**, between 2014 and 2017, the Colombian peso depreciated sharply against the US dollar, while inflation rose from below 3 percent to around 7.5 percent. Understanding the link between these two movements requires going beyond a simple exchange-rate pass-through. It involves supply chains, import competition, and firms' pricing behavior.

Figure 1: Monthly USD/Colombian Peso exchange rate and annual inflation rate in Colombia



The study presented by Natalie Chen at the Paris Trade Seminar at the Paris School of Economics examines these questions using Colombian manufacturing data, exploiting a large depreciation episode that began in July 2014.

The analysis uses the Annual Manufacturing Survey conducted by DANE, which covers manufacturing plants with ten or more employees between 2009 and 2019. After aggregation to the firm-product-year level, the sample contains 9,113 firms, including 4,700 single-product firms, and 773 products at the 4-digit CPC level.

A depreciation does not translate into inflation through a single mechanism. In a globally integrated economy, firms are exposed both to imported inputs and to foreign competition. Prices may increase because imported inputs become more expensive, but also because weaker import competition allows firms to raise markups. The key empirical challenge is to distinguish between these two mechanisms. A change in marginal costs reflects higher production costs faced by firms, for example due to more expensive imported inputs, whereas a change in markups reflects a shift in competitive conditions

and firms' market power. Disentangling these effects is essential to identify the sources of inflation following a depreciation.

The key object in the analysis is the markup, that is, the gap between a firm's price and its marginal cost. If a product sells for 120 and costs 100 to produce at the margin, the markup is 20, or 20 percent over cost. More formally, the study uses the identity:

$$\text{Price} = \text{Marginal Cost} \times \text{Markup}$$

or, in logarithmic terms:

$$\log(\text{Price}) = \log(\text{Marginal Cost}) + \log(\text{Markup})$$

This decomposition is the backbone of the analysis. Once markups are estimated and prices are observed, marginal costs can be recovered. This approach to recovering markups and marginal costs from production data follows established methods in the empirical literature (De Loecker *et al.*, 2016). This allows the study to ask not only whether prices move, but why they move.

Data and Identification: Measuring Prices, Costs and Markups

The main strength of the study lies in the structure of the data. Unlike most firm-level datasets that only report revenues and expenditures, these data include both values and quantities at the firm-product level. This makes it possible to construct unit values and directly measure prices, rather than conflating price and quantity variation.

This level of detail is equally important on the input side. Output quantities are observed for each product, while material inputs are available in both value and quantity terms. Although inputs are measured in different physical units, the study constructs firm-specific material price deflators based on the composition of inputs used by each

firm. Labor is measured by the number of production workers, and capital by the book value of fixed assets. Altogether, this allows production functions to be estimated in quantities.

This is critical because markups are not directly observed. Recovering them requires separating prices into marginal costs and margins, even though domestic prices respond both to firms' own costs and to competitor prices (Amiti *et al.*, 2019). The study addresses this empirical challenge with a production-function approach in which firms' input choices reveal the gap between prices and marginal costs.

Two Channels of Exchange Rate Pass-Through

The study identifies two distinct channels through which a depreciation affects domestic prices. These can also be read as two dimensions of firms' integration into global markets: exposure to imported inputs on the cost side, and exposure to foreign competition on the demand side.

The first is the **cost channel**. When the currency depreciates, imported inputs become more expensive. Firms that use those inputs face higher marginal costs. The estimates show that a 10 percent depreciation raises marginal costs by about 2.9 to 3 percent. Prices also rise, but by less: about 2 percent. The gap between cost and price responses is key. It shows that firms do not fully pass higher costs on to customers, but instead absorb part of the shock by compressing their markups. Quantitatively, the cost channel reduces markups by about 0.159 log points, that is, roughly 1.6 percent, for a 10 percent depreciation.

The second is the **competition channel**. A depreciation also makes imported final goods more expensive in the domestic market. This weakens import competition. Domestic firms then face less pressure from foreign suppliers and can raise their markups. Holding costs constant, the estimates show that a 10 percent depreciation increases markups, and therefore prices, by about 0.077 to 0.080 log points, or roughly 0.8 percent.

These two channels point in opposite directions. Higher imported input costs squeeze margins because firms do not fully pass them on. Weaker import competition raises margins because firms gain some pricing power. This pattern is consistent with trade models in which firms adjust markups in response to competitive conditions, rather than treating demand as fixed (Mrázová and Neary, 2019). The study's central result is that both channels operate simultaneously, but the cost channel dominates quantitatively. Since the cost-channel effect on markups, about -0.159, is larger in absolute value than the competition-channel effect, about +0.08, the net effect on markups is negative.

The implication is straightforward: a depreciation is inflationary, but not only because it raises costs. It also alters the competitive environment in which firms set prices. The overall response of prices depends on the interaction between imported-input exposure and foreign competitive pressure.

Quantitative Effects of the 2014–2017 Depreciation

The full depreciation episode considered in the study amounts to about 40 percent against the US dollar. Once the estimated coefficients are applied to that shock, the magnitudes become easy to interpret. Firm-level prices increase by about 8 percent over the episode. Marginal costs increase by about 11 percent. Markups fall by about 3 percent.

These magnitudes make the decomposition concrete: prices rise, but by less than costs, which implies a decline in markups. Firms therefore absorb part of the increase in costs, even though weaker import competition pushes in the opposite direction.

From Firm-Level Prices to Aggregate Inflation

Translating these firm-level results into aggregate inflation requires caution, because the analysis focuses on domestically produced manufacturing goods, whereas the CPI includes imported goods and non-tradable services.

The study therefore performs a preliminary mapping to the CPI. Using CPI weights, tradable goods account for about 21 percent of the basket. Within tradables, imported final goods represent roughly 23 percent. This implies that the segment most directly covered by the firm-level estimates, domestically produced tradable goods, corresponds to about 27 percent of the CPI.

Using that mapping, the results imply that the roughly 40 percent depreciation, which raises firm-level prices by about 8 percent for the relevant goods, would translate into an increase in the overall CPI level of around 2 percent. This is a cumulative level effect, not a short-run monthly or quarterly inflation rate.

The study also shows that the effects are larger for firms that are more exposed to global markets, in particular importers and exporters. This is one of the broader contributions of the paper. Exchange-rate pass-through is not just a macroeconomic relationship; it depends on how firms are connected to the world economy. Importers are more directly exposed to the cost channel because a larger share of their inputs is purchased abroad, while internationally exposed firms are also more sensitive to changes in foreign competitive pressure.

The competition channel can also be translated into aggregate terms. Since a 10 percent depreciation raises prices by around 0.7 to 0.8 percent through weaker import competition, the implied contribution to the CPI is about 0.5 to 0.7 percentage points. This is not the whole inflation effect of the depreciation, because imported final goods and services are outside the core firm-level analysis. But it provides an order of magnitude and shows that the competition channel is economically meaningful, not just statistically present.

These figures help quantify the broader message. The depreciation did matter for inflation, but the effect was partial. This is because only part of the CPI basket is directly covered by the goods analyzed here, and because firms did not fully transmit higher costs into prices. Aggregate inflation therefore depends both on the composition of the consumption basket and on firms' pricing responses.

What the study changes in the policy discussion

The results change how exchange rate pass-through should be interpreted in policy discussions. A depreciation does not mechanically translate into higher prices. Instead, the response depends on how firms adjust both their costs and their markups.

The estimates show that firms only partially pass cost increases into prices: a 10 percent depreciation raises marginal costs by about 3 percent but prices by only about 2 percent. At the same time, weaker import competition allows firms to increase markups by about 0.8 percent. Exchange-rate pass-through therefore depends both on cost exposure and on competitive conditions. More broadly, the

results show that globalization is not neutral for inflation: firms that are more exposed to imported inputs or to foreign competition react more strongly to exchange-rate shocks.

For monetary policy, the implication is that exchange-rate pass-through should not be treated as a fixed coefficient. It varies with cost exposure and with the degree of competition. For competition policy, the implication is that market structure can amplify or dampen the inflationary consequences of external shocks. For statistical systems, the implication is that better micro data on prices and quantities can substantially improve the diagnosis of inflation.

References

- Amiti M., Itskhoki O. & Konings J., 2019, [International Shocks, Variable Markups, and Domestic Prices](#), *Review of Economic Studies*.
- De Loecker J., Goldberg P. K., Khandelwal A. K. & Pavcnik N., 2016, [Prices, Markups, and Trade Reform](#), *Econometrica*.
- Mrázová M. & Neary J. P., 2019, [Selection Effects with Heterogeneous Firms](#), *Journal of the European Economic Association*.

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