Box 4
The Recent Changes in the Exchange Rate and their Effects on the Economy

1. Performance of the Exchange Rate and some of its Determinants

The US dollar became stronger with respect to the major currencies of developed countries and against the average for emerging economies in 2022 (Table B4.1). Factors such as the uncertainty about the global economic performance caused by the invasion of Ukraine, the sharp increase in global inflation, and a more restrictive monetary policy by the Federal Reserve increased the demand for less risky and higher yielding safe-haven assets and put upward pressure on the dollar against the main currencies. In some emerging economies, the dollar exchange rate was also impacted by declines in the prices of export commodities in the second half of 2022 (such as crude oil and copper) and by idiosyncratic factors related to political uncertainty and macroeconomic imbalances.

Table B4.1
Currency Depreciation Against the Dollar in 2022

	Average (percentage)	End of (percentage)
Colombia	13.7	18.9
Chile	14.8	-0.1
Peru	-1.3	-4.9
Brazil	-4.4	-5.3
Mexico	-0.9	-5.0
Advanced[a/]	12.4	8.2
Emerging[b/]	9.1	5.1

a/ DXY Index consists of the euro, yen, pound sterling, Canadian dollar, Swedish krona and Swiss franc.
b/ FXJPEMCS Emerging Markets Index.
Source: Bloomberg.

In Colombia, the depreciation of the peso against the dollar reached 18.9% in 2022, a performance that was more accentuated in the second half of the year. This figure was higher than the depreciation registered by emerging countries (5.1% according to the FXJPMCS[1]) and by developed countries (8.2% according to the DYX[2]), not to mention the appreciations seen in several countries in the region. In addition to the global factors that also affected the peso's performance, there were other local factors such as the uncertainty seen in the first half of the year regarding the outcome of the presidential elections and, subsequently, the economic policies that the incoming government might implement. In this regard, when the reason why the Colombian peso depreciated the most against its peers in the region was analyzed, the technical staff's analysis suggests that this performance was partly due to factors such as: a more pronounced increase in the perception of risk in the country, and greater uncertainty and volatility of the Colombian currency.

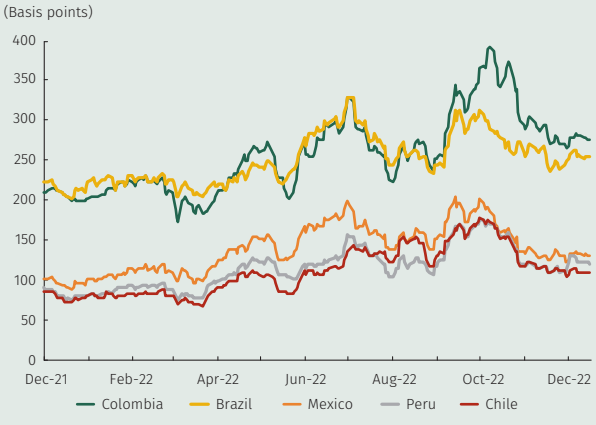
Changes in a country's risk perception are one of the main factors associated with exchange rate performance. For example, to the extent that an economy is perceived as riskier, its probability of insolvency increases and, as a result, investors may prefer to reduce their demand for bonds issued by that country and redirect their capital to other economies and thus put upward pressure on the exchange rate. In this regard, financial instruments measure this country's risk va-

1 Depreciation of emerging currencies against the dollar based on the JP Morgan index.

2 Average depreciation of advanced countries against the dollar according to the DYX index. The "U.S. dollar index," also known by its acronym: DYX, measures the value of the U.S. dollar relative to a basket of other currencies, including those of some of the United States' major trading partners. The currencies included in this basket are the euro (EUR), the yen (JPY), the Canadian dollar (CAD), the Swedish krona (SEK) and the Swiss franc (CHF).

luation and serve to hedge against a possible event of non-payment of a foreign currency debt security issued by a government. One of them is the so-called credit default swap (CDS),[3] in which higher values of this financial instrument reflect a higher perception of a country's risk. As shown in Graph B4.1, compared to the main economies in the region, Colombia's five-year CDS is the highest, and the difference is accentuated in the second half of 2022.

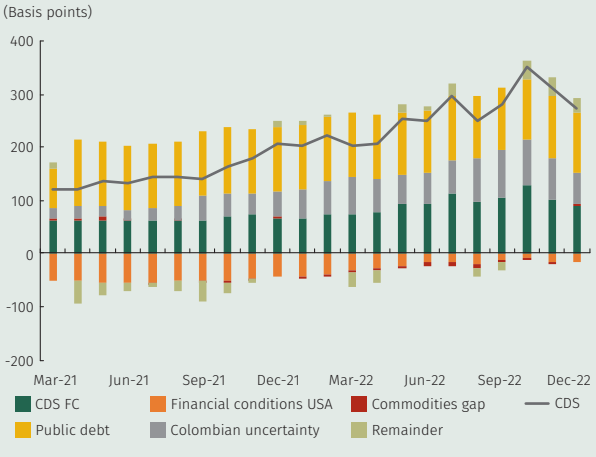
Graph B4.1
5-year CDS from Countries in the Region



Source: Bloomberg.

In general terms, local and global factors influence the country's risk premia. Regarding local factors, the literature emphasizes that those emerging countries with stronger macroeconomic fundamentals and less uncertainty about their policies and institutions have lower risk premia during episodes of stress in international markets. Regarding global factors, some authors[4] have found a close link between the risk premium of emerging countries and various events such as financial conditions in advanced economies, global and regional risk premia, and changes in raw material prices. In the case of Colombia, an exercise that breaks the five-year CDS down into its main determinants[5] indicates that the higher level registered in the risk premium during 2022 was primarily caused by a high level of public debt, less relaxed foreign financial conditions, a higher risk perception of emerging countries, and by a greater uncertainty[6] about local economic policies (Graph B4.2).

Graph B4.2
Breakdown of Colombian 5-year CDS



Source: Bloomberg, calculations by *Banco de la República*.

2. The Pass-Through of Nominal Depreciation to Domestic Prices and its Effects on other Variables

Fluctuations in the exchange rate of the peso against the dollar are transmitted to consumer inflation (annual change in the consumer price index: CPI) through at least three channels: two direct and one indirect.[7] The first, the cost channel, refers to the effect of exchange rate fluctuations on the prices of imported supplies and, subsequently, on producer and consumer prices. Indeed, the annual change in the producer price index (PPI) remained at high levels during 2022 (20.35% as of December), partly due to foreign factors, most notably the accumulated depreciation of the peso. The imported segment of the PPI registered an annual variation of 16.4% as of December 2022.

3 The CDS can be interpreted as insurance: in exchange for a fee paid to the seller, this product, which is a financial derivative, provides buyers with protection against losses they may incur when holding a government debt security that presents a credit event (*default* being the most common of these).

4 The most notable are, for example, Ahmed et al. (2017), Aizenman et al. (2011), Daehler et al. (2020), Ertugrul and Ozturk (2014), Fender et al. (2012), Gerlach et al. (2010), Kocsis and Monostori (2016), Longstaff et al. (2011), etc.

5 The exercise considers global factors (risk premium in emerging countries, financial conditions in the United States, raw material prices) and local factors (level of public debt, political and economic uncertainty).

6 The uncertainty indicator is constructed using techniques that analyze the language of a text, by counting the relative frequency of the word "uncertainty" (or its related words) in the monthly reports for Colombia prepared by *The Economist Intelligence Unit*. This indicator was initially developed by Ahir *et al.* (2018) for the world aggregate and for 143 countries individually including Colombia.

7 See Box 2: "Nominal Exchange Rate and Inflation in Colombia," in the March 2015 Report to Congress, available at: https://repositorio.banrep.gov.co/bitstream/handle/20.500.12134/7158/ijd_mar_2015.pdf?sequence=1&isAllowed=y

The second channel refers to the impact of the exchange rate on the prices of imported consumer goods that put direct pressure on total inflation. This channel also manifests through the change in demand for domestic goods as they replace competing imported goods. This has an effect on the change in the CPI, particularly on the prices of tradable goods.[8] Indeed, the CPI basket of goods showed a 15% annual change during 2022, partly the result of the transmission of the accumulated depreciation of the peso.[9] Finally, the performance of the exchange rate can also affect inflation indirectly since it can accentuate the performance of other important variables in the economy that impact agents' consumption and investment decisions and, therefore, affect consumer prices. For example, strong and persistent increases in the exchange rate can generate increases in asset prices such as housing and, through this channel, generate increases in rentals. They may also increase inflation expectations and contribute to higher wage increases agreed upon between workers and employers. These increases in labor costs will put upward pressure on inflation.

Therefore, it is important to measure and understand how prices in the economy respond to fluctuations in the exchange rate, an effect known in the economic literature as the *pass-through*.[10] This estimate is complex because domestic prices may be simultaneously affected by other shocks that are not easy to assess in isolation. Likewise, the pass-through depends on multiple factors, such as the state of the economy, the ability to replace an imported good with a local one, or the intensity and duration of the exchange rate phenomenon. In this sense, the transmission may be incomplete or delayed due, for example, to low demand, some degree of substitution between local and imported goods, or because agents may perceive exchange rate movements as transitory.

In the case of Colombia, available estimates indicate that the pass-through tends to be incomplete in both the short and medium term.[11] They also suggest that this pass-through to domestic prices of imported goods is significant, but not full, and is greater for producer prices than for consumer prices.[12] It is also lagged and can vary between one and three months in the case of the PPI and between two and three quarters in the case of the CPI. Furthermore, it has been found that the pass-through of exchange rate shocks to prices depends on the characteristics of each episode in which the depreciation occurs. In this sense, González *et al.* (2010) mention that, in the face of macroeconomic episodes considered "normal" (inflation close to target, without excess demand), the pass-through is higher when the economy is booming and inflation is high.[13] This finding would also have been seen in 2022 and the remainder of 2023, a period in which there has been an episode of a sustained increase in the exchange rate together with excess demand, high inflation, and a significant increase in the prices of imported goods.

Indeed, in 2022, the sustained and relatively high depreciation of the Colombian peso was one of the factors behind the continued increase in consumer inflation in Colombia, especially during the last few months of the year. This fact has been strongly driving the tradable component of the CPI, especially that of processed food and other goods which has continued to rise despite the overall drop in transportation and logistics costs. In fact, annual

8 Tradable goods are those that can be traded or exchanged both domestically and internationally. For example, books, shoes, machinery, etc.

9 The degree of transmission of these channels will depend, among other things, on the market power that importers and producers have in the local market and on how fast and costly it is for them to change their prices.

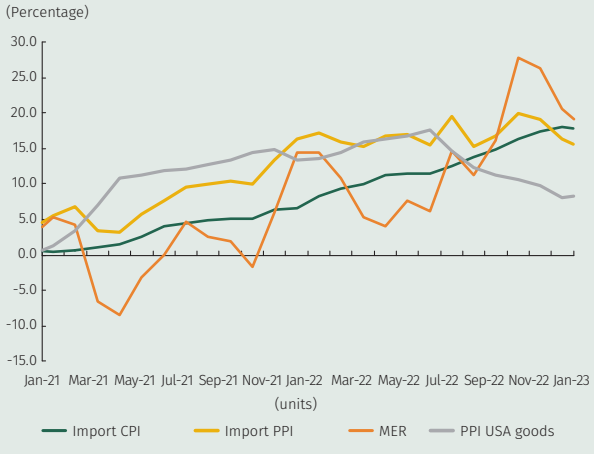
10 Some studies done to estimate the exchange rate pass-through to prices in Colombia are Rowland (2003); Rincón-Castro et al. (2005); Rincón-Castro et al. (2016); Rincón-Castro et al. (2017); Rincón-Castro et al. (2021); Parra-Álvarez (2008); Julio-Román (2019); González-Gómez (2008), etc.

11 See Box 2 of the September 2011 *Inflation Report*: "Exchange rate movements and their impact on inflation: what does the Patacon model say?

12 See Box 2 of the March 2016 *Inflation Report*, "Exchange rate pass-through elasticities to prices."

13 Also, when the real exchange rate is overvalued.

Graph B4.3
Imported CPI, Imported PPI, MER, PPI USA goods
(annual change)



Sources: DANE, *Banco de la República* and US Bureau of Labor Statistics.

adjustments in producer prices of goods in the United States and other countries have been easing over the past two quarters (Graph B4.3) but this trend has not been transmitted to consumer prices in Colombia. This is suggested by the trend in the prices of imported goods in the CPI, which continue to increase annually and which, in December 2022 (18.15%), reached the highest adjustment so far this century.[14] This sharp rise, in spite of the fall in international prices, can be explained by the significant depreciation of the peso against the dollar since the middle of last year.

Suppose the country's macroeconomic imbalances (fiscal and current account) are not reduced and the perception of country risk remains high. In that case, this may generate significant and persistent depreciations with undesirable effects on other relevant macroeconomic variables. For example, income distribution may deteriorate to the extent that depreciation increases the prices of a significant portion of the basket of poorer households and reduces their disposable income since they lack mechanisms to protect themselves from the inflationary tax. Indeed, while food and non-alcoholic beverages (the CPI group that is directly affected by the exchange rate) account for 23.78% in poor households and 22.24% in vulnerable households, they account for 15.80% in the middle class, and 8.16% in the high-income class.

High and persistent nominal depreciations affect inflation and expectations for it and make it more difficult to achieve the monetary authority's goal of maintaining low and stable inflation. This type of shock requires a greater effort in terms of the monetary policy interest rate with undesirable effects on aggregate demand and employment. As was mentioned recently in the communiqués of the Board of Directors of *Banco de la República*, the accumulated effects of the peso depreciation on prices have been one of the elements taken into account for the increase in the policy interest rate in the search for a way to return inflation to its 3.0% target.

Another undesirable effect of significant and persistent depreciations is their impact on the public debt levels. If a country has incurred debt abroad, the depreciation of the domestic currency will increase the cost of debt in pesos since the country has to pay more in domestic currency to service the same amount of debt in foreign currency. Similarly, depreciations tend to be accompanied by an increase in the perception of risk and increases in foreign financing costs. If markets associate a higher exchange rate with capital adequacy problems or high uncertainty in a country, investors will demand higher interest rates to compensate for the perceived higher risk. This translates into higher borrowing costs for the government. Both factors could generate additional spending pressure that might reinforce the risk perception of international financial markets and reduce the fiscal space for a countercyclical policy by the government. In Colombia, the share of foreign currency debt has increased recently. While by the last quarter of 2019 this represented 35.1% of CNG's total financial debt, by the third quarter of 2022, its share

14 Between May 2022 and January 2023, the cumulative price increase for this basket was 12.5%. During this period, the Colombian peso depreciated 22.7% against the dollar. In January and February 2023, the annual change in this basket was 17.67% and 17.57% respectively.

would have reached 42.1%. According to figures provided by the Ministry of the Treasury and Public Credit (MHCP) in the 2023 *Financial Plan*, the depreciation seen in 2022 would probably have generated upward pressure on the levels of public debt to GDP equivalent to 3.9% of the GDP (COP 56 t) while interest payments on foreign debt in 2022 would have reached 1.1% of the GDP (COP 17 t) which would be 0.3% of the GDP (COP 5.8 t)[15] higher than the value seen in 2021.[16]

15 The most recent *Financial Plan* of the MHCP projects an additional collection of COP 20.3 t in 2023 thanks to the Equality and Social Justice Act. The estimated increase in the debt balance is almost three times greater than the estimated proceeds of the reform. The higher interest payments on the CNG's foreign debt in 2022, in turn, represent a figure similar to the revenue projected by the Act.

16 MHCP (2022). *Financial Plan 2023*, Bogota, pp. 23 and 27.