Box 6

Foreign Exchange Position and Capital Adequacy Ratio

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1- Introduction

Exchange rate risk is a financial risk associated with the fluctuation of the exchange rate of one currency with respect to another and corresponds to the positive or negative difference resulting from the changes in that exchange rate over time. This risk is assumed by those agents who take active or passive positions denominated in a currency other than the one they use for their day-to-day transactions.

The excessive accumulation of foreign exchange risk on the balance sheets of local agents is a matter of concern for *Banco de la República* given that, in a strategy of inflation targeting and exchange rate flexibility, the rate of exchange absorbs external shocks that the economy receives and contributes to a less traumatic adjustment for it. However, the significant currency mismatches that the different agents in the economy have may limit foreign exchange flexibility since a strong shift in the exchange rate may jeopardize the financial stability of the country. This concern is greater in the case of financial intermediaries, because of their importance in the payment system and the provision of credit.

A description of the measures used in Colombia to seek to control the exchange rate risk, the existing disconnect between the capital adequacy ratio and one of *Banco de la República*'s macro prudential measures, and recent changes that were introduced in the measure are outlined in this box.

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2. Measurement of Exchange Rate Risk

2.1 Foreign exchange Position and Indicators of Foreign Exchange Risk

As the foreign exchange authority, the Board of Directors of *Banco de la República* (BDBR) sets the macro prudential measures to measure and control the foreign exchange risk of the foreign exchange market intermediaries (FEMI) and of the rediscount public institutions that are not FEMI, in order to limit such exposure, and thereby reduce the likelihood that these institutions may go into bankruptcy in the event of adverse movements in the exchange rate. In particular, the BDBR limits the foreign exchange exposure of these agents by putting limits on the net total foreign exchange position (NTFEP) and on the indicators of exchange rate risk (IERR).

The NTFEP measures the total foreign exchange exposure that the institutions assume at the individual level and its limits are defined as a percentage of the level of the total regulatory capital[1] (TRE) of each intermediary. Currently, the arithmetic average of 3 NTFEP working days has a lower limit of -5% of the TRE and an upper limit of 20% of the TRE (until March 25, 2019 there was a 30% upper limit of the TREfor the FEMI that have controlled investments abroad and are required to consolidate financial statements in accordance with the instructions of the Office of the Financial Superintendent of Colombia -SFC-).

Considering the fact that financial crises typically occur in environments of currency depreciation, the decision has been made to assign asymmetrical controls to the positions that the FEMI and the rediscount public institutions may assume in the foreign exchange market. The lower limit is intended to restrict the taking of short positions in foreign currency in order to reduce the likelihood of institutions going into bankruptcy in the event of scenarios in which the peso is devalued. In contrast, the upper limit seeks to prevent the institutions from taking significant long positions that might lead to them taking substantial losses in the event of an appreciation of the peso. The two limits also prevent the institutions from taking positions that may exacerbate the movements of the exchange rate.

Furthermore, the indicators of foreign exchange risk (IERR: indicator of positive exchange rate risk IERR+, and indicator of negative exchange rate risk IERR-) are designed to control the long and short positions separately in order to show the currency-currency mismatches. These indicators are calculated at the individual or consolidated level depending on whether the institution is or is not required to consolidate financial statements in accordance with the instructions of the SFC.

1 The total regulatory capital is composed of the elements of the equity and liabilities that have the capacity to absorb losses.

For the calculation of the IERR, one NTFEPper currency is estimated using the information from the individual or consolidated financial statements as appropriate, and subsequently, the positions that are positive (long) are added up by currency in the IERR+ and the positions that are negative (short) are added by currency in IERR-. The IERR+ has a limit of +40% of the TE, and the IERR- has a limit of -40% of the TRE (individual or consolidated as appropriate).

2.2 Capital Adequacy Ratio

The Basel Committee on Banking Supervision (BCBS) recommends controlling the exchange rate risk through capital, i.e., using the capital adequacy ratio, which is defined as the ratio of the TREto the risk-weighted assets. The idea behind this indicator is to try to reduce the principal-agent problem that exists when the banks invest public resources. Thus, an effort is made to ensure that banks have a minimum level of invested capital subject to the risks to which their business is exposed, and that this capital can be used as a basis for absorbing the institution's potential losses. In Colombia, the capital adequacy ratio is intended to ensure that the TRE of each institution is at least 9% of the assets adjusted for the risks to which it is exposed and is defined as:

$$RS = \frac{TRE}{RWA + \frac{100}{9} MR}$$

Where TRE represents the technical equity, RWA corresponds to the risk weighted assets to which they are exposed, and MR represents the market risk, defined as the maximum loss that the institutions may experience in their positions in the event of adverse movements of a price or rate in the market. This value is multiplied by a factor of 100/9 so that the potential unexpected loss from this risk will be fully backed by capital.

The exchange rate risk to which institutions are exposed is included in the calculation of market risk. This risk incorporates both the *trading positions* from the treasury book[2] and the positions included in the banking book[3] and uses some sensitivity factors to calculate the unexpected loss caused by fluctuations in the exchange rate. Although the BCBS suggests some sensitivity factors calculated for a horizon of 10 days, the sensitivity factors currently used in Colombia are based on an estimate for a horizon of 30 days and correspond to 12.49% for the dollar, 11% for the euro, and 13.02% for other currencies.

2.3 Trade-off between the NTFEP and the Capital Adequacy Ratio

Although the NTFEP and the capital adequacy ratio are intended to stop the institutions from taking excessive risks on their balance sheets, the way they are defined can generate contradictory incentives with respect to foreign exchange risk. Thus, while the NTFEP and IERR encourage foreign exchange coverage through liabilities, which in the event of a shock to the exchange rate protects the level of equity, capital adequacy encourages the coverage of risks with capital so that institutions have sufficient capital to hedge their exposure to various risks.4

In view of the above, if there is a risk of the peso appreciating, it would be favorable in the case of institutions with long positions in foreign currency to have their foreign exchange risk completely covered (since equity is not affected and, to that extent, the capital adequacy increases). In the event of a risk of depreciation that incentive may not occur due to the fact that the capital adequacy ratio would benefit or be less affected (if it decreases in the case of depreciation) if the foreign exchange position is uncovered.

To illustrate this point, a simple example is presented in which the following is assumed: the equity is equal to the TRE,5 the gains and/or losses due to changes in the exchange rate always affect the institution's TRE (the latter is still not applicable for the institutions at the individual level, but it is, in the case of the calculations at the consolidated level6), the factor of sensitivity to exchange rate risk is 8% and foreign exchange risk is calculated on the difference between assets and liabilities denominated in foreign currency (there are no other market risks).

2 The treasury book consists of the set of positions that are a product of the treasury operations that the entity maintains in order to benefit in the short-term from price fluctuations as well as those investments that are sensitive to fluctuations in market variables. Along this line, the treasury book covers, along with others, the total negotiable investments and investments available for sale (Basic Accounting and Financial Circular, Chapter 21, number 1.7).

3 The banking book consists of the set of positions from: (i) the institutions' income operations from the current and savings accounts, term deposits, the issuance of bonds, etc.; (ii) the loan portfolio; (iii) the establishment of guarantees and collateral, (iv) investments until maturity, and, in general, (v) any transaction that is not included in the treasury book (Basic Accounting and Financial Circular, chapter 21, number 1.6).

4 In addition, this measure seeks to align the incentives in the risk-taking by the shareholders of the institutions and their customers, by requiring a minimum level of capital to carry out various active operations.

5 The technical equity consists of instruments that have the capacity to absorb losses. Therefore, not all equity items are included in the TRE (for example: trade credit).

6 Currently, the measurement of the TRE does not include the effect of fluctuations due to changes in the exchange rate that go directly to the ORI (other comprehensive income). This generates an asymmetry between the TRE and the denominator of the capital adequacy ratio in the event of shocks to the exchange rate. This asymmetry will be resolved in February 2020 when the ORI becomes part of the TE.

There are two institutions with the following balance sheet:

Institution A	
Assets	**Liabilities**
COP 500	COP 500
USD 100	
	Equity
	COP 100
PP/Equity = 100%	
Initial CAR = 14.52%	

Institution B	
Assets	**Liabilities**
COP 500	COP 400
USD 100	USD 100
	Equity
	COP 100
PP/Equity = 0%	
Initial CAR = 16.67%	

Note: All values on the balance sheet are expressed in pesos. COP and USD indicate whether this amount is from an asset or liability denominated in pesos (COP) or in US dollars (USD).

Institution A has a fully uncovered long position in foreign currency due to which it has a 100% PP. In addition, it registers a capital adequacy ratio of 14.52%. Moreover, institution B has a balance similar to that of institution A, but with the difference that its position in foreign currency is fully hedged (PP equals 0%). When this institution is not exposed to exchange rate risk, it registers a higher capital adequacy (16.67%) given that its MR is zero. Assuming that there is a 50% depreciation of the COP/USD exchange rate, the following changes in the balance and capital adequacy of the institutions would be seen:

Institution A	
Assets	**Liabilities**
COP 500	COP 500
USD 150	
	Equity
	COP 150
PP/Equity = 100%	
Initial CAR = 19.15%	

Institution B	
Assets	**Liabilities**
COP 500	COP 400
USD 150	USD 150
	Equity
	COP 100
PP/Equity = 0%	
Initial CAR = 15.38%	

Note: All values on the balance sheet are expressed in pesos. COP and USD indicate whether this amount is from an asset or liability denominated in pesos (COP) or in US dollars (USD).

In the event of depreciation, the value in pesos of institution A's assets in foreign currency will rise by the same magnitude as its equity does. This could generate an increase in the capital adequacy ratio. In the case of Institution B, the assets and liabilities in foreign currency, in turn, would probably rise by the same value. This would lead to its equity remaining constant and, consequently, the capital adequacy of institution B would decline due to the increase in the denominator.

As can be seen, the institution that has their foreign exchange exposure hedged will see its capital adequacy negatively affected as a result of the depreciation of the currency while the institution that is assuming the foreign exchange risk registers an increase in their capital adequacy. This occurs because the hedging nullifies the effect of the depreciation of the peso on the equity (perfect coverage) whereas when there is no hedging or it is partial, depreciation of the currency leads to an increase in the equity and partially compensates for the rise in the denominator.[7]

If institution A would like to keep its capital adequacy constant at a ratio of 14.52% in the event of a peso depreciation of 50%, they would have to have liabilities at a value of 42 pesos denominated in USD, which would be equivalent to 27.8% coverage.

The above implies that in scenarios of peso depreciation, greater exchange rate risk hedging using liabilities could have negative effects on the capital adequacy ratio, or seen another way, the upper limit of the NTFEP could be restrictive for institutions that decide to have an uncovered long position to reduce the negative effect. This problem also occurs in economies with high degrees of dollarization[8].

2.4 Adjustment to the Capital Adequacy Ratio

Since Basel II, the BCBS has acknowledged that the institutions may wish to maintain their position in foreign currency without full hedging in order to decrease the effect on the capital adequacy ratio in the event of the shifts in the exchange rate. That is why it stipulated that the institutions that have a structural position in uncovered foreign currency for this reason may exclude the position from market risk with the approval of the supervisor.[9]

The problem with this approach is that the BCBS is ignoring the market risk that these positions have. This risk may be significant in emerging countries and, even more so, if the fact that structural investments are long-term is considered. During the period of flotation in Colombia, the peso has experienced an appreciation (investment risk that the BCBS allows to be excluded from the exchange rate risk in capital adequacy) of up to 44.3%.

Another approach, which the BCBS does not consider and that would definitely solve the problem of the capital adequacy ratio caused by the movements of the exchange rate, is that the assets weighed by the level of credit risk may not change as a result of movements in the exchange rate if they have total foreign exchange hedging.[10]

7 When the exchange rate coverage is partial, the institution's capital adequacy could decrease.

8 "The Exchange Rate Risk that Financial Institutions in Dollarized Economies Have." Superintendency of Financial Intermediation Institutions in Uruguay.

9 International Convergence of Capital Measurement and Capital Standards. 718 (xxxvii xxxviii).

10 Or change proportionally if they have partial hedging.

In Uruguay, a country with a high degree of dollarization, the decision was made to adjust the capital requirement for foreign exchange risk11 such that net foreign exchange exposure per currency would be determined as the difference between assets and liabilities in each currency12 while deducting the "structural position by currency", which is equivalent to the accounting equity multiplied by the proportion of assets in each currency13 and divided by the total assets.14 This helps to preserve the capital adequacy ratio without departing from what is established by the BCBS.

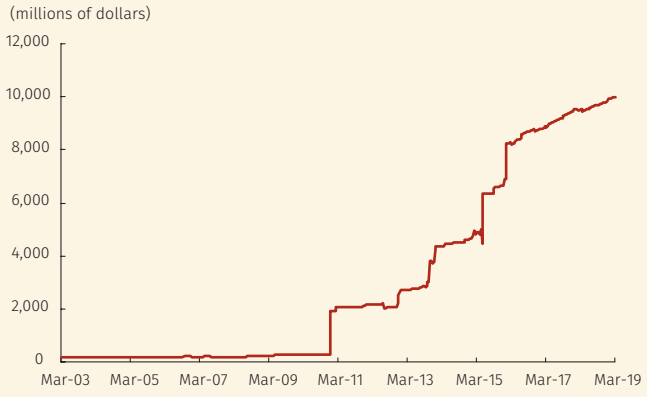
3. Exchange Rate Risk of Controlled Investments Abroad

The expansion of Colombian banking abroad has involved a change in the balance sheet structure of some intermediaries that has been reflected in a higher value of the investments denominated in foreign currency. In particular, as can be seen in Graph B7.1, the value of investments in subsidiaries, affiliates, and joint ventures, and the contributions in branch offices in foreign currency15 presents an increase from 2011 and, in March 2019, stood close to USD$10.000 billion for the FEMI total which, as a share of the total TE, is close to 35%.

The increase seen in the value of these investments reflects the acquisition of institutions abroad on the part of the FEMI and is affected by the adoption of International Financial Reporting Standards (IFRS), which required that the value of retained earnings abroad and all the trade credit generated by these acquisitions be included within the assets denominated in foreign currency.16

The increase in these investments in foreign currency within the balance sheets of some FEMI, has made the disconnect between capital adequacy and macro prudential measures that seek to limit the foreign exchange risk more evident since, as was explained, it may be desirable for some FEMI with growing foreign currency assets to be uncovered with respect to the exchange rate to protect their capital adequacy ratio in the event of adverse movements in the exchange rate.

Graph B6.1
Investments and Contributions in Subsidiaries and Branches



Source: Office of the Financial Superintendent of Colombia.

When this disconnect for the FEMI is analyzed, the conclusion was drawn that the exchange rate risk should be monitored regardless of the position that gives rise to the risk. However, considering the fact that the investments in subsidiaries and affiliates are not current, it was felt that it would be appropriate to modify the macro prudential measures of the FEMI in order to separate control of exchange rate risk from controlled investments and the exchange rate risk from other positions on the balance sheet. Thus, the BDBR made the following decisions on March 22, 2019:

- To exclude the FEMI that have controlled investments abroad and are required to consolidate financial statements in accordance with instructions from the FSC, the value of these investments and the value of the derivatives as well as other obligations designated by the FEMI governing body as hedging instruments for these investments in compliance with the IFRS hedge accounting requirements from the calculation of the PP. This way, the NTFEP restricts the foreign exchange risk of the foreign currency positions other than capital investments as was envisaged at its origin in the 1990s.
- To create the Position of Controlled Investments Abroad (PCIA) to measure and monitor exchange rate risk of the FEMI controlled investments abroad.

Adopting the solution referred to in section 2.4 was not considered as it departs from what has been defined by the BCBS for the calculation of the capital adequacy ratio.

4. Position of Controlled Investments Abroad (PCIA)

As the macro prudential measurement of the FEMI, the PCIA makes it possible to monitor the foreign exchange rate risk of the controlled investments abroad and helps to reduce the disconnect between the NTFEP and the capital adequacy ratio since these investments can be used to immunize capital adequacy without being affected by the upper limit of the PP.

11 Document entitled "The Exchange Rate Risk that Financial Institutions in Dollarized Economies Have." Superintendency of Financial Intermediation Institutions in Uruguay.

12 Including the net delta position equivalent in options on that currency.

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14 $A_i - P_i - K\frac{A_i}{\sum_{i=1}^{n} A_i}$, where i corresponds to each currency.

15 This value corresponds to what was reported on format 230 (Report of its proprietary position) and includes, in addition to the investments, the contributions in foreign branches.

16 The FEMI which had included the trade credit in legal currency in their accounting prior to the adoption of IFRS, had to include it in the assets denominated in foreign currency.

The PCIA is calculated as the difference between the value of the controlled investments abroad, and the value of the derivatives and other obligations designated by the governing body of the FEMI as hedging instruments of said investments in compliance with the IFRS hedge accounting requirements:

$$\textbf{\textit{PCIA}} = \textit{controlled investments abroad - liabilities designated as hedging for such investments.}$$

The PCIA cannot exceed the equivalent in foreign currency to one hundred and fifty percent (150%) of the technical capital for controlled investments, which are defined as:

$$PT_{IC} = PT - \frac{11{,}5}{100}\left(APNR^{o} + C_{IC} + \frac{100}{9}\,VeR\,RM^{o} + \frac{100}{9}\,VeR\,RO\right)$$

The PT_{IC} purports to measure the remaining technical equity once the rest of the risks that the intermediary is exposed to (credit, market and operational) are discounted under the consideration that for every 100 pesos of exposure, the institution must have 11.5 pesos in capital and a factor of sensitivity to exchange rate risk for unhedged, controlled investments (44.3%).

5. Conclusions

The excessive accumulation of foreign exchange risk on the balance sheets of local agents is a matter of concern for BR and, to that extent, there are a series of macro prudential measures which seek to limit exposure to that risk that are applicable to the FEMI and some that are applicable to the rediscount public institutions that are not FEMI.

The BCBS recommends controlling the exchange rate risk of financial institutions through capital, i.e., through the capital adequacy ratio. However, for institutions with long positions in foreign currency, it may be more expedient to assume currency risk (uncovered positions in foreign currency) because that would allow them to protect the capital adequacy ratio from changes in the foreign exchange rate.

The expansion of Colombian banking abroad has involved a change in the balance sheet structure of some intermediaries that has been reflected in a higher value of the investments denominated in foreign currency. This has made the disconnect between capital adequacy and macro prudential measures laid down by the BDBR to limit the foreign exchange risk for the FEMI more evident.

When the disconnect between capital adequacy and the macro prudential measures was analyzed for Colombia, it was considered expedient to modify one of the FEMI macro prudential measures in order to separate the monitoring of the foreign exchange rate risk for controlled investments from the exchange rate risk for the other positions on the balance sheet.

Thus, the Board of Directors decided on March 22, 2019: 1) to exclude (the FEMI that have controlled investments abroad and are required to consolidate financial statements in accordance with instructions from the FSC), the value of the controlled investments and the value of the derivatives as well as other obligations designated by the FEMI governing body as hedging instruments for these investments in compliance with the IFRS hedge accounting requirements from the calculation of the PP. 2) to create the PCIA to measure and monitor the exchange rate risk for the FEMI's controlled investments.