

# The monetary and macroprudential policy framework in Colombia in the last 30 years: lessons learnt and challenges for the future

*Leonardo Villar, Javier Gómez,<sup>1</sup> Andrés Murcia,<sup>2</sup> Wilmar Cabrera<sup>3</sup> and Hernando Vargas<sup>4,5</sup>*

## Abstract

Over the past 30 years, Colombia's monetary and macroprudential policy framework has evolved in pursuit of a credible low inflation objective and a more stable financial system. To some extent, the framework is shaped by both the entrenched inflation that started in the early 1970s and the financial vulnerability build-up of the 1990s, which led to the financial crisis at the end of the 20th century, a full-blown economic crisis that was part of the emerging market crisis in 1997–99 and involved both external and internal financial sector aspects, among others.

This chapter describes the evolution of the monetary and macroprudential policy framework in Colombia (Sections 1 and 2). It also discusses some of the lessons learnt from the implementation of the monetary and macroprudential framework (Section 3). Finally, the chapter concludes with some present and future challenges, namely the need to return inflation to its target and the need to preserve financial stability as financial deepening and capital market development proceed in a financial system that has become complex and international (Section 4).

## The evolution of the monetary policy framework

In the early 1970s, Colombia experienced rising inflation similar to that in other advanced economies (AEs) and emerging market and developing economies (EMDEs) (Graph 1). The upsurge in inflation in Colombia did not reach the hyperinflation levels of other Latin American countries, but it did become entrenched, not to be subdued until the dawn of the new century.

In 1991, after almost 20 years of moderate inflation, the new Political Constitution made the Banco de la República, the central bank of Colombia (CB), responsible for

<sup>1</sup> Senior Economist, Banco de la República (Central Bank of Colombia).

<sup>2</sup> Chief Officer for Monetary Operations and International Investments, Banco de la República.

<sup>3</sup> Director of Operations and Market Analysis Department, Banco de la República.

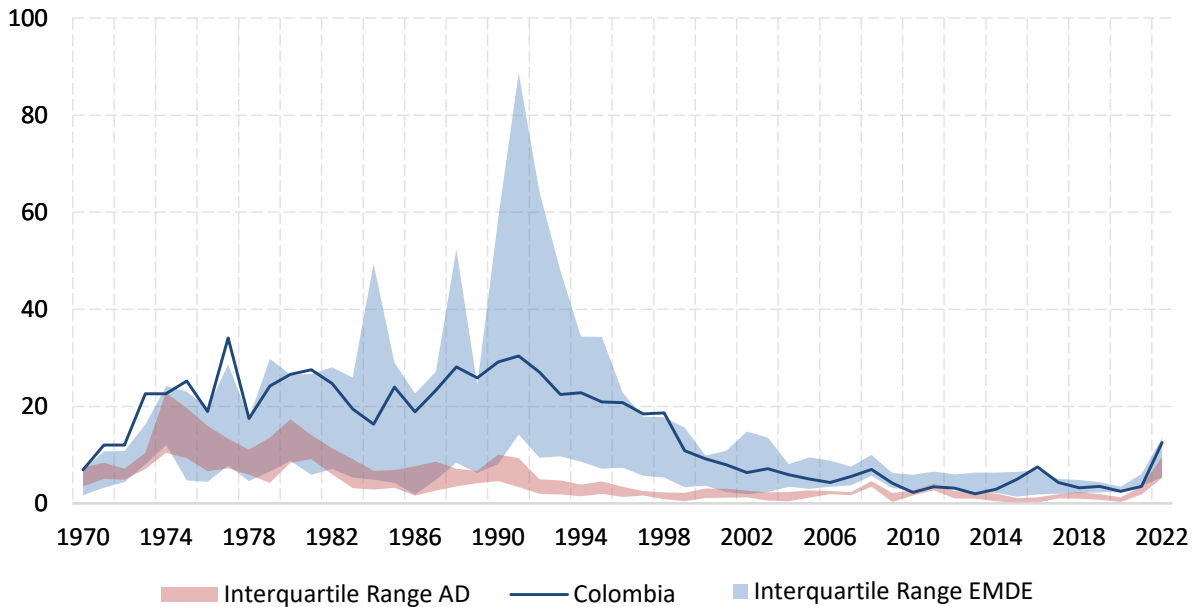
<sup>4</sup> Technical Deputy Governor, Banco de la República.

<sup>5</sup> The authors thank Ana Aguilar, Juan Esteban Carranza, Adolfo Cobo, Jon Frost, José Eduardo Gómez, Juan Sebastián Mariño, Miguel Sarmiento, Philip Symington, Daniela Rodríguez and Christian Upper for their comments; the authors are also grateful to Álvaro Carmona, balance of payments expert, for data and José Manuel Gamarra for his excellent research assistance.

maintaining the purchasing power of money and endowed the CB with the legal, technical and operational independence necessary to achieve the inflation objective.<sup>6</sup>

Colombian inflation in the international context

Graph 1



EMDEs: Argentina, Cambodia, Chile, China, Colombia, Hungary, India, Indonesia, Iraq, Iran, Kenya, Mexico, Malaysia, Peru, Philippines, Poland, Romania, Russia, Saudi Arabia, South Africa, Thailand, Turkey.

AEs: Australia, Canada, Czech Republic, Denmark, Hong Kong SAR, Iceland, Israel, Japan, Korea, Norway, New Zealand, Singapore, Sweden, Switzerland, United Kingdom, United States, Euro Area.

Sources: Ha et al (2021); central bank websites; Federal Reserve Bank of St. Louis, Federal Reserve Economic Data; authors' calculations.

To lead the CB, the Political Constitution created an independent Board of Directors consisting of seven members,<sup>7</sup> including the Minister of Finance,<sup>8</sup> who would also be the president of the Board. The Political Constitution states that the Governor of the CB is a member of the Board, appointed by the Board itself for periods of four years not to exceed three consecutive periods.<sup>9</sup> It also states that the remaining five members represent the interest of the nation and are appointed by the President of the Republic for overlapping periods of four years, also not to exceed three consecutive periods for each member.<sup>10,11</sup>

Despite the central bank's independence and the explicitly stated goal of inflation as the main objective of monetary policy, low single-digit inflation was not achieved during the 1990s. The central bank struggled to maintain monetary targets

<sup>6</sup> See Article 371 of the Political Constitution.

<sup>7</sup> See Article 372 of the Political Constitution.

<sup>8</sup> In Spanish, *Ministro de Hacienda y Crédito Público*.

<sup>9</sup> See Article 43 of Decree 2520 of 1993.

<sup>10</sup> The President of the Republic appoints two members during the second half of their mandate. In case of resignation of one of the members, the president also appoints a replacement for the remainder of the four-year term. See Articles 34 and 35 of Law 31 of 1992.

<sup>11</sup> Hamann et al (2014, p 6) point out that this arrangement was established to preserve the CB's independence, as most of the Board members are appointed by the previous president.

as well as exchange rate bands, an endeavour that proved considerably difficult under increasing capital mobility.<sup>12</sup> A sudden stop in capital flows at the end of the 1990s hit an economy that featured an exchange rate band, pervasive financial fragilities and increasing government financing needs. Against this backdrop, the exchange rate band system in Colombia, like many others around the world, became unsustainable.<sup>13</sup>

In September 1999 the Colombian peso was allowed to float in the context of an agreement between Colombia and the International Monetary Fund (IMF).<sup>14</sup> At the outset, the arrangement included targets for monetary aggregates, yet monetary targets were rapidly waived on the grounds that the monetary policy framework had evolved into a fully-fledged inflation targeting (IT) regime.

## Overview of capital inflows

As in most EMDEs with international capital mobility, capital inflows in Colombia have been a key driver of the exchange rate and a critical factor in financial stress. Graph 2 shows capital inflows and outflows, illustrating the ebb and flow of foreign capital movements in Colombia, which mark important events in the world economy and in Colombia.<sup>15</sup>

The literature emphasises the role of external (“push”) factors, mainly the VIX (see eg the survey by Koepke (2019)), as drivers of capital flows. Related literature around the global financial cycle (GFCy) also gives relevance to the VIX, although indirectly, given that the effect of US interest rates on the GFCy is limited to at most a third of the variance decomposition of the GFCy (see Bekaert et al (2013), Rey (2015) and Bruno and Shin (2015)). Thus, the swings in capital inflows shown in Graph 2 are important factors in financial stress in Colombia; they are inversely related to the VIX and directly related to Rey’s (2015) common factor for the GFC.<sup>16</sup>

## The implementation of the IT regime

An IT regime is commonly defined by a number of key characteristics: an inflation target, a forward-looking operational procedure, transparency and accountability. The monetary policy goal of low inflation and the accountability of the CB were established in the Political Constitution of 1991. In turn, the forward-looking operational procedure and the element of transparency, understood as an inflation projection and Inflation Report (IR) that use a forward-looking inflation model, were formalised in March 2001,<sup>17</sup> though some of these characteristics had already been

<sup>12</sup> The argument for a transparent solution to this trilemma is put forth by Fischer (2001). A similar argument in the context of Colombia is underscored by Gómez-Pineda (2006).

<sup>13</sup> See Fischer (2001, p 5), who notes that “soft exchange rate pegs are not sustainable”.

<sup>14</sup> It was an Extended Fund Facility arrangement that would later become a Stand-By Agreement. Urrutia Montoya (2002, p 15) points out that the arrangement helped avoid a possible exchange rate depreciation.

<sup>15</sup> The figure shows the run-up to the financial crisis of the end of the 1990s, the Latin American financial crisis, the burst of the dotcom bubble, the risk-on episode at the time of the Great Moderation, the GFC, the rise in global liquidity, the taper tantrum talk and the pandemic.

<sup>16</sup> For a review of the effect of the GFCy in Colombia, see Sarmiento et al (2023).

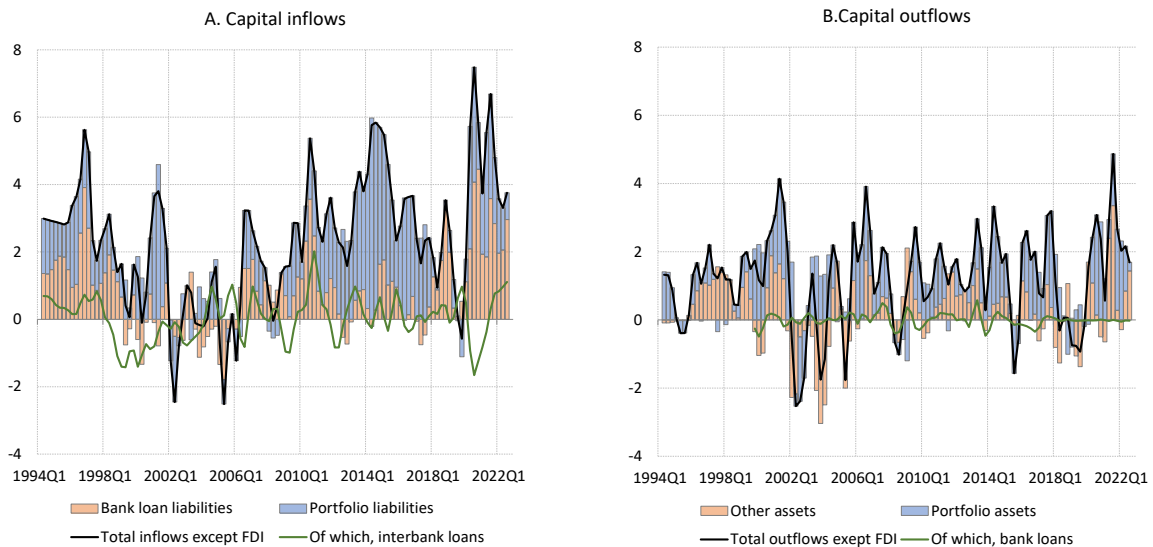
<sup>17</sup> Urrutia Montoya (2002, p 20) notes that “the refinement of inflation forecasting models was a necessary condition for the formal adoption of inflation targeting”.

introduced before. Indeed, from September 1999 through end-2000, decisions about the instrument of monetary policy in Colombia were made in the form of growth targets for the monetary base (Hernández-Gamarra and Tolosa-Buitrago (2001)).

In what follows, we organise our presentation of the evolution of IT in Colombia around these IT characteristics.<sup>18</sup> We also discuss FX intervention because it has been a feature of the central bank policy framework in Colombia.

## Capital inflows and outflows

Graph 2



Note: Bank loan liabilities were approximated from the balance of payments as “Other investment” and “Other liabilities incurred” and excluding other liabilities incurred by the CB. Portfolio inflows were taken from the balance of payments as “Portfolio investment liabilities” and “Net liabilities incurred”. “Other assets” include bank deposits, bank loans, assets of insurance companies and credit granted by suppliers. Dollar GDP was smoothed with a local linear trend model. Data in percent of GDP was smoothed with the following two-sided truncated exponential filter:  $\frac{1}{4} \times (t - 1) + \frac{1}{2} \times t + \frac{1}{4} \times (t + 1)$ .

Sources: From 1996–2002: Central Bank of Colombia, quarterly balance of payments statistics; from 1994–95: Central Bank of Colombia, yearly balance of payments statistics.

## The inflation target

As said above, the Political Constitution in 1991 established low inflation as the goal of monetary policy. The Political Constitution also required the CB to carry out the central banking function with administrative autonomy.<sup>19</sup> This legal setup gave the CB the necessary independence to establish a specific numerical value for the inflation target.<sup>20</sup>

Inflation targets have taken the form of both point and range targets. In most EMDEs, the point target or the middle of the range target has been set at 3%.<sup>21</sup> This has also been the case of the long-term target in Colombia. In November 2002, the

<sup>18</sup> For a narrative account of IT under the different macroeconomic developments that took place during 1999–2015, see López-Enciso et al (2017, pp 483–513).

<sup>19</sup> See Articles 371–73 of the Political Constitution and Ruling C481-99 of the Constitutional Court.

<sup>20</sup> This is also underscored by González et al (2019).

<sup>21</sup> In comparison, in most advanced economies, the point target or the middle of the range is most commonly 2%.

CB announced a long-term inflation target of 3% (Gómez-Pineda et al (2002, p 10)) and followed a process of gradual disinflation. Although price stability literally means zero inflation, a small but positive inflation rate can help incorporate an inflation bias that could arise due to increased quality of the goods in the CPI. At the same time, it can help avoid the major limitations and costs to monetary policy of the effective lower bound on the policy interest rate.<sup>22</sup> The effective lower bound has substantial costs in terms of the inability of conventional monetary policy to stimulate aggregate demand during a recession.<sup>23</sup>

After the disinflation process was complete, the CB reiterated that, starting in 2010, the inflation target would be permanently set at 3%, within a two-percentage point range.<sup>24</sup>

## The forward-looking operating procedure

The second characteristic of an IT regime is a forward-looking operational procedure. This procedure is based on a dynamic forward-looking inflation model so that inflation projections are consistent with an interest rate policy path. An inflation model also enables the construction of scenarios for policy and risk analysis.

A forward-looking inflation model was introduced at the CB in October 2000 (the transmission mechanisms model, MMT per its acronym in Spanish; see Gómez-Pineda and Julio-Román (2001) and Central Bank of Colombia (2001b)). The semi-structural MMT included the monetary transmission channels now standard in inflation models. The model emphasised both the strong aggregate demand channel and inflation inertia as key features of the inflation process in Colombia. It also included the main shocks relevant to the country, namely a disinflation shock, a risk premium shock and a food inflation shock. The semi-structural MMT was incorporated into the March 2001 monetary policy decision process and the Inflation Report.<sup>25</sup>

In October 2000, the Board of the CB adopted a two-pillar strategy for the monetary policy framework (Urrutia Montoya (2000)). The strategy, akin to that implemented at the time by the ECB, included both IT and monetary base targets. This strategy provided a transitional phase in the move towards IT to allow for the build-up of knowledge about the transmission mechanisms of monetary policy (Gómez-Pineda et al (2002, pp 7–8)). The monetary pillar was implemented based on the assumption of a relatively stable demand for money (Gómez-Pineda et al (2002, p 6)).

In 2002, with technical assistance from the IMF, a new version of the semi-structural MMT was set up on an improved platform.<sup>26</sup> This version was used for policy decisions and the central projection of the IR until 2019. Shortly after the introduction of the forward-looking operational procedure, and considering the

<sup>22</sup> Another effect is that it can enable changes in relative prices that otherwise would not take place under zero inflation.

<sup>23</sup> In this light, shortly after the GFC, Blanchard et al (2010) and Ball (2014) argued that, in the context of advanced economies, an increase in the inflation target would reduce the likelihood of hitting the effective lower bound on interest rates.

<sup>24</sup> For a list of the short-term inflation targets in Colombia, see López-Enciso et al (2017, p 522).

<sup>25</sup> Research on the transmission mechanisms of monetary policy and testing of the semi-structural MMT was carried out in Central Bank of Colombia (2001a) and (2001c).

<sup>26</sup> The new platform ran on Iris-Matlab, in contrast with the former platform, which ran on Winsolve, a software programme developed at the Bank of England.

evidence on the instability of money demand, the monetary targets of the transitional two-pillar strategy lost pre-eminence or were abandoned. Indeed, IMF (2003, p 4) states that the CB would “continue to cast monetary policy within and IT framework and a floating exchange rate regime”.

To enhance the forward-looking operational procedure, in 2002 the CB created a Macro Modelling Division. Since its establishment, the Division has carried out work on the transmission mechanisms of monetary policy and has also supported periodic forecasting rounds.

As IT developed around the world, leading central banks introduced dynamic stochastic general equilibrium (DSGE) models into the forward-looking operating procedure. The CB first incorporated a DSGE inflation model into its forecasting in June 2011. The model, called PATACON (González et al (2011)),<sup>27</sup> is a rational expectations DSGE model tailored for the Colombian economy. It is used for forecasting and policy analysis.

In 2019, the semi-structural MMT morphed into a four-goods model (4GM, see González et al (2020)).<sup>28</sup> The semi-structural 4GM incorporated four Phillips curves covering foods, regulated prices, goods and services. It also included trends for the real exchange rate and relative prices, as well as some features of the real economy that were considered relevant to a model tailored to Colombia, such as the price of oil and the terms of trade. The semi-structural 4GM was incorporated into policy discussions in December 2018 and into the Monetary Policy Report<sup>29</sup> (*Informe de Política Monetaria*, or MPR), in September 2019.

## Transparency and communication strategy

Transparency stems from communication to the public of the rationale behind policy decisions. Several communication instruments have served this purpose, namely a press release published after policy meetings, which includes the distribution of Board members’ votes; a press conference that explains the rationale behind decisions to the media; policy meeting minutes explaining the policy decision, the opinions shared by the members of the Board and their main differences; and the MPR, made public and presented a few days after the policy meeting. In addition, technical documents are made available through the CB’s working paper series, *Borradores de Economía*,<sup>30</sup> as well as in Boxes in the MPR. Of these, the MPR is the most comprehensive technical communication instrument and so deserves some comment.

The first IR with an inflation projection constructed on the basis of an inflation model with an endogenous policy path was published in March 2001.<sup>31</sup> At this time,

<sup>27</sup> The calibration of the DSGE PATACON model and the main impulse responses are presented in Bonaldi et al (2011). When they were launched, the DSGE PATACON and semi-structural 4GM ran on a Dynare-Matlab platform.

<sup>28</sup> The semi-structural 4GM is less backward-looking than the semi-structural MMT, which used to emphasise inflation rigidities during disinflation. Regarding the evolution of the transmission mechanisms of monetary policy, see for instance Mohanty and Turner (2008).

<sup>29</sup> The Inflation Report had been transformed into the Monetary Policy Report (MPR) by this point.

<sup>30</sup> The CB’s working paper series can be found at [repositorio.banrep.gov.co/handle/20.500.12134/5018](https://repositorio.banrep.gov.co/handle/20.500.12134/5018).

<sup>31</sup> A monthly internal IR has circulated within the CB since 1995. A quarterly IR was first made public in January 1999.

the IR also started using an inflation fan chart to evaluate uncertainty and risks to the outlook, which are also inputs to the policy decision.<sup>32, 33</sup>

With the outbreak of the pandemic, given the unprecedented level of uncertainty in the outlook, the fan chart ceased to be published for a brief period. The pause served to introduce an important enhancement to the communication strategy. Starting with the July 2021 MPR, uncertainty and risks to the outlook were built using the predictive densities method.<sup>34</sup> With the new method, the forward-looking distributions of the variables of interest, mainly inflation and output, are consistent with each other.

In October 2019, to enhance the analysis and discussion of the monetary decision process, the number of meetings at which the Board makes monetary policy decisions was reduced from 12 to eight per year (Central Bank of Colombia (2019b)). The Board of the CB continues to meet monthly, holding a total of 12 meetings a year, but as of October 2019, it does not, in principle, make monetary policy decisions in February, May, August or November. In addition, the IR was made more forward-looking and concise, and its name was changed to MPR.

## Accountability

In the pursuit of its price stability IT mandate, the CB is accountable to Congress as well as to the public at large. At the same time, in the pursuit of other central banking functions, the CB is accountable to other public entities.<sup>35</sup>

Biannually, within 10 days of the beginning of Congress' ordinary sessions, the Board of the CB presents a report to Congress (*Informe de la Junta Directiva al Congreso de la República*) on the current developments and outlook of monetary policy as well as on the administration of international reserves and the CB's financial statements. Furthermore, the Economic Commission of Congress can ask for any report it deems necessary in the pursuit of its functions, and the Governor and the members of the Board can be summoned to explain the content of the report to Congress as well as the policies implemented.

The CB is also accountable to the public. After every monetary policy meeting, the Minister of Finance and the Governor of the CB hold a press conference for an audience of communications professionals and answer questions from them. In

<sup>32</sup> The fan chart was explained in the March 2001 IR; the technical details appear in Julio-Román (2007).

<sup>33</sup> The level of uncertainty in the fan chart was constructed first using a notion of statistical uncertainty and later using the history of inflation forecast errors. The balance of risks was constructed using an evaluation of the different shocks that could materialise over the forecasting horizon. The fan chart was constructed by overlaying the level of uncertainty and the balance of risks on the central projection of the semi-structural MMT.

<sup>34</sup> In contrast with the previous fan-chart method, in which uncertainty and risks were overlayed on the central inflation projection, the predictive densities method uses the expected probability distribution of the shocks within the macroeconomic model to get a full distribution of the main macroeconomic variables. This method was explained in Central Bank of Colombia (2021b).

<sup>35</sup> In its capacity as a central bank with its own legal regime, the CB is supervised by the Superintendency of the Financial Sector (*Superintendencia Financiera de Colombia*, or SFC) and controlled by an auditor appointed by the President of the Republic. The supervision function is as stated in Articles 46 and 47 of Law 31 of 1992, and the control function is as stated in Articles 70 and 71 of Decree 2520 of 1993. In addition, as a public entity, the CB is subject to fiscal control by the Office of the Comptroller (*Contraloría General de la República*) and has a disciplinary regime overseen by the Office of the Attorney General (*Procuraduría General de la Nación*).

addition, three days after the press release and press conference, the Deputy Governor of the CB presents the MPR to the public and also answers questions from the audience.

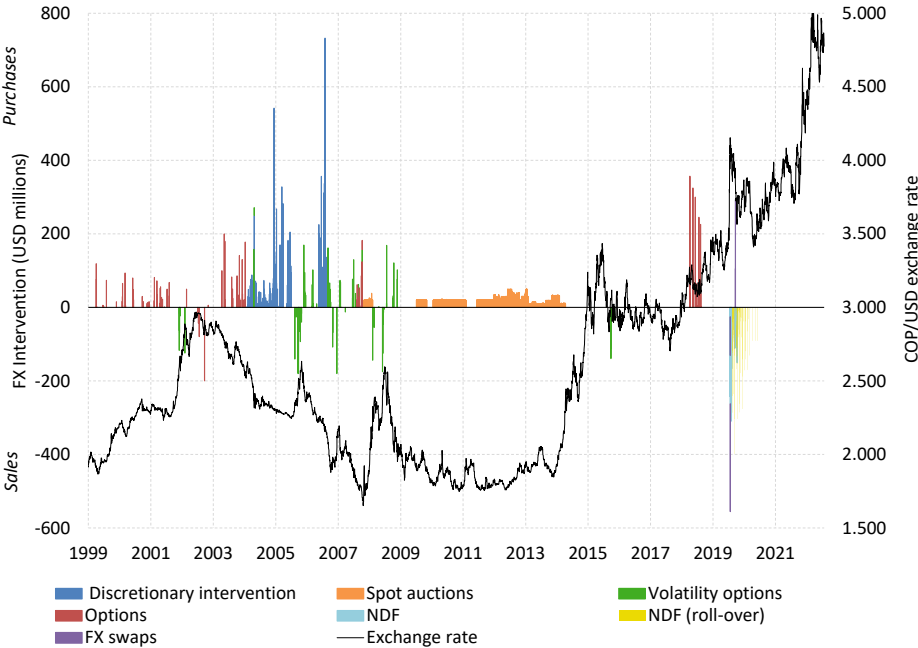
### FX intervention

Colombia has one of the most flexible exchange rates among EMDEs. The monetary policy regime has made the exchange rate the first line of defence against capital flow swings as well as other external shocks, thus enabling monetary autonomy and reducing real volatility in the face of external shocks. In addition, the floating exchange rate has helped to contain the incentives for exchange rate risk-taking (see eg Vargas (2011)).

As has been the case with CBs in other EMDEs and even in some AEs, the CB intervenes in the FX market. In Colombia, this has been the case since the exchange rate was allowed to float (Graph 3). FX intervention in Colombia has had three explicit motivations: to accumulate international reserves, to reduce exchange rate volatility and to moderate deviations of the exchange rate from trend (see Rincón et al (2020) and Vargas (2011)). In addition, during the pandemic crisis, the CB intervened to preserve FX market liquidity and to support the supply of FX hedging alternatives (Central Bank of Colombia (2023, p 80)).

The floating exchange rate and FX intervention

Graph 3



Note: The left axis shows the data as stacked columns.

Source: CB website.

The literature on fear of floating (eg Calvo and Reinhart (2002)) has established that CBs in EMDEs intervene to offset both the financial channel of the exchange rate



and the pass-through of the exchange rate to inflation.<sup>36</sup> Still, as noted below, ever since the Colombian peso was allowed to float and several macroprudential policies were implemented, the strength of both the financial channel of the exchange rate and the pass-through to inflation appears to have receded.<sup>37</sup>

Graph 3 shows the amount of FX intervention implemented by the CB along with the direct COP/USD exchange rate. The graph suggests that FX purchases tend to take place during periods of Colombian peso appreciation, and sales, during depreciation. Beyond these short-term interventions, over the long term, FX intervention has helped to achieve the reserve accumulation objective, one of the stated goals of FX intervention in Colombia. The CB generally aims at maintaining international liquidity (reserves plus the flexible credit line from the IMF)<sup>38</sup> close to the current account deficit plus expected payments on external debt for the following year, plus an estimate of capital outflows in the event of external financial stress.<sup>39</sup>

As mentioned above, the CB has also recently intervened to preserve the liquidity of the FX market. In particular, intervention during the pandemic crisis aimed to provide market participants with alternatives for their FX hedging needs and short-term liquidity in foreign currency. From March 2020 to March 2021, the CB sold dollars through non-deliverable forward (NDF) contracts to offset potential restrictions across hedging instruments.<sup>40</sup> In March and April 2020, the CB performed 60-day FX swaps to provide short-term dollar funding.<sup>41</sup>

BIS (2019, p 41) underscores that the effect of FX intervention on the exchange rate may not be trivial and reviews some literature explaining the effect. By contrast, in the literature for Colombia, the effect of FX intervention on the exchange rate has been found to be small and short-lived (see Rincón et al (2020) and the references therein). In implementing FX intervention, the CB carries out a cost-benefit analysis, including the possible small and short-lived effect of FX intervention on the exchange rate (Rincón et al (2020)).

## The evolution of the macroprudential policy framework

Macroprudential policy seeks to limit financial crises and their macroeconomic costs by protecting the resilience of the financial system (Crockett (2000), Borio et al (2001), Galati and Moessner (2013), IMF-FSB-BIS (2016)). In pursuit of this objective,

<sup>36</sup> In addition, it has recently been pointed out that FX intervention can have a macroprudential role as it can offset the effect of capital movements on credit (see Hofmann et al (2021)).

<sup>37</sup> The term “macroprudential policy” was not widely used before the Great Financial Crisis (GFC). McCauley (2009) points out that EMEs were early adopters of policies with a macroprudential objective, though they did not label them as such.

<sup>38</sup> In a way, Colombia’s access to the IMF FCL in 2009 was an endorsement of the quality of the country’s monetary, fiscal and macroprudential policy framework.

<sup>39</sup> See Central Bank of Colombia (2021a), Rincón et al (2020), Central Bank of Colombia (2023, p 79–83) and Vargas (2011). These criteria follow the IMF (2016) Assessment of Reserve Adequacy (ARA) criteria; at the same time, these criteria also resemble the Liquidity Coverage Ratio at a macroeconomic level.

<sup>40</sup> In the NDF, the CB sells dollars forward and, on the due date, pays the difference between the spot rate and the forward rate.

<sup>41</sup> In the swap contract, the CB sells dollars spot and buys the same amount at some point in the future. See Central Bank of Colombia (2023, p 81).

authorities implement a range of macroprudential measures that seek to contain systemic risk.

In Colombia, macroprudential policy (as described by Vargas et al (2017)) is implemented by four institutions: the Ministry of Finance (*Ministerio de Hacienda y Crédito Público*, or MoF), the Superintendency of the Financial Sector (*Superintendencia Financiera de Colombia*, or SFC), the Deposit Guarantee Fund (*Fondo de Garantías de Instituciones Financieras*, or DGF) and the CB. The MoF regulates the capital requirements for all financial institutions and the controls on portfolios and foreign direct investment. The SFC regulates liquidity and market risk. The CB regulates limits on FX positions, deposits on foreign indebtedness and reserve requirements. The government (MoF) establishes limits to the LTV and DSTI ratios in the mortgage market.<sup>42</sup> The SFC carries out the supervision function, whereas both the SFC and the DGF carry out the resolution function. The DGF is also responsible for the deposit insurance scheme. Finally, the CB serves as the lender of last resort with information support from the SFC.

Macroprudential policy is discussed and coordinated within a Financial System Coordination and Surveillance Committee (*Comité de Coordinación y Seguimiento del Sistema Financiero*, or CCSSF). Colombia is an early adopter of this type of institution; the CCSSF was created in 2003, much earlier than in other economies, where committees of this sort appeared after the GFC. The members of the CCSSF are the heads of the SFC, CB, MoF and DGF. Although the CCSSF does not have a legal macroprudential mandate or decision-making power and none of its members has explicit legal responsibility for macroprudential stability or policy, various macroprudential policies fall within the legal mandate of its members. The CCSSF has benefited from good coordination, as shown for instance by the package of measures taken during the capital inflow and credit growth of 2006–07 (see below).

Colombia's intricate financial system features financial conglomerates with systemic relevance. These financial conglomerates also have systemic relevance in several Central American countries.<sup>43</sup> Currently, the assets of Colombian banks account for about half of financial system assets in Central American countries and about one fourth of the assets of Colombian conglomerates, although these shares differ across countries and conglomerates. The expansion of Colombian conglomerates throughout Central America took place as European banks retrenched during the financial crisis in Europe (Cardozo et al (2022)) and posed new macroprudential challenges for Colombian authorities.

The macroprudential measures implemented in Colombia have been documented exhaustively by Mora-Arbeláez et al (2015). The various macroprudential measures in place include a set that has a capital flow aspect (see Frost et al (2020), Das et al (2022), Bergant et al (2020)), which is important to limit foreign exchange exposure by the financial system. The relevance of these measures in an EMDE is that capital flow swings can have important effects on systemic risk (Cetorelli and Goldberg (2011), Bruno and Shin (2015), Kalemli-Özcan (2019)). In Colombia, some prudential measures are permanently in place, while others have been used countercyclically. These policies include limits on open FX positions of financial

<sup>42</sup> In 1999, Congress enacted a law that instructed the government to establish limits for these metrics. Those limits were imposed by a government decree in 2000 and modified in 2008.

<sup>43</sup> Colombian conglomerates have a market share of 24% in Panama, 53% in El Salvador, 50% in Costa Rica, 16% in Guatemala, 16% in Honduras and 22% in Nicaragua (Cardozo et al (2022, p 11)).

intermediaries, limits on leverage in foreign currency, and unremunerated reserve requirements on foreign indebtedness and foreign portfolio inflows.

## Overview of macroprudential policy measures in the international context

Macroprudential policy includes a wide range of measures. In the banking sector, it includes capital requirements, limits on banks' leverage, requirements on loan loss provisions, liquidity requirements such as the Net Stable Funding Ratio (NSFR), limits on FX positions, reserve requirements for macroprudential purposes (RRs) and capital buffers on systemically important financial institutions (SIFIs). In the household sector, it includes the loan-to-value ratio (LTV) and the debt service-to-income ratio (DSTI), among others. In the corporate sector, it includes the LTV and the debt service coverage ratio (DSCR).

The IMF integrated Macroprudential Policy (iMaPP) database (Alam et al (2019)) can contribute to the study of the evolution of the macroprudential measures implemented in Colombia. The database provides a policy action indicator for each macroprudential instrument through a monthly dummy variable that indicates a policy action in a particular month, as well as its direction, tightening if positive and loosening if negative.<sup>44</sup>

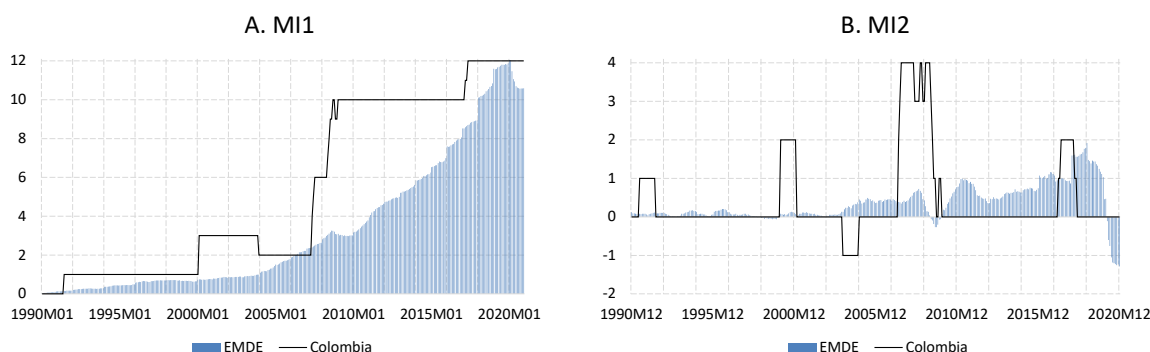
The results of the iMaPP database in Colombia (Echavarría Soto (2020)) show that Colombia has a relatively high number of macroprudential measures related to liquidity and exchange rate risks, as well as measures to deal with risks taken by the household sector. In contrast, the number of measures related to corporate and non-bank financial intermediaries is below the regional average.

For illustration purposes, we use, on the one hand, a Macroprudential Indicator 1 (MI1), or the cumulative sum of the number of tightening and loosening macroprudential policies; and on the other hand, a Macroprudential Indicator 2 (MI2), or the cumulative sum of the number of tightening and loosening policies over 12 months. Although the indicators aggregate policy actions that may have different intensities, we regard an increase in the MI1 or a positive MI2 as a macroprudential policy tightening and a decrease in the MI1 or a negative MI2 as a macroprudential policy loosening.

Graph 4 shows the MI1 and MI2 for the macroprudential policy instruments in the iMaPP database for Colombia as well as for the comparable group of EMDEs. As is well known, the net number of tightening macroprudential policy actions increased in EMDEs well before it did in AEs (eg Cerutti et al (2017)); Graph 4 shows that the net number of tightening macroprudential policy measures increased in Colombia ahead of the average for EMDEs. The graph also shows that the macroprudential stance in Colombia tightened before the GFC and loosened afterwards.

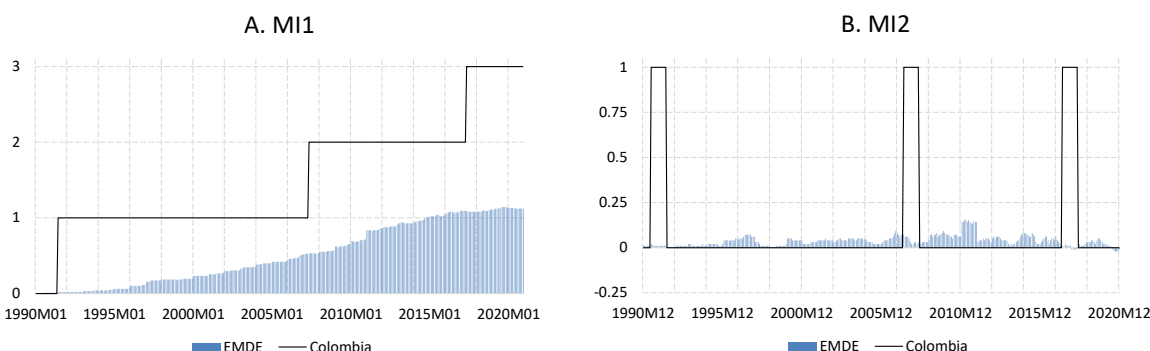
As mentioned above, one of these macroprudential measures – limits on FX positions – may help manage capital flow swings. Graph 5 shows the MI1 and MI2 for this specific macroprudential policy. Compared with the average for EMDEs, Colombia was an early adopter of this type of measure (Panel A). Limits on FX positions were further tightened during the capital inflow of 2006–07, as well as in 2017 (Panel B).

<sup>44</sup> As indicated by Alam et al (2019), the dummy indicators do not account for intensity and are added up despite heterogeneity across measures and economies. In addition, the cumulative sum may indicate the existence of a measure even though its effect may have lapsed.



EMDEs: Albania, Algeria, Angola, Argentina, Armenia, Azerbaijan, Bahamas, Bahrain, Bangladesh, Belarus, Benin, Bhutan, Bosnia and Herzegovina, Botswana, Cambodia, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cabo Verde, Chile, China, Colombia, Congo, Costa Rica, Côte d'Ivoire, Croatia, Dominican Republic, East Timor, Ecuador, El Salvador, Ethiopia, Fiji, The Gambia, Georgia, Ghana, Guinea-Bissau, Haiti, Honduras, Hungary, India, Indonesia, Jamaica, Jordan, Kazakhstan, Kenya, Kosovo, Kuwait, Kyrgyz Republic, Laos, Lebanon, Lesotho, Malaysia, Mali, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Montenegro, Morocco, Mozambique, Nepal, Niger, Nigeria, North Macedonia, Oman, Pakistan, Paraguay, Peru, Philippines, Poland, Romania, Russia, St Kitts and Nevis, Saudi Arabia, Senegal, Serbia, Solomon Islands, South Africa, Sri Lanka, Sudan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, United Arab Emirates, Uruguay, Vietnam, Yemen, Zambia.

Sources: Alam et al (2019), IMF iMaPP database, indicator SUM\_17; authors' calculations.



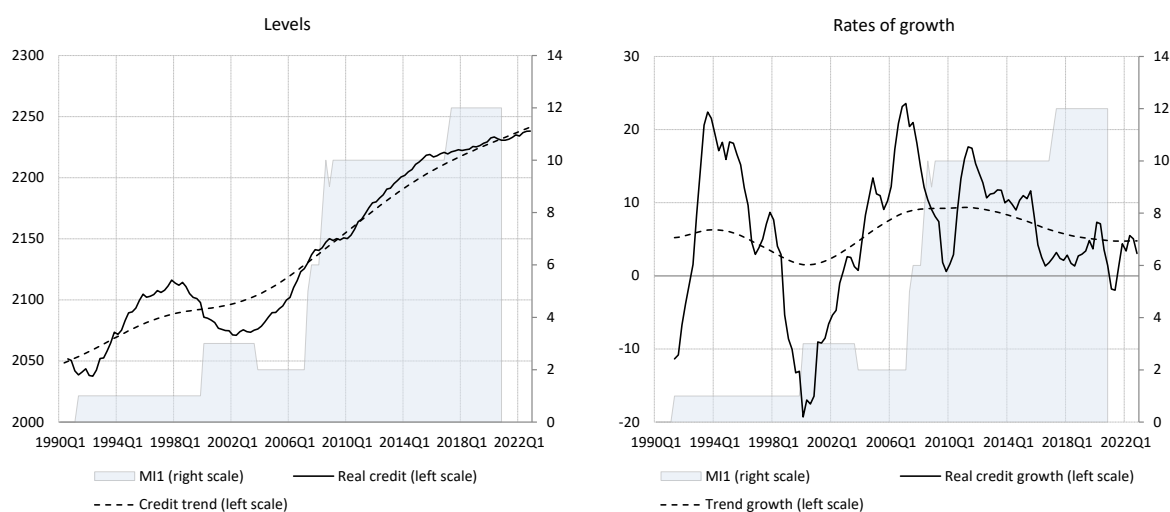
Note: EMDEs are those indicated in Graph 4.

Sources: Alam et al (2019), IMF, iMaPP database, indicator LFX; authors' calculations.

Multi-country studies by Gambacorta and Murcia (2020) and Cerutti et al (2017) have shown that these macroprudential policies are effective. In studies for Colombia, their effectiveness has been shown by Gómez et al (2020).<sup>45</sup> In addition, Graph 6 shows that the amplitude of the credit cycle in Colombia dropped as the number of macroprudential measures increased over time.

The remainder of this section presents some of these macroprudential measures in the context in which they were implemented.

<sup>45</sup> In addition, Vargas et al (2017) show that macroprudential measures improved the solvency and liquidity in the financial system.



Note: Latent credit is estimated as endogenous to a common factor (not reported) among real credit, real housing prices and leverage measured as the credit-to-GDP ratio.

Source: authors' estimations based on data on credit and housing prices from the Central Bank of Colombia, consumption data from the National Statistical Department of Colombia (Departamento Administrativo Nacional de Estadística, DANE) and the MI1 index as in Graph 4.

## The run-up to the financial crisis of the end of the 1990s

The reforms of 1991<sup>46</sup> transformed a regime of decades-long restrictions on capital movements into a regime with international capital mobility.<sup>47</sup> The CB liberalised several interest rates while the MoF helped create a public debt market and a yield curve. As underscored by Perez-Reyna (2017), Caballero Argáez et al (2006) and Zárate Perdomo et al (2012), the surge in capital inflows was accompanied by increases in the price of real estate, the number of financial intermediaries, the participation of foreign capital in the banking sector, bank privatisations, and the credit level and rate of growth.<sup>48</sup> As shown in Graph 6, the highest rates of credit growth leading to the financial crisis at the end of the 1990s took place in 1993–95. Positive rates of credit growth continued until 1998; thereafter, the credit level dropped amidst the financial crisis of the end of the 1990s. The upsurge in credit took place under poor regulation and low capitalisation.

Moreover, an exchange rate policy that maintained the exchange rate within a band provided incentives for considerable currency mismatches in both the corporate sector and the central government. In contrast, in the banking sector, unhedged FX positions were contained using macroprudential limits,<sup>49</sup> which are perhaps the earliest measure taken in Colombia with an explicit macroprudential objective.

<sup>46</sup> See Law 45 of 1990 and Law 9 of 1991.

<sup>47</sup> In Colombia, the liberalisation process was known as the “opening of the economy” (in Spanish, *apertura*). Sufi and Taylor (2021, p 24) point out that deregulation of the financial sector frequently led to credit growth.

<sup>48</sup> An account of the financial crisis of the end of the 1990s can be found in Perez-Reyna (2017) and the references therein.

<sup>49</sup> See Resolution No. 57 of 1991 issued by *Junta Monetaria* (the governing body of the Central Bank of Colombia before the constitutional reform that created the independent central bank)

Several factors set the stage for the financial crisis of the end of the 1990s: the capital inflow during that decade, insufficient macroprudential regulation, widespread risk-taking in the household and corporate sectors, a high rate of credit growth, a significant surge in real estate prices and the government's increasingly fragile financial position.<sup>50</sup> When capital flows reversed, the substantial risks taken by the different sectors materialised. The crisis was amplified due to the poor capital provisions in the banking sector (Zárate Perdomo et al (2012)).

## The financial crisis of the end of the 1990s

The EM crisis of 1997–99 led to a drop in net capital inflows (Graph 2). Widespread latent risks materialised, and a profound and prolonged financial crisis ensued. A brief account of the crisis follows.

In the late 1990s, real estate prices stagnated while the nominal value of housing loans, which incorporated an inflation adjustment, continued increasing. A large number of households were left with negative equity and little incentive to repay, leading to an increase in non-performing loans. Mortgage banks were also hit by the materialisation of interest rate risk.<sup>51</sup> Solvency indicators in this and other parts of the financial system sharply deteriorated. Several private and state-owned banks went insolvent; some were rescued, while others were merged or liquidated (Zárate Perdomo et al (2012)). The cooperative sector (credit unions) also experienced solvency problems and liquidations due to the deterioration in household balance sheets (see Zárate Perdomo et al (2012)).

Amidst the profound financial crisis and recession, monetary policy turned procyclical as a result of the defence of an exchange rate band. Consequently, by end-1998 the real interest rate had risen above and beyond 15%.<sup>52</sup> Despite the strong defence of the exchange rate, net capital outflows forced several realignments of the exchange rate band. With each successive realignment of the band, the Colombian peso depreciated, adding to the recession via the financial channel of the exchange rate.<sup>53</sup> Unemployment soared to more than one fifth of people in the workforce.

## The aftermath of the financial crisis of the end of the 1990s

The unprecedented economic crisis led to a profound reassessment of the perception of risk, as well as of risk-taking by households, firms, banks and the government. It also gave rise to some important institutional developments and macroprudential measures.

An important institutional development was the creation in 2003 of the CCSSF, which is, as mentioned above, a mechanism for discussing and coordinating macroprudential policies. Another important institutional development was the

<sup>50</sup> For an account of the views on the role of government expenditure and debt in the crisis, see Perez-Reyna (2017, p 445) and López-Enciso et al (2017, pp 472 and 476).

<sup>51</sup> The materialisation was due to the rise in interest rates to defend the exchange rate band, as well as a change in the inflation adjustment of the mortgage banks' deposit rates, now calculated as a percentage of the system-wide average deposit interest rate.

<sup>52</sup> This is the real interest rate on 90-day deposits, deflated by 12-month CPI inflation.

<sup>53</sup> For an approach that emphasises the internal factors of the sudden stop, such as the insolvency of the financial sector and the deterioration of public finances owing to the increase in expenditure and the drop in economic activity, see López-Enciso et al (2017).

creation of the Financial Stability Department (FSD) within the CB in 2002. Twice a year, the FSD prepares and publishes a Financial Stability Report (*Reporte de Estabilidad Financiera* or FSR).<sup>54</sup> Since its creation, the FSR has undergone significant enhancements, including the incorporation of the systemic stress model SYSMO in 2017 (Gamba-Santamaría et al (2017)), which is the analytical framework used by the FSD to construct stress testing exercises.<sup>55</sup> The FSD's continuous financial stability assessments also serve as inputs to the CB's participation in the CCSSF.<sup>56</sup> These institutional developments have strengthened the CB's capacity to directly influence macroprudential policy through the macroprudential instruments under its control as well as indirectly as a member of the CCSSF.

Still another institutional development was the creation of the Financial Regulation Unit (*Unidad de Regulación Financiera*, or URF). The URF supports the regulatory work of the MoF and is a permanent guest of the CCSSF.

Aside from these institutional developments, the financial crisis of the end of the 1990s also led to the introduction of important macroprudential policy measures. Such is the case of the above-mentioned limits on the loan-to-value (LTV) and debt service-to-income (DSTI) ratios. Another decision that has served as an important macroprudential policy is the flotation of the Colombian peso, as this is an important deterrent against open, unhedged FX positions.

## The capital inflow and credit growth of 2006–07

In 2006–07, the global financial cycle was in the risk-on phase, as indicated by Rey (2015) using a common factor indicator as well as the VIX. In Colombia, as well as in other EMDEs, this led to an increase in capital inflows and an upsurge in credit growth. In Colombia, the increase in credit corresponded with a change in the composition of bank assets towards credit and away from government bonds.<sup>57</sup> All this took place in an economy that had, not long ago, experienced the financial crisis of the end of the 1990s. Thus, all the regulatory agencies were ready to take measures. The CB established a marginal reserve requirement on domestic deposits<sup>58</sup> and an unremunerated reserve requirement (URR) on debt inflows. The MoF established a URR on portfolio inflows. The SFC contributed to the package with a provisioning method based on expected credit losses.<sup>59</sup>

The marginal reserve requirement, implemented by the CB in May 2007, had a deliberate macroprudential purpose. The decision was motivated by a growth in real

<sup>54</sup> The first report was published in July 2002.

<sup>55</sup> The SYSMO model consists of a DSGE model of the economy, satellite risk models of credit and market risks, and a bank model to simulate banks' response. In addition to the FSR, further detailed analysis of certain risks relevant to financial stability in Colombia are provided in Special FSRs (in Spanish, *Reportes Especiales de Estabilidad Financiera*).

<sup>56</sup> The FSD participates in collaborative research work in the Consultative Group of Directors of Financial Stability (CGDFS) of the Consultative Council of the Americas (CCA). One example of the CGDFS research group's work on stress testing is Cardozo et al (2022).

<sup>57</sup> For a discussion with this approach, see Vargas et al (2017).

<sup>58</sup> The rationale for the marginal reserve requirement and its effectiveness are presented in Vargas et al (2011) and Vargas and Cardozo (2012).

<sup>59</sup> For details on the package of measures, see Vargas et al (2017).

credit above and beyond 30%.<sup>60</sup> In the year after the measure was implemented, credit growth dropped sharply (Graph 6).<sup>61</sup> In June 2008, the marginal reserve requirement was eliminated and the ordinary reserve requirement was increased (Mora-Arbeláez et al (2015)).<sup>62</sup>

In parallel with the marginal reserve requirement, the CB reactivated a URR on foreign indebtedness in order to deter regulatory arbitrage (see Vargas et al (2017)),<sup>63</sup> and the MoF established a URR on portfolio inflows.<sup>64</sup> One year later, both the URR on foreign indebtedness and that on portfolio inflows were reverted to zero.<sup>65</sup>

In 2007 and 2008, the SFC enhanced the provisioning scheme using the method of expected credit losses (ECL).<sup>66</sup> The ECL method helps cushion the effect of bank provisions on credit supply, banks' profits and economic activity.<sup>67</sup> The SFC also implemented a dynamic ECL method that links provisions to a handful of bank indicators.<sup>68 69</sup>

## The GFC and the 2008 capital outflows

The macroprudential framework was put to the test again during the GFC. In contrast with the previous period of a crawling exchange rate and crawling bands, both the floating exchange rate regime and the limits on FX positions had now helped to contain FX risk. Therefore, the capital outflow that took place during the GFC could easily be met with currency depreciation and a countercyclical interest rate policy; this is what Vegh and Vuletin (2012) call the graduation of monetary authorities or, in other words, the implementation of countercyclical monetary policy.

Under the new IT framework, a more generalised policy across EMDEs was a countercyclical reduction in interest rates. In Colombia, this policy was feasible due to limited open FX positions and the low exchange rate pass-through to inflation (eg Zárate Perdomo et al (2012) and Vargas (2011)). This contrasts with the experience

<sup>60</sup> In an authoritative comment, Hamann et al (2014, p 35) point out that real credit growth reached rates beyond 30%. Indeed, this was the case for some credit aggregates. This number may not be reflected in Figure 6 due to the quarterly frequency of the data and because the figure refers to total credit.

<sup>61</sup> As Gómez et al (2020, p 2) point out, part of the collapse in credit was due to the GFC. The marginal reserve requirement also increased monetary policy transmission from the policy interest rate to other interest rates (Vargas et al (2017)).

<sup>62</sup> See External Resolution No. 5 of 2008 issued by the Board of Directors of Central Bank of Colombia.

<sup>63</sup> The URR had first been established in the 1990s through Resolution 21 of 1993.

<sup>64</sup> See Decree 1801 of 2007.

<sup>65</sup> See Decree 3264 of 2008.

<sup>66</sup> The previous method was based on incurred credit losses (ICL), ie provisions are made in the event of a loss. The ICL method can result in insufficient and/or untimely provisions, potentially tightening credit supply at times of financial stress. The ECL method was set as part of the Credit Risk Management System (*Sistema de administración del riesgo crediticio*, SARC); see SFC (2002) and Morais et al (2021).

<sup>67</sup> The regulation was implemented for commercial credit on 1 July 2007 and for consumption credit on 11 July 2008. The measures hold for banks.

<sup>68</sup> As the indicators are at the bank level, the SFC does not have to take a stance on the financial cycle. See Chapter II of *Circular Básica Contable y Financiera*.

<sup>69</sup> For a study of loan provisions in Colombia, see Cabrera et al (2022).



during the financial crisis of the end of the 1990s, when a drop in the policy interest rate during a crisis would have been considered a luxury accessible only to AEs.

For its part, in 2009 the SFC implemented an instrument similar to the Basel III liquidity coverage ratio (LCR).<sup>70</sup>

It bears emphasising that the capital outflow during the GFC did not go hand in hand with any major disruption of the Colombian financial system.

## The 2010 global liquidity glut, the taper tantrum and the fall in oil prices

As was the case in other EMDEs, Colombia recovered rapidly from the GFC. Given the health of its balance sheets, the countercyclical monetary policy was quickly transmitted to aggregate demand. This was in sharp contrast with the financial crisis of the end of the 1990s, when the prolonged balance sheet repair prevented a quick recovery.

This time, AEs were launching unconventional monetary policies (UMPs). The period of global liquidity that started in 2010 led to a surge in capital flows to EMDEs (Sahay et al (2014) and Borrillo et al (2016)). In addition, in 2014 JPMorgan increased the weight of Colombia in their EM bond indices,<sup>71</sup> which led to increased participation by foreign investors in the public debt market and, thus, to an increase in Colombia's exposure to foreign liquidity (see Romero et al (2021) and García-Andrade (2019)).

In 2013, the mere mention of the possibility of unwinding UMPs led to an increase in financial market volatility (Sahay et al (2014) and Borrillo et al (2016)). The Federal Reserve's programme of actually tapering bond-buying purchases at end-2014 began alongside other recessionary forces that consolidated in 2015, such as lower growth in China. Consequently, a large drop in commodity prices ensued and capital flows to EMDEs receded. EM currencies depreciated, including the Colombian peso, which was highly related to collapsing oil prices.

This episode highlights one of the advantages of the IT regime with floating exchange rate. The sharp depreciation of the Colombian peso by more than 60% in nominal terms in August 2015 had a relatively small effect on domestic prices and no effect on financial stability. Indeed, core inflation rose to 7% by mid-2016 and returned to the target range by end-2017. The pass-through had decreased with the disinflation as well as with the increase in central bank credibility. In addition, both the macroprudential framework put in place and the floating exchange rate regime had helped to limit the effect of the exchange rate financial channel.

The capital inflow during the 2010 global liquidity glut affected credit to a smaller extent than during the previous 1990–98 credit build-up.<sup>72</sup> As illustrated in Graph 6,

<sup>70</sup> This instrument limits short-term liquidity risk by requiring banks to maintain enough liquid assets to meet their liquidity requirements for the next seven and 30 days. See Central Bank of Colombia (2008, p 108), Central Bank of Colombia (2009, p 99) and Chapter VI of *Circular Básica Contable y Financiera*, issued by the SFC.

<sup>71</sup> Importantly, in 2012 the withholding tax on foreign portfolio investment earnings was reduced and simplified in Colombia.

<sup>72</sup> For an analysis of the effect of capital flow swings on credit, see Sarmiento (2022).

the macroprudential measures in place helped tame the amplitude of the credit growth cycle.

In 2013, the IMF Financial System Stability Assessment (FSSA) (IMF (2013)) underscored the complexity of the Colombian financial system and recommended that the SFC be given greater powers to regulate financial conglomerates. In this vein, the Conglomerates Law of 2017<sup>73</sup> stated that the SFC should supervise financial conglomerates, as well as their holding companies, and regulate their capital adequacy ratios, if necessary.

The growing complexity of Colombia's financial system demanded further enhancements to the macroprudential policy framework. To limit exchange rate risk, in 2017 the CB set limits on net FX positions in different currencies.<sup>74</sup> In addition, in order to limit liquidity risk in different currencies, the CB established limits on an individual position indicator (IEI).<sup>75</sup> The IEI is designed to limit liquidity risk by ensuring that banks have sufficient resources to meet their obligations in different currencies. In the same vein, for the case of conglomerates, the CB established a consolidated position indicator<sup>76</sup> (Central Bank of Colombia (2016)).

## The implementation of Basel III and the pandemic test of the macroprudential framework

The convergence to Basel III reforms was completed in 2018 with the implementation of important regulatory enhancements.<sup>77</sup> That same year, a solvency requirement was established for systemically important institutions. The requirement was to be increased gradually to 1% of risk-weighted assets in 2024, starting from 0.25% in 2021.<sup>78</sup> In addition, a capital conservation buffer was set to reach 1.5% in 2024, starting at 0.375% of risk-weighted assets in 2021.<sup>79</sup> <sup>80</sup> Furthermore, in 2019 a lower limit of 3% was introduced for the leverage ratio, or the ratio of bank capital to assets, effective in 2021.<sup>81</sup>

<sup>73</sup> See Law 1870 of 2017.

<sup>74</sup> In the process, new exchange rate risk indicators were defined. The positive exchange rate risk indicator (ICR+) was defined as the dollar sum of positive net FX positions in different currencies. Likewise, the negative exchange rate risk indicator (ICR-) was defined as the dollar sum of negative net FX positions in different currencies. Limits on indicators ICR+ and ICR- were set at +40 and -40 per cent of top-tier capital (in Spanish, *patrimonio técnico*), respectively. See External Resolution No. 3 of 2016 and *Circular Reglamentaria Externa* DODM-361 issued by the Board of Directors of Central Bank of Colombia. See also Central Bank of Colombia (2019a).

<sup>75</sup> See External Resolution No. 1 of 2018 issued by the Board of Directors of Central Bank of Colombia. See also Central Bank of Colombia (2019a).

<sup>76</sup> Ibid.

<sup>77</sup> For an evaluation of Colombia's convergence to Basel III regulations, see IMF (2022b, p 22).

<sup>78</sup> The solvency requirement was set as follows: 0.25% in 2021, 0.5% in 2022, 0.75% in 2023 and 1% in 2024. See Decree 1477 of 2018.

<sup>79</sup> The capital conservation buffer was set as follows: 0.375% in 2021, 0.75% in 2022, 1.125% in 2023 and 1.5% in 2024. The capital conservation buffer was set by Decree 1477 of 2018.

<sup>80</sup> This 1.5% requirement differs from the 2.5% requirement of the Basel III regulations because the total solvency limit in Colombia is 9% and not 8% as in other countries.

<sup>81</sup> *Circular* No. 020 of 2019 of the SFC set the limit at 3%. See also Decree 1477 of 2018.

In 2020, an instrument similar to the Basel III Net Stable Funding Ratio regulation was implemented.<sup>82</sup> Sources of stable funding include long-term loans, bank deposits and equity. To ensure that financial institutions do not undertake excessive maturity transformation, the ratio was to be gradually built up through 2022, to 100% for large banks and 80% for medium-sized banks. Smaller banks only inform the SFC and are not subject to a minimum NSFR (see Central Bank of Colombia (2020)).

The pandemic presented yet another test for the macroprudential framework, now equipped with increased capital buffers. As in the GFC, this new test was weathered without any bankruptcy.<sup>83</sup> During the pandemic, capital inflows decreased (Graph 2); external demand fell sharply and the terms of trade collapsed, driven by the price of oil. The exchange rate absorbed a substantial part of the shock, the CB supported the liquidity of the FX and local bond markets, and monetary policy was relaxed in the face of a rapidly weakening economy (Vargas et al (2022)). In addition, to help cushion the shock, the SFC released the countercyclical provisions while the CB provided support with short-term liquidity.

## Lessons learnt

Having reviewed the development of the monetary and macroprudential framework in Colombia, it seems natural to draw some lessons. Some lessons have already been pointed out by Zárate Perdomo et al (2012). A first, long-established lesson is that macroeconomic stability is not guaranteed by the price stability objective alone. Instead, the financial stability objective requires that it be accompanied by macroprudential policy. Second, limits on open FX positions aside, the floating exchange rate regime plays a role in containing FX risk. Third, an adequate stock of international reserves plays an important role in preserving macro-financial stability. Fourth, limits on risk-taking must be balanced with the goal of financial development and financial deepening.<sup>84</sup>

An additional lesson is that, in contrast with the monetary policy framework that prevailed before the financial crisis of the end of the 1990s, a transparent monetary policy framework with a floating exchange rate helped the CB focus on the inflation objective, enabling the CB to overcome 25 years of so-called moderate inflation.<sup>85</sup>

Still another lesson is that financial stability risks change over time; therefore, continuous assessments of the evolving risks and suitable evaluations of the measures at hand are necessary. In the future, risks to financial stability may arise from instruments or markets that are not completely understood or for which information is not currently available, such as non-bank financial institutions, fintech, cryptoassets and even possibly central bank digital currencies, among others.

<sup>82</sup> See *Circular Básica Contable y Financiera* of 2020 issued by the SFC.

<sup>83</sup> Still, five institutions were required to increase their capital (see IMF (2022b, p 12)).

<sup>84</sup> Not all of the lessons pointed out by Zárate Perdomo et al (2012) are developed in detail in this chapter.

<sup>85</sup> Dornbusch and Fischer (1993) introduced the term “moderate inflation” to refer to inflation rates that persist in the range of 15 to 30 per cent.

A final lesson has to do with the interaction between monetary and macroprudential policies.<sup>86</sup> As pointed out by Gambacorta and Murcia (2020), macroprudential measures and monetary policy seem to reinforce each other; their effect on credit growth seems to be greater when both policies are used simultaneously. Both policies work through the financial system, so the development of both the financial system and the macroprudential policies in place can influence the transmission mechanism and the effectiveness of monetary policy (see Vargas et al (2011) and Morales et al (2022)). The complex interaction between monetary policy and macroprudential policy poses plenty of research questions, particularly considering the trade-offs that capital flow swings impose on monetary policy in EMDEs.

## Challenges ahead

The challenge for the future is to preserve both price and financial stability. The fight against inflation is currently the most imminent task, and with the current IT framework, the CB is well equipped to attain the objective. The challenge in this case is to maintain the credibility of the inflation target by avoiding fiscal or financial dominance of monetary policy. Sound fiscal and macroprudential policies are key elements in this endeavour.

As for financial stability, a key issue is strengthening the role of the CB in macroprudential policy (see IMF (2022a, p 7)). In principle, as pointed out by Martin et al (2021), if macroprudential policy is effective, it can be directed towards achieving the financial stability objective while monetary policy is directed towards the inflation objective. If macroprudential policy is not completely effective, then there would be a case for monetary policy to act as a complement.

Financial deepening and inclusion, as well as capital market development, are ongoing processes in Colombia. Progress in these areas in the context of financial stability is a challenge that requires learning and careful adaptation of financial regulation and international standards. In this light, the recent IMF FSSA (see IMF (2022a)) recommended strengthening the monitoring of household indebtedness and cross-border links of financial institutions, as well as enhancing the central bank's role in the evaluation of systemic risk within the CCSF, among others.<sup>87</sup>

In addition, Colombia is host as well as home to international banks. In this international environment, the control, supervision and, in particular, resolution of financial institutions in times of crisis is subject to the challenges exposed by Schoenmaker (2013) in the financial trilemma,<sup>88</sup> namely that the quest for financial stability in a world with capital mobility requires bilateral and multilateral instances of macroprudential policy coordination. In this vein, the challenge is to continue strengthening these international coordination and cooperation channels.<sup>89</sup>

<sup>86</sup> See Martin et al (2021) on this topic.

<sup>87</sup> See also Central Bank of Colombia (2022).

<sup>88</sup> See also IMF-FSB-BIS (2016, p 8).

<sup>89</sup> For a list of bilateral and multilateral instances of Colombia's coordination with the Central American countries, see CCSBSO (2016).

Finally, adaptation of policy frameworks to financial and payment innovations and the increasing threat of cyber risk is an important challenge for the central bank and other financial authorities.

## References

Alam, Z, A Alter, J Eiseman, G Gelos, H Kang, M Narita, E Nier and N Wang (2019): "Digging deeper – evidence on the effects of macroprudential policies from a new database", *IMF Working Papers*, no 19/66, 22 March, doi.org/10.5089/9781498302708.001.

Arango, M (2006): "Evolución y crisis del sistema financiero colombiano", *Serie Estudios y Perspectivas*, no 11, CEPAL.

Ball, L (2014): "The case for a long-run inflation target of four percent", *IMF Working Papers*, no 14/92, 9 June, doi.org/10.5089/9781498395601.001.

Bank for International Settlements (BIS) (2019): "Monetary policy frameworks in EMEs: inflation targeting, the exchange rate and financial stability", *BIS Annual Economic Report*, 30 June, pp 31–53.

——— (2020): "Stress testing in Latin America: a comparison of approaches and methodologies", *BIS Papers*, no 108, 4 February, [ssrn.com/abstract=3535923](https://ssrn.com/abstract=3535923).

Bekaert, G, M Hoerova and M Lo Duca (2013): "Risk, uncertainty and monetary policy", *Journal of Monetary Economics*, vol 60, no 7, October, pp 771–88, doi.org/10.1016/j.jmoneco.2013.06.003.

Bergant, K, F Grigoli, N-J Hansen and D Sandri (2020): "Dampening global financial shocks: can macroprudential regulation help (more than capital controls)?", *IMF Working Papers*, no 20/106, 26 June, doi.org/10.5089/9781513547763.001.

Blanchard, O, G Dell’Ariccia and P Mauro (2010): "Rethinking macroeconomic policy", *IMF Staff Position Notes*, no 10/03, 12 February, doi.org/10.5089/9781455224982.004.

Bonaldi, P, A González and D Rodríguez (2011): "Importancia de las rigideces nominales y reales en Colombia: un enfoque de equilibrio general dinámico y estocástico", Central Bank of Colombia, *Ensayos Sobre Política Económica*, vol 29, no 66, December, pp 48–78, doi.org/10.32468/Espe.6602.

Borio, C, C Furfine and P Lowe (2001): "Procyclicality of the financial system and financial stability: issues and policy options", *BIS Papers*, no 1, pp 1–57, [www.bis.org/publ/bppdf/bispap01a.pdf](http://www.bis.org/publ/bppdf/bispap01a.pdf).

Borralló, F, I Hernando and J Vallés (2016): "The effects of US unconventional monetary policies in Latin America", *Banco de España Working Papers*, no 1606, 22 March, dx.doi.org/10.2139/ssrn.2752888.

Bruno, V and H S Shin (2015): "Capital flows and the risk-taking channel of monetary policy", *Journal of Monetary Economics*, vol 71, April, pp 119–32, doi.org/10.1016/j.jmoneco.2014.11.011.

Caballero Argáez, C, M Urrutia Montoya and D Lizarazo (2006): "Desarrollo financiero y desarrollo económico en Colombia", in C Caballero Argáez and M Urrutia Montoya (eds), *Historia del sector financiero colombiano en el siglo XX: ensayos sobre su desarrollo y sus crisis*, Asobancaria, pp 22–60.

Cabrera, W, S Gamba, C Gómez and M Villamizar-Villegas (2022): "Examining macroprudential policy through a microprudential lens", Central Bank of Colombia, *Borradores de Economía*, no 1212, doi.org/10.32468/be.1212.

Calvo, G and C Reinhart (2002): "Fear of floating", *The Quarterly Journal of Economics*, vol 117, no 2, May, pp 379–408, doi.org/10.1162/003355302753650274.

Cardozo, P, P Morales-Acevedo, A Murcia and A Rosado (2022): "Does the geographical complexity of the Colombian financial conglomerates increase banks' risk? The role of diversification, regulatory arbitrage, and funding costs", *Journal of Banking & Finance*, vol 134, January, doi.org/10.1016/j.jbankfin.2021.106076.

Central Bank of Colombia (2001a): "Transmission mechanisms and inflation targeting: the March 2001 inflation forecast", mimeo.

——— (2001b): *Inflation Report*, March.

——— (2001c): "Transmission mechanisms and inflation targeting: the July 2001 inflation forecast", mimeo.

——— (2006): *Financial Stability Report*, September.

——— (2008): *Financial Stability Report*, September.

——— (2009): *Financial Stability Report*, September.

——— (2016): *Financial Stability Report*, First Semester.

——— (2019a): *Financial Stability Report*, First Semester.

——— (2019b): "Recuadro 1: Proceso de toma de decisiones de política monetaria del Banco de la República y comunicación sobre política monetaria", *Informe de Política Monetaria*, October.

——— (2020): *Financial Stability Report*, First Semester.

——— (2021a): *Administración de las reservas internacionales*, March.

——— (2021b): *Inflation Report*, July.

——— (2022): *Financial Stability Report*, First Semester.

——— (2023): *Informe de la Junta Directiva al Congreso de La República*, March.

Cerutti, E, S Claessens and L Laeven (2017): "The use and effectiveness of macroprudential policies: new evidence", *Journal of Financial Stability*, vol 28, February, pp 203–24, doi.org/10.1016/j.jfs.2015.10.004.

Cetorelli, N and L Goldberg (2011): "Global banks and international shock transmission: evidence from the crisis", *IMF Economic Review*, vol 59, no 1, pp 41–76, doi.org/10.3386/w15974.

Consejo Centroamericano de Superintendentes de Bancos, de Seguros y de Otras Instituciones Financieras (CCSBSO) (2016): "Memorando multilateral de intercambio de información y cooperación mutua para la supervisión consolidada y transfronteriza entre los miembros del Consejo Centroamericano de Superintendentes de Bancos, de Seguros y de Otras Instituciones Financieras", November.

Crockett, A (2000): "Marrying the micro- and macro-prudential dimensions of financial stability", speech delivered at the Eleventh International Conference of Banking Supervisors, Basel, 20–21 September.

Currie, L (1981): *The role of economic advisers in developing countries*, Greenwood Press.

- Das, M, G Gopinath and Ş Kalemli-Özcan (2022): "Preemptive policies and risk-off shocks in emerging markets", *IMF Working Papers*, no 22/03, 7 January, doi.org/10.5089/9781616358341.001.
- Dornbusch, R and S Fischer (1993): "Moderate inflation", *The World Bank Economic Review*, vol 7, no 1, January, pp 1–44.
- Echavarría Soto, J (2020): "Instrumentos de política macroprudencial en Colombia", *Revista del Banco de la República*, vol 93, no 1097, May, Nota Editorial, publicaciones.banrepultural.org/index.php/banrep/article/view/21559/21725.
- Fischer, S (2001): "Exchange rate regimes: Is the bipolar view correct?", *Journal of Economic Perspectives*, vol 15, no 2, spring, pp 3–24 doi.org/10.1257/jep.15.2.3.
- Frost, J, H Ito and R van Stralen (2020): "The effectiveness of macroprudential policies and capital controls against volatile capital inflows", *BIS Working Papers*, no 867, 2 June, www.bis.org/publ/work867.pdf.
- Galati, G and R Moessner (2013): "Macroprudential policy – a literature review", *Journal of Economic Surveys*, vol 27, no 5, December, pp 846–78, doi.org/10.1111/j.1467-6419.2012.00729.x.
- Gamba-Santamaría, S, O Jaulín-Méndez, A Lizarazo-Cuellar, J Mendoza-Gutiérrez, P Morales-Acevedo, D Osorio-Rodríguez and E Yanquen (2017): "SYSMO I: a systemic stress model for the Colombian financial system", Central Bank of Colombia, *Borradores de Economía*, no 1028, doi.org/10.32468/be.1028.
- Gambacorta, L and A Murcia (2020): "The impact of macroprudential policies in Latin America: an empirical analysis using credit registry data", *Journal of Financial Intermediation*, vol 42, April, doi.org/10.1016/j.jfi.2019.04.004.
- García-Andrade, S (2019): "Efectos del rebalanceo de los índices de J.P. Morgan en 2014 sobre los rendimientos de los TES en moneda local", Central Bank of Colombia, *Borradores de Economía*, no 1094, doi.org/10.32468/be.1094.
- Gómez, E, A Murcia, A Lizarazo and J Mendoza (2020): "Evaluating the impact of macroprudential policies on credit growth in Colombia", *Journal of Financial Intermediation*, vol 42, April, doi.org/10.1016/j.jfi.2019.100843.
- Gómez-Pineda, J (2006): "La política monetaria en Colombia", *Revista del Banco de la República*, vol 79, no 940, February, pp 23–53, publicaciones.banrepultural.org/index.php/banrep/article/view/9718/10110. Also in Central Bank of Colombia, *Borradores de Economía*, no 394, 2006.
- Gómez-Pineda, J and J Julio-Román (2001): "Transmission mechanisms and inflation targeting: the case of Colombia's disinflation", Central Bank of Colombia, *Borradores de Economía*, no 168, doi.org/10.32468/be.168. Also in *Revista de Análisis Económico*, vol 18, no 2, 1 December 2003, [ssrn.com/abstract=1244682](https://ssrn.com/abstract=1244682) and L Mahadeva and P Sinclair (eds), *How monetary policy works: comparing estimates of the transmission mechanism between developing, transitional and industrialized countries*, Routledge, 2012, pp 139–68.
- Gómez-Pineda, J, J Uribe and H Vargas-Herrera (2002): "The implementation of inflation targeting in Colombia", Central Bank of Colombia, *Borradores de Economía*, no 202, March, doi.org/10.32468/be.202.
- González, A, L Mahadeva, J Prada and D Rodríguez (2011): "Policy analysis tool applied to Colombian needs: PATACON model description", Central Bank of Colombia, *Borradores de Economía*, no 656, 18 May, doi.org/10.32468/be.656.

González, A, C Huertas, J Parra and H Vargas (2019): "Proceso de toma de decisiones de política monetaria del Banco de la República y comunicación sobre política monetaria", Central Bank of Colombia, *Documentos Técnicos o de Trabajo*, Subgerencia de Política Monetaria e Información Económica, November, [www.banrep.gov.co/sites/default/files/paginas/proceso-de-toma-decisiones-de-politica-monetaria.pdf](http://www.banrep.gov.co/sites/default/files/paginas/proceso-de-toma-decisiones-de-politica-monetaria.pdf).

González, A, A Guarín-López, D Rodríguez and H Vargas-Herrera (2020): "4GM: a new model for the monetary policy analysis in Colombia", Central Bank of Colombia, *Borradores de Economía*, no 1106, doi.org/10.32468/be.1106.

Ha, J, A Kose and F Ohnsorge (2021): "One-stop source: a global database of inflation", *World Bank Policy Research Working Papers*, no 9737, July, doi.org/10.1596/1813-9450-9737.

Hamann, F, M Hofstetter and M Urrutia (2014): "Inflation targeting in Colombia, 2002–12", *Economía*, vol 15, no 1, 1 October, doi.org/10.31389/eco.83.

Hernández-Gamarra, A and J Tolosa-Buitrago (2001): "La política monetaria en Colombia en la segunda mitad de los años noventa", Central Bank of Colombia, *Borradores de Economía*, no 172, doi.org/10.32468/be.172.

Hofmann, B, H S Shin and M Villamizar-Villegas (2021): "FX intervention and domestic credit: evidence from high-frequency micro data", *BIS Working Papers*, no 774, November, [www.bis.org/publ/work774.pdf](http://www.bis.org/publ/work774.pdf).

International Monetary Fund (IMF) (2003): "Colombia: staff report for the 2002 Article IV Consultation and Request for Stand-by Arrangement", *IMF Staff Country Reports*, vol 2003, no 19, 24 January, doi.org/10.5089/9781451808773.002.

——— (2013): "Colombia: financial system stability assessment", *IMF Staff Country Reports*, vol 2013, no 50, 22 February.

——— (2016): "Guidance note on the assessment of reserve adequacy and related considerations", *Policy Papers*, vol 2016, no 18, 6 March, doi.org/10.5089/9781498345644.007.

——— (2022a): "Colombia: financial system stability assessment", *IMF Staff Country Reports*, vol 2022, no 98, 4 April, doi.org/10.5089/9798400206634.002.

——— (2022b): "Colombia: Financial Sector Assessment Program – detailed assessment of observance of the Basel Core Principles for Effective Banking Supervision", *IMF Staff Country Reports*, vol 2022, no 135, 11 May, doi.org/10.5089/9798400207372.002.

International Monetary Fund, Financial Stability Board and Bank for International Settlements (IMF-FSB-BIS) (2016): *Elements of effective macroprudential policies: lessons from international experience*, 31 August, [www.bis.org/publ/othp26.pdf](http://www.bis.org/publ/othp26.pdf).

Julio-Román, Juan (2007): "The fan chart: the technical details of the new implementation", Central Bank of Colombia, *Borradores de Economía*, no 468, doi.org/10.32468/be.468.

Kalemli-Özcan, Ş (2019): "U.S. monetary policy and international risk spillovers", *NBER Working Paper Series*, no 26297, September, doi.org/10.3386/w26297.

Koepke, R (2019): "What drives capital flows to emerging markets? A survey of the empirical literature", *Journal of Economic Surveys*, vol 33, no 2, April, pp 516–40, doi.org/10.1111/joes.12273.



López-Enciso, E, H Vargas-Herrera and N Rodríguez-Niño (2017): "La estrategia de inflación objetivo en Colombia", in Central Bank of Colombia (ed), *Historia del Banco de la República, 1923–2015*, pp 465–539.

McCauley, R (2009): "Macroprudential policy in emerging markets", paper presented at the Central Bank of Nigeria's 50th Anniversary International Conference on "Central banking, financial system stability and growth", Abuja, 4–9 May.

Martin, A, C Mendicino and A Van der Ghote (2021): "On the interaction between monetary and macroprudential policies", *ECB Working Paper Series*, no 2021/2527, 1 February, [dx.doi.org/10.2139/ssrn.3797147](https://doi.org/10.2139/ssrn.3797147).

Mohanty, M and P Turner (2008): "Monetary policy transmission in emerging market economies: what is new?", *BIS Papers*, no 35, pp 1–59.

Mora-Arbeláez, T, A Garcia-Bernal, J Gómez-González and M Villamizar-Villegas (2015): "Una historia exhaustiva de la regulación financiera en Colombia", Central Bank of Colombia, *Borradores de Economía*, no 887, [doi.org/10.32468/be.887](https://doi.org/10.32468/be.887).

Morais, B, G Ormazabal, J-L Peydró, M Roa and M Sarmiento (2021): "Forward looking loan provisions: credit supply and risk-taking", Central Bank of Colombia, *Borradores de Economía*, no 1159, [doi.org/10.32468/be.1159](https://doi.org/10.32468/be.1159).

Morales, P, D Osorio, J Lemus and M Sarmiento (2022): "The internationalization of domestic banks and the credit channel of monetary policy", *Journal of Banking & Finance*, vol 135, February, [doi.org/10.1016/j.jbankfin.2021.106317](https://doi.org/10.1016/j.jbankfin.2021.106317).

Perez-Reyna, D (2017): "Historia del Banco de la República: crisis de 1999", in Central Bank of Colombia (ed), *Historia del Banco de la República, 1923–2015*, pp 437–63.

Rey, H (2015): "Dilemma not trilemma: the global financial cycle and monetary policy independence", *NBER Working Paper Series*, no 21162, May, [doi.org/10.3386/w21162](https://doi.org/10.3386/w21162).

Rincón-Castro, H, L Arango-Lozano, S Ariza-Murillo, V Bejarano-Salcedo, P Cardozo-Ortiz, F Gamboa-Estrada, J Julio-Román, L León-Díaz, C Miranda-Triana, W Moreno-Jiménez, J Ocampo-Gaviria, J Parra-Polanía, C Quicazán-Moreno, N Rodríguez-Niño, D Rodríguez-Novoa, J Rojas-Moreno, A Sánchez-Jabba, M Sarmiento, M Villamizar-Villegas and H Zárate-Solano (2020): "Impacto de la intervención cambiaria y su duración", Central Bank of Colombia, *Ensayos Sobre Política Económica*, no 98, 30 November, pp 1–123.

Romero, J, H Vargas, P Cardozo and A Murcia (2021): "How foreign participation in the Colombian local public debt market has influenced domestic financial conditions", *Latin American Journal of Central Banking*, vol 2, no 4, December, [doi.org/10.1016/j.latcb.2021.100043](https://doi.org/10.1016/j.latcb.2021.100043).

Sahay, R, V Arora, A Arvanitis, H Faruquee, P N'Diaye and T Mancini Griffoli (2014): "Emerging market volatility: lessons from the taper tantrum", *IMF Staff Discussion Notes*, vol 2014, no 9, 2 October, [doi.org/10.5089/9781498318204.006](https://doi.org/10.5089/9781498318204.006).

Sarmiento, M (2022): "Sudden yield reversals and financial intermediation in emerging markets", *Journal of Financial Stability*, [doi.org/10.1016/j.jfs.2022.101050](https://doi.org/10.1016/j.jfs.2022.101050).

Sarmiento, M, N Cardozo Alvarado, F Gamboa-Estrada, J Gómez-Pineda, C León, J Miguélez-Márquez and J Ojeda-Joya (2023): "Ciclo financiero global, flujos de capital y respuestas de política", Central Bank of Colombia, *Ensayos Sobre Política Económica*, no 104, March, pp 1–55, [doi.org/10.32468/espe104](https://doi.org/10.32468/espe104).

Schoenmaker, D (2013): "Governance challenges for global finance", in *Governance of international banking: the financial trilemma*, Oxford University Press, pp 1–17.

Sufi, A and A Taylor (2021): "Financial crises: a survey", *NBER Working Paper Series*, no 29155, August, doi.org/10.3386/w29155.

Superintendencia Financiera de Colombia (SFC) (2002): *Circular externa 011*, 20 May.

Urrutia Montoya, M (2000): "La estrategia de política monetaria", *Revista del Banco de la República*, vol 73, no 876, October, Nota Editorial.

——— (2002): "Una visión alternativa: la política monetaria y cambiaria en la última década", Central Bank of Colombia, *Borradores de Economía*, no 207, doi.org/10.32468/be.207.

Vargas, H (2011): "Monetary policy and the exchange rate in Colombia", *BIS Papers*, no 57, doi.org/10.32468/be.655.

Vargas, H, Y Betancourt, C Varela and N Rodríguez (2011): "Effects of reserve requirements in an inflation targeting regime: the case of Colombia", *BIS Papers*, no 54, pp 133–69, [www.bis.org/publ/bppdf/bispap54i.pdf](http://www.bis.org/publ/bppdf/bispap54i.pdf).

Vargas, H, P Cardozo (2012): "El uso de encajes en un marco de política monetaria óptima", Central Bank of Colombia, *Borradores de Economía*, no 716, June, doi.org/10.32468/be.1086.

Vargas, H, P Cardozo and A Murcia (2017): "The macroprudential policy framework in Colombia", *BIS Papers*, no 94, pp 103–28, [www.bis.org/publ/bppdf/bispap94i.pdf](http://www.bis.org/publ/bppdf/bispap94i.pdf).

Vargas, H, J. Ospina and J Romero (2022): "The Covid-19 shock and the monetary policy response in Colombia", in "The monetary-fiscal nexus in the wake of the pandemic", *BIS Papers*, no 122, March, pp 79–114, [www.bis.org/publ/bppdf/bispap122\\_f.pdf](http://www.bis.org/publ/bppdf/bispap122_f.pdf).

Vegh, C and G Vuletin (2012) "Overcoming the fear of free falling: monetary policy graduation in emerging markets", *NBER Working Paper Series*, no 18175, June, doi.org/10.3386/w18175.

Zárate Perdomo, J, A Cobo Serna and J Gómez-González (2012): "Lecciones de las crisis financieras recientes para el diseño e implementación de las políticas monetarias y financieras en Colombia", Central Bank of Colombia, *Ensayos Sobre Política Económica*, vol 30, no 69, December, pp 257–93, doi.org/10.32468/Espe.6906.