Box 4
Estimating a Local Financial Conditions Index (FCI) for Colombia

Tatiana Andrea Mora Arbeláez
Nicolle Valentina Herrera Pinto
Jose Luis Moreno Monroy*

1. Introduction

Financial conditions reflect the state of financial factors that, through various channels (e.g., leverage), influence the current and future evolution of key economic variables (Hatzius et al., 2010). Accordingly, the Financial Conditions Index (FCI) for Colombia is constructed to synthesize information from a wide range of indices across different financial markets, enabling the timely identification of signals of economic activity.

The literature highlights that financial condition indices are a valuable tool for monetary policy purposes because they facilitate comparison of financial conditions across periods and serve as inputs to macroeconomic forecasting models. (Angelopoulou et al., 2014). Studies such as those of Hatzius et al. (2010) and Koop and Korobilis (2014) show that these indices incorporate information about the business cycle that is not directly reflected in traditional variables, thereby capturing temporary signals associated with key episodes in the economic and financial analysis of an economy. In addition, financial condition indices play an important role as a communication tool, synthesizing the economy's financial situation in a clear and understandable manner, helping to shape public expectations and strengthen the credibility of monetary policy. (Blinder et al., 2009). In Colombia, a small and open economy vulnerable to external shocks and periods of high financial volatility, using a synthetic indicator of domestic financial conditions helps anticipate risks, enhances macroeconomic analysis, and contributes to informed decision-making. This, in turn, supports more effective monetary policy.

2. Methodology

The literature presents multiple methodologies for constructing this type of index. The most widely used is principal component analysis, which summarizes information from a broad set of financial variables into one or a few common factors that capture most of their variability. Following this approach, Gómez et al. (2011) estimated an FCI for Colombia to identify early signs of economic activity evolution. Building on this contribution and recognizing the growing importance of capturing changes in the dynamics of different financial markets over time, this new ICF estimate adopts the methodology proposed by Koop and Korobilis (2014), which is based on a TVP-FAVAR model.[1] This approach, among its benefits, allows dynamic changes in factor weights as new information is incorporated via the Kalman filter, thus creating a more adaptable relationship between financial variables and the indicator's construction.

The proposed methodology follows three main steps:

1. A database of 72 factors is constructed using a sectoral approach, which in principle incorporates the most relevant relationships of households, companies, and the government with the financial sector.

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* The authors are members of the Programming and Inflation Department. The opinions herein expressed are solely the responsibility of the authors and do not necessarily reflect those of the Bank nor its Board of Directors.

1 Time-Varying Parameter Factor-Augmented Vector Autoregression (TVP-FAVAR)

2. The number of variables is reduced using the algorithm proposed by Kursa, M. B., and Rudnicki, W. R. (2010), known as Boruta, to retain only the most relevant variables for estimating the indicator. This methodology assesses the importance of each financial indicator by comparing it with what could be obtained by pure chance, selecting only those with the greatest explanatory power regarding economic activity. For this exercise, the economic activity indicator (ISE for its Spanish acronym) is used as the objective variable, given its high frequency and its ability to reflect the evolution of economic activity in a timely manner.

3. The variables selected in the previous step are employed to estimate the index following the DVT-Favar methodology. Specifically, those selected are broken down into components attributable to their relationship with the macroeconomic variables included in the analysis and to financial behavior alone.

For this last step, a TVP-Favar is followed as follows:

$$x_t = \lambda_t^y y_t + \lambda_t^f f_t + u_t$$

$$\begin{bmatrix} y_t \\ f_t \end{bmatrix} = c_t + B_{.1} \begin{bmatrix} y_{t-1} \\ f_{t-1} \end{bmatrix} + \cdots + B_{.p} \begin{bmatrix} y_{t-p} \\ f_{t-p} \end{bmatrix} + e_t$$

where x_t corresponds to the financial variables; y_t corresponds to the macroeconomic variables of interest (ISE and core inflation); and f_t corresponds to the ICF. Errors are distributed in the manner $u_t \backsim N(0, V_t)$ y $e_t \backsim N(0, Q_t)$. The regression coefficients are contained in λ_t^y, λ_t^f, which are the weights of the financial variables in the indicator, and $(B_{t,1}, \ldots, B_{t,p})$ are the VAR coefficients that are modeled by a random walk:

$$\lambda_t = \lambda_{t-1} + v_t$$
$$\beta_t = \beta_{t-1} + \eta_t$$

where $v_t \backsim N(0, W_t)$ and $\eta_t \backsim N(0, R_t)$.

3. Databases

The variables were selected using a sectoral approach that analyzes how households, the government, and companies interact with the financial sector, enabling the identification of indices that represent savings, financing, and investment mechanisms in each sector. For households, the primary ways they relate to the financial system through financial savings and debt instruments were considered. Based on these relationships, factors such as gross household savings, interest rates on CDTs and savings accounts, and portfolio composition were selected. A similar exercise was conducted for the government, examining its connection to financial markets via public debt and potential effects on financial conditions, as well as for companies, focusing on their access to investment and operational resources through credit and capital markets.

Consequently, a comprehensive database was created, comprising 72 indicators from various financial markets, including equity market, monetary data, public debt, the external sector, and surveys primarily focused on credit supply and demand. This database features series with varying frequencies: 15 daily, 13 weekly, 29 monthly, and 16 quarterly. The original data underwent three preprocessing stages: first, symbols were assigned so that positive values indicate tighter financial conditions and negative values indicate looser conditions; second, variables were standardized monthly to ensure comparability in scale and frequency; third, the stationarity of each series was assessed and adjusted as needed.[2] Table B4.1 summarizes the indices used to estimate the FCI.

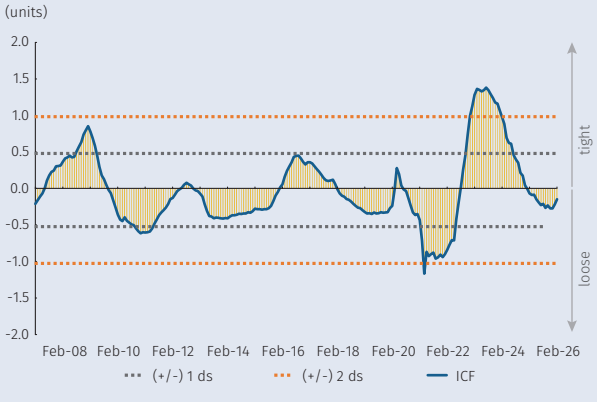
2 Most of the variables did not need transformation and remained at level form. Seventeen were transformed using annual growth, and six were transformed using first differences.

Table B4.1
Savings, investment, and financing mechanisms for households within the financial sector

Name	Frequency
Bid-Ask Spread TES Pesos, MPR, Spread: TES 10-3 years, TES-TIB, mortgage interest rate-TES 10 years, TES 2 years-3 months, Price to book Colcap, ISA and Ecopetrol Capitalization, CDS 5 years, TIB United States, DXY Index and Colcap. Interest rate of savings and CDT accounts. Disbursements of the mortgage portfolio (construction and acquisition), consumer, commercial, FED ICF, M3 (cash + deposits held by the public).	Daily and weekly
Real interest rate on consumer, mortgage, and commercial loans (ordinary and preferential). Spread between the interest rates of the loan portfolio and TES, TIB-TPM. Buyer/seller position of foreigners in TES, government bonds outstanding, and profits of credit institutions. Gross portfolio and mortgage, commercial, and consumer NPL indices. Volatility of TRM (representative market exchange rate), Colcap, and Brent. Fedesarrollo survey: good/bad time to buy housing and durable goods.	Monthly
Price index of used housing, gross household savings, and debtors with exchange rate risk. Survey on the perception of supply/demand and changes in the standards for new loans in the mortgage, consumer, and commercial loan portfolios. Survey on the availability of credit in the sectors included in the Quarterly Survey of Economic Expectations (ETE for its Spanish acronym). Survey on the external debt quota of credit-granting establishments.	Quarterly

Source: Authors' own elaboration.

Graph B4.1
Financial Conditions Index for Colombia



Source: Authors' own calculations.

4. Results

Positive FCI values for Colombia indicate tighter financial conditions, while negative values reflect looser conditions. The historical performance of the index indicates that it effectively reflects key episodes of tightening and easing in Colombia's financial conditions. (Graph B4.1), as well as changes in trends across different economic cycles.

During the 2008 global financial crisis, the FCI reflected a marked tightening of local financial conditions, consistent with reduced foreign investment flows, heightened risk aversion, and a deteriorating international financial environment. This episode resulted in greater financial constraints on the Colombian economy, accompanied by a deterioration in credit indicators and a decline in credit perceptions among some surveys, among other factors, in a context of a restrictive monetary policy stance.

Between 2010 and 2011, the indicator suggested a gradual normalization toward looser financial conditions, consistent with the recovery of economic activity, the return to a more stable growth path, and the appreciation of the peso, amid a progressive improvement in global financial conditions.

Between 2011 and 2016, financial conditions remained comfortable on average, consistent with a period of sustained growth, high international commodity prices - particularly oil and coal, and dynamic inflows of foreign investment, all of which furthered GDP growth. However, from 2014 onwards, there was a gradual tightening of these conditions, associated with falling oil prices, a decline in fiscal revenues, a sharp depreciation of the currency, and a deterioration in Colombia's macroeconomic outlook.

From 2016 to the end of 2021, initial financial conditions were tighter than before but gradually eased. From 2020 onward, this loosening persisted as a result of the measures adopted in the context of the pandemic, aimed at guaranteeing ample liquidity conditions for the financial system and economic activity, in an environment characteri-

zed by low interest rates mirroring *Banco de la República's* decisions, relatively stable credit growth, and inflation close to the target.

From the beginning of 2022 to mid-2024, the FCI pointed to tighter financial conditions, reflecting greater uncertainty about global economic growth and the persistence of internal and external inflationary pressures. Domestically, this environment was characterized by increases in the monetary policy rate amid inflationary pressures, resulting in higher market interest rates. At the same time, lower disbursement growth and a gradual deterioration in loan portfolio quality indices, among other factors, were observed.

Since the end of 2024, the FCI has been close to zero, suggesting slightly looser financial conditions. This behavior occurred in a context of some recovery of the credit market, consistent with stable interest rates on average. However, at the margin, the index shows signs of a slight tightening, in line with recent increases in the monetary policy interest rate, stable disbursements, a signaling of decreased activity in the loan portfolio, and slight deteriorations in loan portfolio quality indices.

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