Box 3
Indicator of Financial Conditions

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In their publication of the April 2017 *Global Financial Stability Report*, the International Monetary Fund (IMF) showed an indicator that seeks to approximate the ease of getting access to funding for a group of economies. The intention of this financial condition indicator (FCI) is to capture the common trends of a set of financial variables while excluding the macroeconomic environment.

An indicator is proposed in this Box that has the same purpose as the FCI has in the IMF. Nevertheless, instead of using a model of factors to control for the macroeconomic environment, the decision was made to carry out a 2-stage estimate where: 1) a Vector Autoregressive model (VAR) is estimated which makes it possible to break down the trend of each variable in the model with respect to the contribution of financial and macroeconomic shocks and 2) A principal component analysis is used to find the common trend of the financial series after excluding the effect of the macroeconomic variables. This procedure is explained in greater detail below.

First, a VARl(1) is estimated for the entire set of variables. This model can be expressed as follows:

$$\begin{bmatrix} F_t \\ M_t \end{bmatrix} = \beta_0 + \beta_1 \begin{bmatrix} F_{t-1} \\ M_{t-1} \end{bmatrix} + \begin{bmatrix} u_{F,t} \\ u_{M,t} \end{bmatrix} \qquad (1)$$

Where F_t represents the financial variables, M_t the macroeconomic variables, β_0 and β_1 are parameter vectors to be estimated and $u_{F,t}$ and $u_{M,t}$ are the vectors of errors in the model associated with the financial and macroeconomic variables respectively. Starting with equation 1, the model is restated as a VMA (∞) in order to find the contribution of macroeconomic shocks to the changes in the model series.

$$\begin{bmatrix} F_t \\ M_t \end{bmatrix} = \bar{\beta}_0 + \begin{bmatrix} \Psi(L)_{FF} & \Psi(L)_{FM} \\ \Psi(L)_{MF} & \Psi(L)_{MM} \end{bmatrix}_{L=0,\ldots,\infty} \begin{bmatrix} u_{F,t} \\ u_{M,t} \end{bmatrix} \qquad (2)$$

Where, $\bar{\beta}_0$ is the non-conditional mean vector, and $\Psi(L)_{FF}$, $\Psi(L)_{MF}$ and $\Psi(L)_{MM}$ are lag operator polynomial matrices that contain coefficients which are found based on β_0 and β_1. Finally, the series of financial variables separating the macroeconomic conditions is defined as:

$$\tilde{F}_t = F_t - \psi(L)_{FM}\, u_{M,t} \qquad (3)$$

Finally, the FCI is defined as the first principal component of the vector of variables $\tilde{F}_t$. Table B3.1 presents the financial and macroeconomic variables that are used to estimate the indicator. This series corresponds to a subset of the variables suggested by the IMF that are adapted to the Colombian situation.

Graph B3.1 presents the behavior of the FCI over time. Note that, in general, the indicator identifies the following periods: 1) between September 2006 and March 2008, the financial conditions were the most favorable for the sample analyzed, which coincided with a boom in commercial and consumer loans, and 2) restrictive financial conditions between March 2009 and March 2011 which, together with the global financial crisis, could be explained by the materialization of risks that had accumulated during the previous period. Last of all, financial conditions have remained stable at slightly below their long-term average during the most recent period.

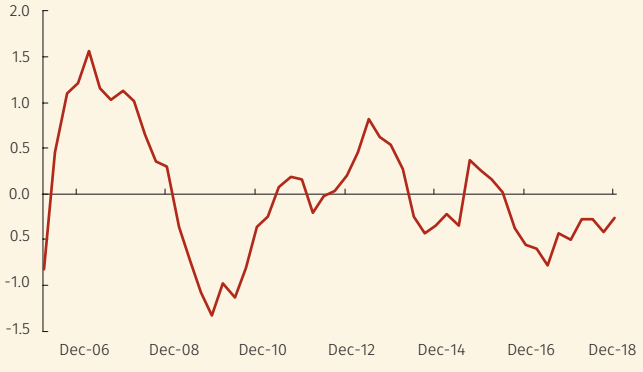
* The authors are part of the Financial Stability Department in *Banco de la República*. The opinions expressed here are the sole responsibility of the authors and do not imply any commitment on the part of *Banco de la República* or its Board of Directors.

Table B3.1
Variables in the Financial Condition Indicator

Variables	Description
Macroeconomic	
Monetary Policy Interest Rate	
Real GDP Annual Growth	
Inflation	
Financial	
Term premia of the TES curve	Difference between the return on a 10-year and a one-year TES bond
Interbank Premia	Difference between the Interbank Rate IBR and the return on a 3-month TES bond
Real long-term return	Annual change in the return on a 10-year TES bond adjusted for inflation
Colcap	Annual difference of the logarithm of the Colcap index
NHPIBR	Real annual change of *Banco de la República*'s new housing price index
Real Growth of the Loan Portfolio	Real annual change in the CIs total loan portfolio

Sources: DANE, Bloomberg, Precia, Office of the Financial Superintendent of Colombia, and *Banco de la República*.

Graph B3.1
Financial Condition Indicator (FCI)



Sources: DANE, Bloomberg, Precia, Office of the Financial Superintendent of Colombia, and *Banco de la República*, calculations by *Banco de la República*.