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Exchange rate forecasts for Colombia*

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Colombia's exchange rate is of considerable interest to economic and financial agents, especially in trying to understand its behavior. This has led several analysts and academics to undertake efforts to make predictions, most of which have proven wrong. However, this is not unique to the country, as Meese and Rogoff (1983) and Rossi (2013) showed that the rate of change was akin to a random walk. As we try to broaden our forecasting over the long term, our ability to generate coherent and consistent predictions becomes even more precarious. In a globalized world context, with many countries having a free flow of capital and the exchange market being a decentralized market and the most liquid among assets, it is not difficult to think that the exchange rate is close to a martingale.

Colombia's position as a relatively small economy worldwide, having flexible capital flows, exposes it to international shocks from different factors such as oil prices and interest rate fluctuations of our foremost trade allies, namely, the United States and Europe. These pose a difficulty for the Bank of the Republic regarding economic stability and in formulating efficient investment strategies for domestic and foreign companies. However, in the short term, some domestic firms, on average, have made roughly accurate predictions about the exchange rate behavior.

Graph 1 shows the dynamics of the exchange rate since 2010, together with forecasts based on the Short-Term (Monthly) and Medium-Term (Annual) expectations of domestic financial market participants. In the short term, the exchange rate was found to be close to the average and at least two standard deviations from the predictions made by firms participating in the financial market. However, this is different regarding medium-term forecasts. As we can see, in most cases, these have fallen considerably short of their forecasts. There are three noteworthy episodes where this is most notable: the 2014-2016 oil price drop from 100 USD a barrel to less than 40 USD, the oil price drop and crisis generated by the 2020 pandemic, and the recent contraction of world trade resulting from the pandemic and global inflationary rates.

In order to contrast these predictions against the most recent forecasting methods using Unsupervised Learning, different models were estimated based on one hundred domestic and foreign macroeconomic and financial variables that the literature has shown to predict the Exchange Rate. Graph 2

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shows the forecast for the last year. We can see that the agents' projections underestimated the recent devaluation of the dollar. Models such as Support Vector Machine (SVM) and Relevance Vector Machine (RVM) made predictions with the same trend as above, with stronger Peso revaluations nonetheless. In contrast, models based on Principal Component Factors (PCR) and Partial Least Squares (PLSR) performed better predicting the rate than expectations and the other models. This suggests that, although we are still far from an adequate medium- and long-term forecast, recent tools bring us closer to a better estimate than the market consensus (average) does. To the extent that they can incorporate information from different sources in real-time and exceed our capacity to acquire new information and biases, they can provide information not being considered for an informed medium-term investment decision.

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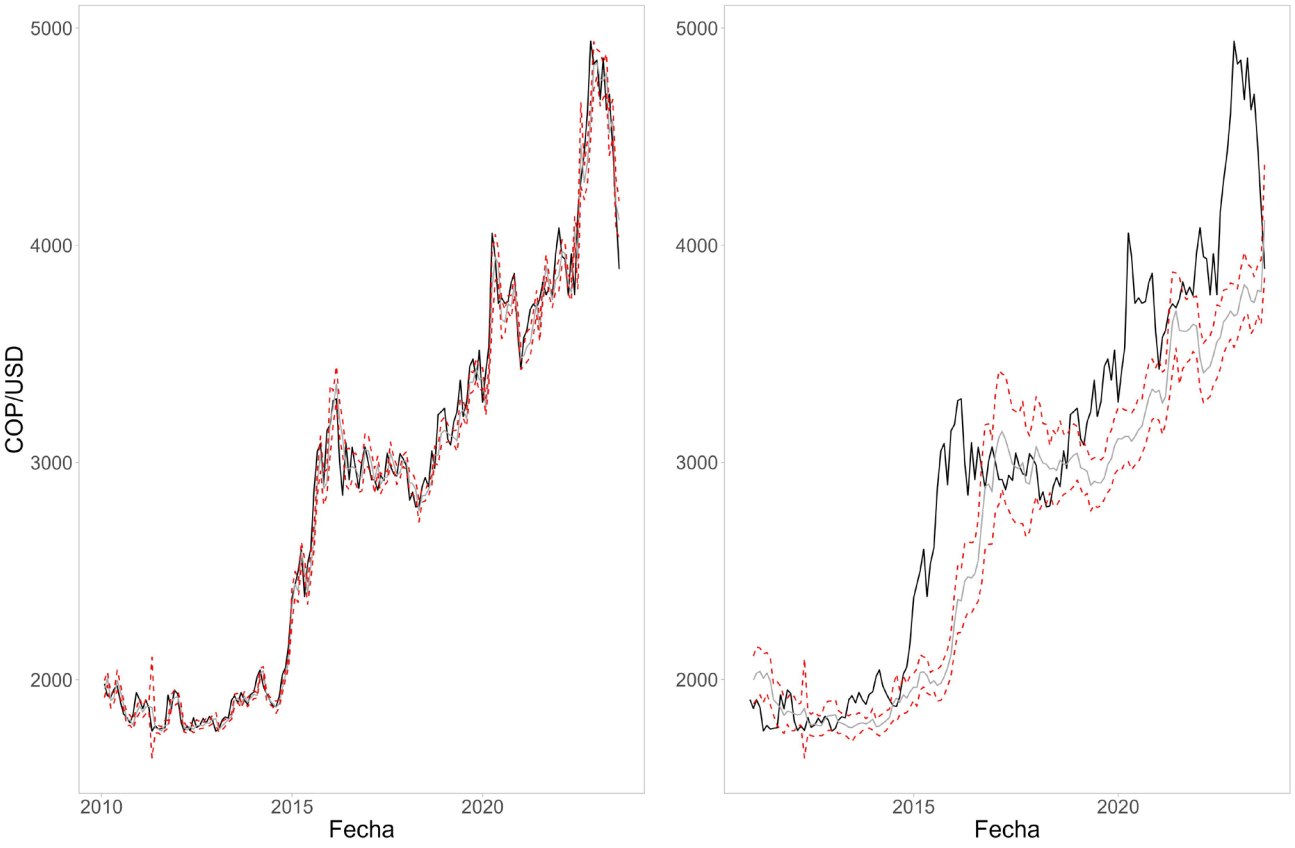
Graph 1. Monthly Peso/Dollar Exchange Rate and Short-Term and Medium-Term Forecasts



Note: The graph shows the Peso/Dollar exchange rate (black), the mean of the predictions (gray), and two bands (red) reflecting two standard deviations from the mean. The left graph corresponds to the predictions for the beginning of the end of the month, while the right graph corresponds to rate predictions for the following year.

Source: Prepared and calculated by the Bank of the Republic with data from the Monthly Expectations Survey.

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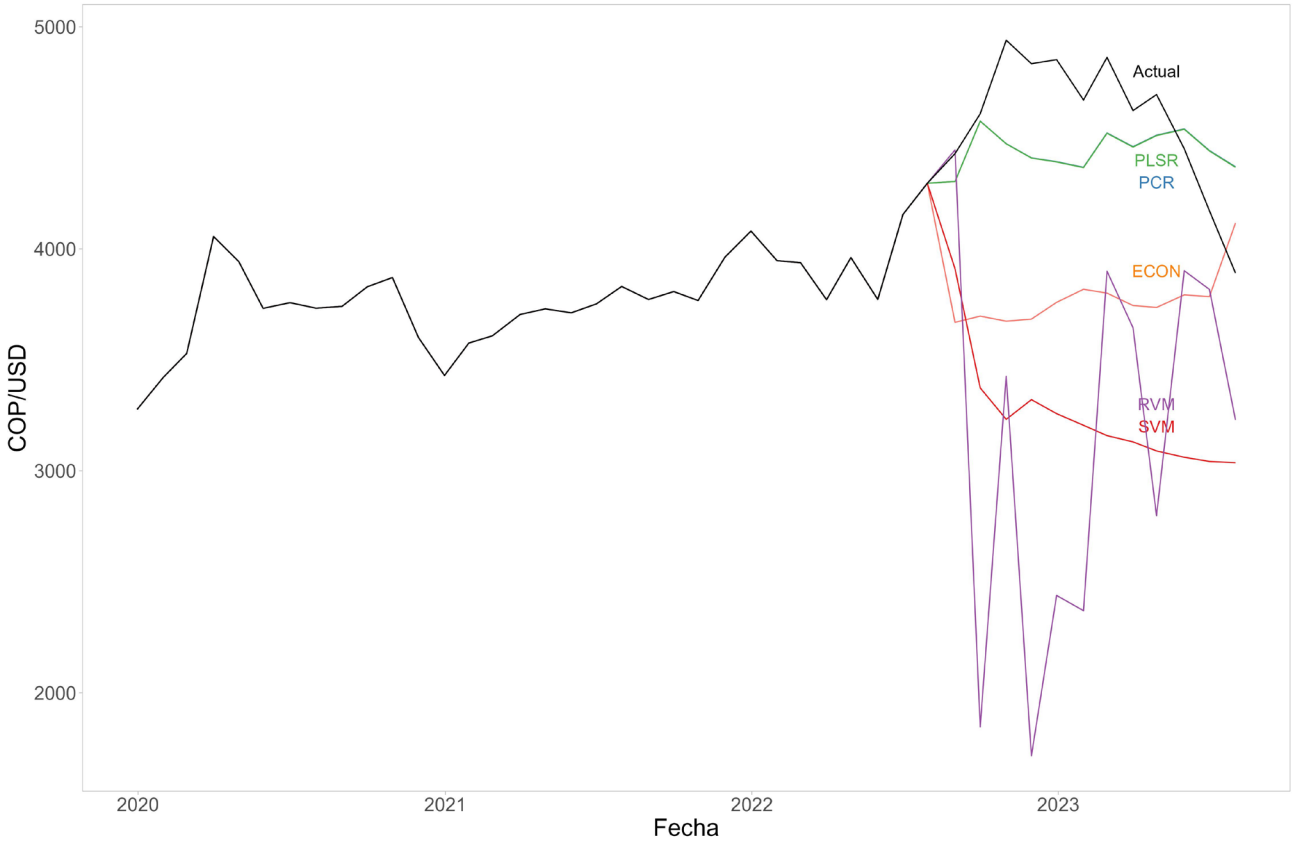
Graph 2. Monthly Peso/Dollar Exchange Rate and Short-Term and Medium-Term Forecasts



Note: The graph shows the Peso/Dollar exchange rate (black) and different forecasts from July 2022 to July 2023. ECON is the prediction of the Colombian market, SVM is the Support Vector Machine model, RVM is the Relevance Vector Machine, PCR is Principal Components, and PLSR is partial least squares regression.

Source: Prepared and calculated by the Bank of the Republic using data from the Monthly Expectations Survey and Bloomberg.

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