

Mind the Gap: BRL remains weaker than suggested by fundamentals

Diving into our FX econometric models

- The Brazilian Real (BRL) depreciated by 21% in 2024, underperforming other emerging market currencies amid deteriorating economic fundamentals and increased risk premium. A partial rebound in early 2025 suggests that the sharp depreciation in December may have been an overshooting rather than a structural shift.
- This report seeks to evaluate the extent to which the recent performance of the BRL deviates from econometric model predictions. Additionally, to capture short-term fluctuations, we developed a model based on daily data to identify high-frequency drivers of the BRL.
- Through econometric modeling, we outline five alternative scenarios for the BRL trajectory: baseline – 5.90 reais per dollar; optimistic – 5.40; pessimistic – 6.45; and two intermediate cases balancing global and domestic factors – 5.75 and 6.00.
- Meanwhile, the Real Effective Exchange Rate (REER) model suggests that the BRL remains misaligned compared to economic fundamentals, though the gap has narrowed in recent years. The “equilibrium” exchange rate would be in the interval from approximately BRL/USD 5.15 to BRL/USD 5.60, with an average of circa BRL/USD 5.45.
- Despite the good performance in early 2025 and persistent currency misalignment (from REER models), we continue to see nominal FX under pressure in the short term.
- Accordingly, we revised our projection for YE 2025 from 6.20 to 6.00 reais per dollar. For 2026, we project the exchange rate at 6.20 reais per dollar (previously: 6.40), in line with the inflation differential.
- The daily econometric model helps identify the key factors influencing BRL movements at high frequency. Recently, short-term fluctuations have been mainly driven by domestic market risk proxies. In turn, the US dollar index lost significance in late January, whereas the CRB commodity index has not been a noteworthy driver since November 2024.
- The BRL has diverged from other emerging market currencies since mid-2024, showing a weaker correlation amid rising domestic uncertainty. This trend is similar to those seen in previous election cycles.

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Will the BRL performance in early 2025 be sustained?

The Brazilian Real (BRL) depreciated by 21% over the past year. By the end of 2024, the exchange rate stood just below 6.20 reals per dollar, compared to 4.85 at the end of 2023 – a significant underperformance relative to the average of emerging market currencies (see Appendix). This decline was driven both by deteriorating economic fundamentals and a substantial increase in the risk premium.

After high volatility in December, the BRL showed a relatively strong performance in February 2025. The exchange rate reached levels around 5.70 reals per dollar last month. This reversal suggests that the sharp depreciation in December may have been an overshooting¹, with the BRL experiencing intense stress amid heightened uncertainty in the macroeconomic environment (mostly driven by fiscal concerns). The subsequent rebound in early 2025 could be attributed to a partial reversal of these distortions.

At that time, we revised our projection for the exchange rate to 6.20 reals per dollar, although acknowledging low confidence given the high level of stress in financial markets.

But what do the models indicate? This report seeks to evaluate the extent to which the recent performance of the BRL deviates from econometric model predictions. Both nominal and structural models are estimated for the assessment of exchange rate dynamics. We simulate five alternative scenarios to forecast the potential trajectory of the BRL under varying assumptions (on a monthly basis): baseline; optimistic; pessimistic; and two intermediate cases combining different global and domestic economic environments (positive/negative). Besides, to capture short-term fluctuations, we also developed a model based on daily data to identify high-frequency drivers of the BRL.

The nominal view

Alternative scenarios point to a nominal FX between 5.40 and 6.45

To forecast nominal exchange rate dynamics, we built an econometric model based on financial asset data with monthly frequency. Estimates consider the sample period ranging from January 2010 to January 2025. Among a broad set of models tested, this report presents the preferred specification using econometric criteria (expected signs; statistical significance; backtesting). The explanatory variables included in our exchange rate model are presented in the equation below.

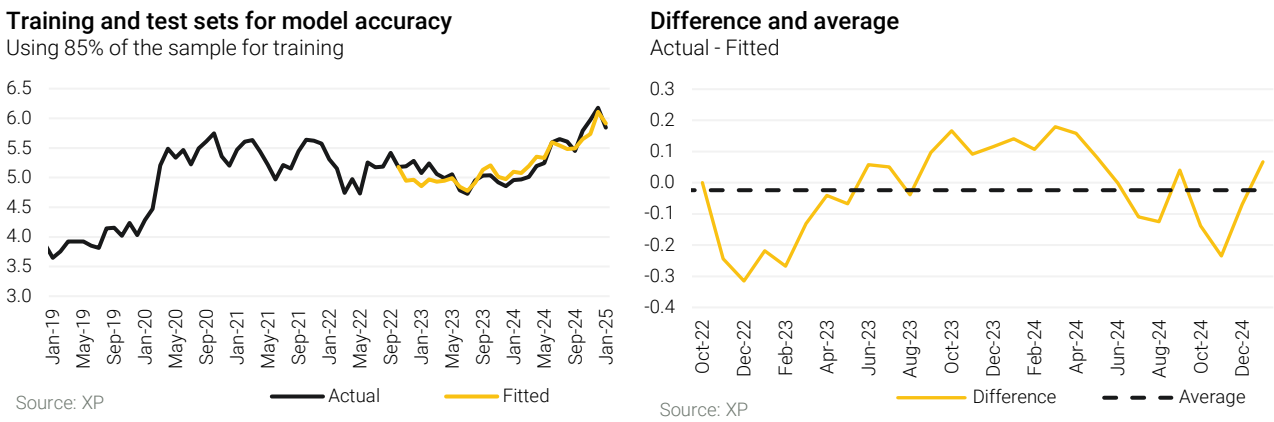
$$dlog(BRL_t) = \beta_0 + \beta_1 dlog(Dollar_t) - \beta_2 dlog(Commodity_t) + \beta_3 dlog(Risk_t) - \beta_4 log(Int_Dif_t) + \epsilon$$

Abbreviation	Variable	Description	Source	Expected Sign	Economic Intuition
Dollar	Dollar Index	Measures the strength of the US dollar against a basket of major developed-market currencies	Bloomberg	+	The stronger US dollar, the more BRL is devaluated
Commodity	Commodity Index	A broad index reflecting international commodity prices (spot index)	Bloomberg	-	Higher commodity prices increase the value of Brazilian exports, leading to a greater supply of foreign currency, which supports BRL appreciation
Risk	CDS 5Y - Brazil	A measure of sovereign credit risk associated with Brazil	Bloomberg	+	Higher CDS spreads indicate increased country risk, reducing the attractiveness of Brazil for foreign capital inflows and leading to BRL depreciation
Int_Dif	Interest rate differential	The difference between the nominal rates in Brazil (DI) and the US (Treasury) over a two-year horizon	B3 and Bloomberg	-	A higher interest rate differential increases the relative attractiveness of Brazilian assets, encouraging foreign capital inflows and supporting BRL appreciation

Source: XP

1. Kenneth, Rogoff. "Dornbusch's Overshooting Model After Twenty-Five Years'." IMF, Washington (2002).

To assess the model's accuracy, the database was split into training and test sets. We used 85% of the sample period for model training. Thereafter, we tested our model for the period October 2022 to January 2025. The model has shown a good predictive performance, with the difference between actual and fitted values not exceeding BRL/USD 0.02 in either direction (on average). Moreover, the errors were evenly distributed above and below the predicted values, suggesting the absence of systematic bias in the projections. That is, the model does not consistently overestimate or underestimate the exchange rate.



The BRL has fluctuated between around 5.70 and 5.90 reais per dollar in the first two months of 2025. How sustainable are these levels? To answer this question, we outlined five scenarios: (i) baseline; (ii) optimistic; (iii) pessimistic; (iv) intermediate 1 – solid global conditions but weak domestic fundamentals; and (v) intermediate 2 – weak global conditions but solid domestic fundamentals. The definition of values for explanatory variables under each scenario was based on historical comparison and judgmental analysis (see Appendix for illustrations).

Our models suggest that the BRL could fluctuate between 5.40 reais per dollar (optimistic scenario) and 6.45 reais per dollar (pessimistic scenario). Of course, more extreme scenarios (positive or negative) may occur. Nevertheless, our main goal is to outline a reasonable range for the BRL based on the assumptions incorporated into our models. Below, we present a detailed breakdown of each scenario.

Scenario	BRL - 2025
Optimistic	5.40
Intermediate 1	5.75
Baseline	5.90
Intermediate 2	6.00
Pessimistic	6.45

Source: XP

Baseline Scenario: 5.90 reais per dollar

Exchange rate slightly depreciated compared to current market levels. Among the key assumptions, we foresee that while US President Donald Trump has implemented significant import tariff increases, he does not extend these measures throughout the entire year. That said, the trade war is expected to have an indirect impact through lower global economic growth, heightened risk aversion, and a more hawkish Federal Reserve (we assume no Fed rate cuts in 2025), which would further weigh on Brazilian asset prices.

Furthermore, we anticipate a virtual stability in international commodity prices throughout 2025, despite the recent decline – the CRB Spot Index fell by around 2.5% from late February to early March. Economic growth in major buyers such as China is expected to remain subdued. That said, geopolitical tensions and a potential trade war keep the scenario cloudy.

Regarding the country risk, we assume that Brazil's CDS will remain around 170 basis points, which is consistent with levels seen between January and February 2025. A similar assumption is applied to the interest rate differential, which is based on the expected rates two years ahead.

Under these conditions, our model projects the Brazilian exchange rate at 5.90 reais per dollar.

Optimistic Scenario: 5.40 reais per dollar

Stronger BRL. The US trade policy shows no significant tariff increases under Trump's administration. US inflation converges towards the target, leading the Federal Reserve to cut rates this year. The Bloomberg Dollar Index stabilizes at 1,230, a level last observed in 2023 when Fed Chair Jerome Powell shifted to a more dovish stance. Lower global interest rates ease financial conditions, supporting a 5% increase in the CRB commodity index, which would lead to levels not seen since 2023.

The Brazilian government implements a new round of fiscal adjustment measures and avoids interventionist economic policies, thus reducing perceived sovereign risk. The 5-year CDS declines to 130, one of the lowest levels since 2020. Domestic economic activity slows, inflation declines, and the Central Bank's Monetary Policy Committee starts discussing interest rate cuts in the second half of 2025.

Under this scenario, the exchange rate appreciates, reaching 5.40 reais per dollar.

Pessimistic Scenario: 6.45 reais per dollar

Global and domestic headwinds lead to a weaker BRL. On the external front, US President Donald Trump implements and sustains trade war policies throughout the year, leading to a sharp deterioration in global trade dynamics. As a result, the US dollar strengthens considerably, with the Bloomberg Dollar Index reaching 1,350, a level last seen in late 2022. Tighter trade restrictions drive US inflation higher, prompting discussions of a potential Fed interest rate hike as early as the second half of 2025. Additionally, the global economic slowdown triggered by the trade war exerts downward pressure on commodity prices. We assume a 6% decline in commodity prices, bringing them back to the lowest level of 2024.

On the domestic front, fiscal deterioration intensifies. The government expands fiscal and quasi-fiscal policies (focusing on short-term stimulus measures), which further undermine investor confidence. In response, Brazil's CDS risk premium rises to 250 basis points, a level similar to that observed when the current administration previously challenged the Central Bank's independence. At the same time, growing inflationary pressures require a higher Selic rate, weighing on economic growth prospects.

Under this scenario, the exchange rate depreciates sharply, reaching 6.45 reais per dollar.

Intermediate Scenarios: Mixed domestic and global conditions

Between the optimistic and pessimistic scenarios, we also simulate two intermediate cases: (i) solid global conditions but weak domestic fundamentals – intermediate 1; and (ii) weak global conditions but solid domestic fundamentals – intermediate 2.

Each intermediate scenario was built by combining the respective domestic and international assumptions from the optimistic and pessimistic cases. However, two key variables show distinct behavior in these scenarios: (i) Credit Default Swap - while the CDS is influenced by both domestic and global factors, it is more sensitive to local conditions. Consequently, under the scenario where domestic fundamentals are weak but global conditions are favorable, CDS is lower than in the fully pessimistic scenario (but still elevated compared to the base case); and (ii) Interest Rate Differentials: given that Brazilian interest rates present greater variation than US rates, the interest rate differential fluctuates significantly. Under the "solid global

conditions but weak domestic fundamentals” scenario, the differential reaches its highest levels among the simulated cases. Conversely, under the “weak global conditions but solid domestic fundamentals” scenario, the interest rate differential reaches its narrowest value.

Under the Intermediate 1 Scenario, the exchange rate reaches 5.75 reais per dollar.
In turn, the Intermediate 2 Scenario projects the exchange rate at 6.00 reais per dollar.

The structural view

FX remains weaker than fundamentals suggest, although the gap has narrowed

As discussed above, the Brazilian exchange rate has recently faced high volatility, due to both domestic and global factors. Our base scenario foresees levels close to BRL/USD 6.00, although simulations of alternative scenarios bring a relatively wide range for the nominal exchange rate.

That said, should we affirm that the Brazilian Real is weaker compared to what is indicated by economic fundamentals? To answer this question, we look deeper into the Real Effective Exchange Rate (REER) dynamics.

In this report, we update econometric models that aim to estimate the equilibrium real exchange rate and the so-called *currency misalignment* (persistent undervaluation or overvaluation) in the Brazilian economy. These models have been presented in special reports published in recent years. For details, please see [XP Macro Special: Will the BRL Continue to Appreciate? January 30, 2022](#); and [XP Macro Special: New year, same question: Will the Brazilian currency appreciate? February 02, 2023](#).

In short, we present below the list of indicators used in our estimation process, highlighting their expected signs in the equations as well as the economic intuition behind their impact on the REER.

Variable	Description	Source	Expected Sign	Economic Intuition
TOT - Terms of Trade	Ratio between Brazil's export prices and import prices	Funcex	—	Higher export prices than import prices imply a trade balance surplus (foreign currency trade inflows).
NEL - Net External Liabilities	Ratio between International Investment Position and Total GDP	Central Bank of Brazil and IBGE	+	The greater the external liability, the greater the accumulated foreign currency outflow.
PROD – TFP Growth Differential	The difference in growth rates of total factor productivity (TFP) between Brazil and the average of emerging countries	The Conference Board	—	A component for measuring potential economic growth. Literature shows that stronger economic growth usually implies currency appreciation.
INT – Interest Rate Differential	The contrast in interest rates between 5-year government bonds from Brazil and the United States	B3 and Bloomberg	—	Higher interest rates attract foreign capital and appreciate the domestic exchange rate.
NTT – Non-Tradables versus Tradables Inflation	The ratio between non-tradables and tradables inflation based on Brazil's CPI	IBGE	—	If services prices rise faster than industrial prices, the exchange rate strengthens.
DEBT – Government Debt Differential	The difference in government debt-to-GDP ratio between Brazil and the average of emerging countries	The World Bank	+	Higher the government debt differential, the higher the risk perceived by investors and other financial market participants.
CDS – Sovereign Risk	Credit Debt Swap spread	Bloomberg	+	Higher the sovereign risk, lower the incentives to invest resources in the country.
TRI – Trade Restrictiveness Index	The ratio between the amount collected with import taxes and the value of total imports	Bloomberg	—	Greater the trade restrictiveness, the lower the flow of imports into the country (lower demand for foreign currency).

Source: XP

We performed the analyses in this study through the development of BEER (Behavioral Equilibrium Exchange Rate) models. This approach does not seek a long-term exchange rate that leads to the convergence of the current account balance at a certain equilibrium level, which is more related to FEER (Fundamental Equilibrium Exchange Rate) models. Rather, it combines structural and cyclical factors aiming at evaluating the currency misalignment.

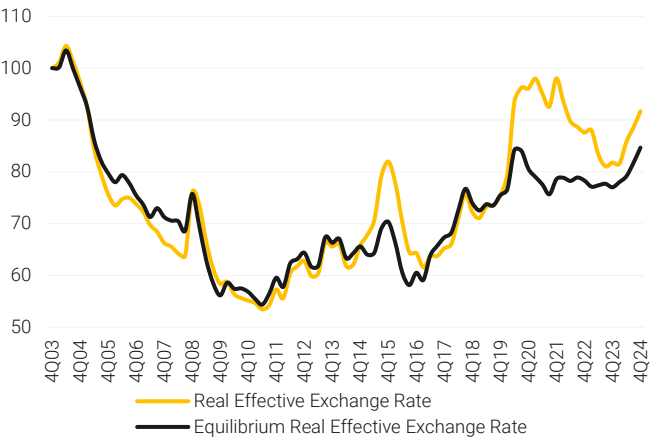
Indeed, real exchange rates should move back towards their equilibrium in the medium term, erasing the currency misalignment. Nevertheless, nominal and structural rigidities may hinder adjustment and lead to a long-lasting deviation.

Our estimation process considers the sample period ranging from 2003Q1 to 2024Q4, on a quarterly basis. Three different econometric methods (and four models) were applied: (I) FMOLS – Fully Modified Ordinary Least Squares; (II) VEC – Vector Error Correction; and (III) GMM – Generalized Method of Moments.

The estimates obtained from those different frameworks ranged from 5% to 13% regarding currency misalignment, with an average of around 8%. Therefore, the current “equilibrium” exchange rate (by applying the results to the nominal pair, having 5.90 as a reference) would be in the interval from approximately BRL/USD 5.15 to BRL/USD 5.60, with an average of circa BRL/USD 5.45.

We estimate a currency misalignment of around 8% currently

Misalignment = current vs. fundamentals-based REER



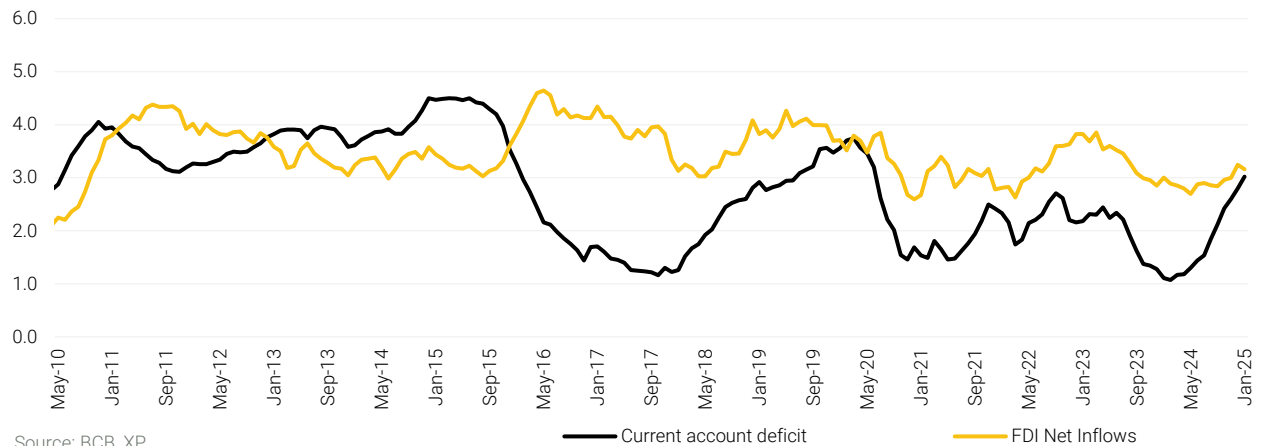
Source: IBGE, BCB, BBG, World Bank, Conf. Board, XP

About three years ago, our estimates pointed to a considerably larger exchange rate misalignment: from 18% to 33%, with an average of 25% (see Appendix). Persistent imbalances between supply and demand conditions in the post-pandemic period weighed heavily on the exchange rates of emerging economies.

In a nutshell, our estimates continue to suggest currency misalignment – i.e., BRL is weaker than suggested by economic fundamentals. However, there has been a narrowing gap in the recent period. In this regard, we draw attention to the deterioration in the Brazilian current account balance (see chart below) and the greater difference between Brazil’s government debt-to-GDP ratio compared to its emerging peers. The worsening of these fundamentals has increased the estimate of the “equilibrium” real exchange rate in recent years, thus reducing exchange rate misalignment.

Deteriorating external accounts throughout 2024

(% of GDP)



Source: BCB, XP

We forecast the exchange rate at 6.00 reais per dollar

Despite the good performance of the BRL in early 2025 and persistent currency misalignment (from REER models), we continue to see nominal FX under pressure in the short term. The exchange rate trajectory remains within a range where further depreciation is plausible. Under our baseline scenario presented before, the BRL reaches 5.90 reais per dollar, not far from current levels. In our view, the balance of risks around that projection is tilted to the upside (i.e., a more depreciated exchange rate). Risks of a more intense trade war and the adoption of unorthodox economic measures in Brazil have increased in recent weeks.

All considered, we are revising our projection for the Brazilian exchange rate YE 2025, to 6.00 from 6.20 reais per dollar. This adjustment ensures better alignment with the projections of our nominal exchange rate model. Additionally, as Brazil's electoral cycle approaches, we anticipate increased FX volatility. Taking this into consideration, we project 6.20 reais per dollar YE 2026 (previously: 6.40), in line with the inflation differential.

The strategy view

A look at the (very) short-term

Daily-based models: Monitoring determinants

To capture which variables are showing the greatest explanatory power for BRL variation in the short term, we ran a daily-based model with rolling windows of 120 business days (about six months). The intention is not to forecast from them, but to understand at each moment how much each explanatory variable is contributing to determining the FX price, based on the relative weights of the estimated coefficients.

Initially, we adopted the same specification as the monthly model, with the Bloomberg Dollar Index, the 5-year CDS, the CRB commodity index, and the interest rate differential as explanatory variables.

However, the interest rate differential showed a coefficient with a different sign to that expected according to the economic literature. This result seemed to indicate that the variations in interest rates over such a short period (one day) signal the market's risk perception rather than the nature of monetary policy itself. Even when we tried to control for risk, as explained below.

The challenge was, therefore, to isolate the factor linked to monetary policy by including additional local risk variables in the model. Of these, the one that proved to be most significant was the FRA (forward rate agreement) of 3 to 5 years, i.e., the average interest rate between the 4th and 5th years ahead. This reflects the risk perception, with the benefit of avoiding, as far as possible, expectations about the shorter monetary policy cycle.

Based on this econometric specification, we noticed an increased explanatory power over the average period. That said, the sign of the coefficient linked to the interest differential continued to behave more like a risk component than an expectation for monetary policy (and it was not significant at 10% most of the time).

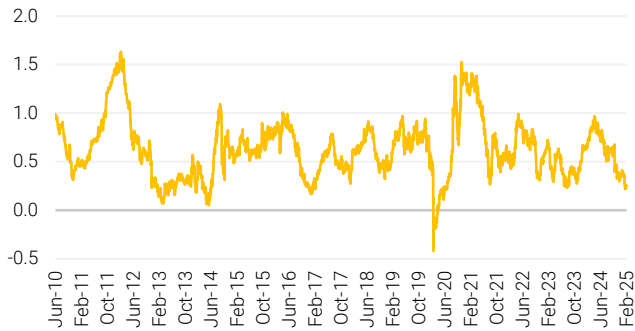
We, therefore, opted for a specification that includes the 3-year and 5-year FRA, but without the interest rate differential (acknowledging the trade-offs implied in this decision).

In this regard, it is worth briefly discussing the choice of 120 business days (bd) as the period defined for the moving window. A smaller window of 3 months (90 bd) showed high volatility in the estimated coefficients, making it difficult to interpret and analyze the results. Moreover, this option presented a lower R² (coefficient of determination) than the time frame chosen. On the other hand, a longer window of 180 bd (around 9 months) does not alter the R² but implies a lower sensitivity for understanding high-frequency movements.

The estimated results are seen in the charts below. They present the behavior of the *betas* (coefficients) over time. The signs of the explanatory variables are in line with what is expected by economic theory for virtually the entire period analyzed.

Bloomberg Dollar Spot Index

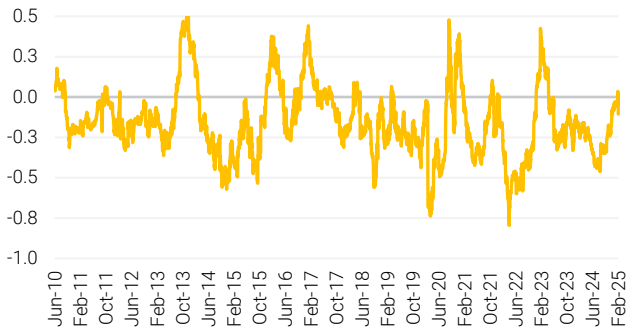
Estimated coefficient



Source: XP

CRB Spot Index

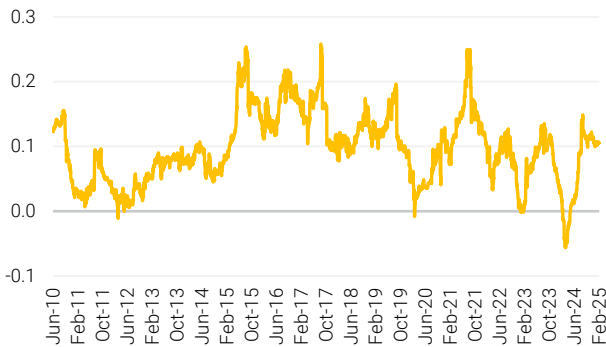
All Commodities. Estimated coefficient.



Source: XP

Brazilian Credit Default Swap (CDS)

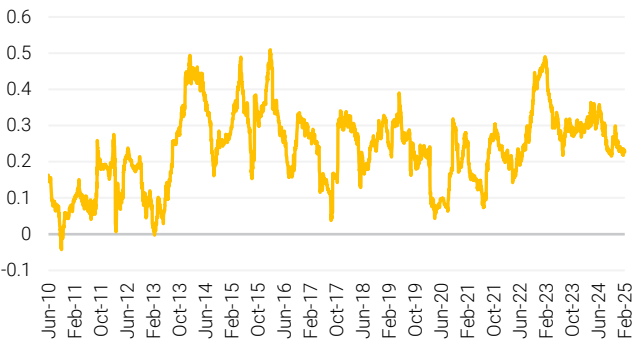
5Y. Estimated coefficient.



Source: XP

Brazil Forward Rate Agreement (FRA)

3Y vs 5Y. Estimated coefficient.

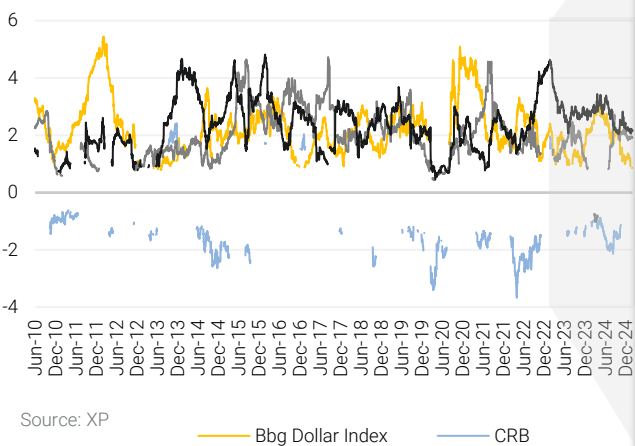


Source: XP

Below, to make it easier to show how much each of the variables explains the behavior of the exchange rate over time, we standardized the *betas* so that they have a standard deviation of 1. They are shown only when significant at 10%.

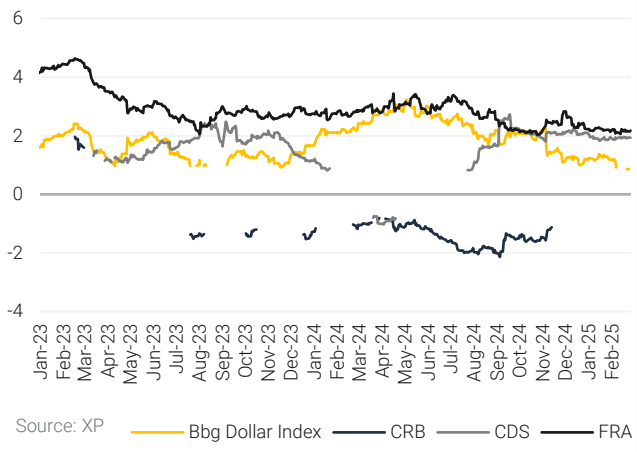
Estimated coefficients

Adj. by the stdev (gaps = coef. was not significant at 10%)



Source: XP

Zooming in on the estimates since the beginning of 2023



Source: XP

For example, we currently see that the daily movements are being mostly explained by the two risk variables in the model (CDS and FRA), while the dollar index ceased to be significant at the end of January (although it returned to significance on February 21 and 24). The CRB index hasn't been a significant driver since November 13, 2024.

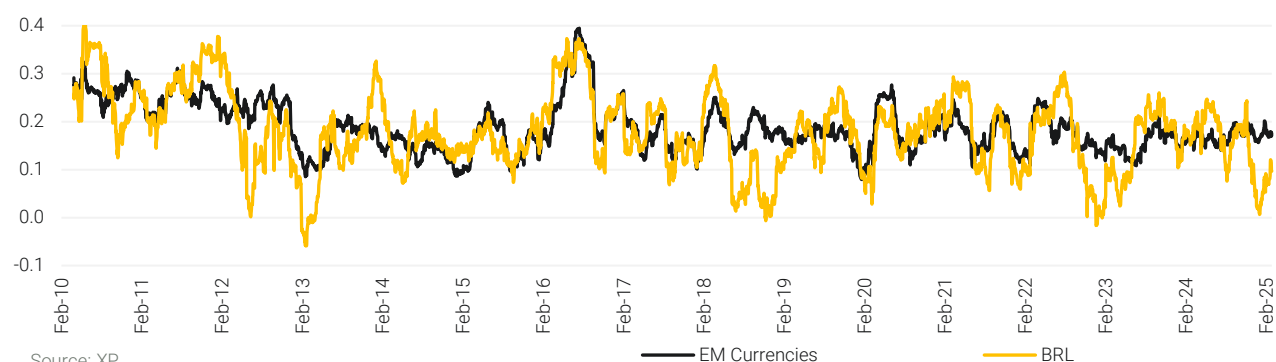
Asset correlation: Another way of understanding price determination

To complement the analysis made by monitoring the *betas* in the daily models, we created a metric to compare the correlation of the BRL with 19 other emerging currencies, as well as the correlation of emerging currencies with each other over time. The sample includes: Brazil; Colombia; Chile; Mexico; Peru; Bulgaria; Hungary; Poland; Czech Republic; Romania; Hong Kong; Philippines; South Korea; Malaysia; Indonesia; India; Thailand; Australia; Turkey; and South Africa.

We calculated the pairwise correlations between the currencies for the period of 60 business days. Then, we extracted the average of these correlations for analysis, weighted by the sum of the total trade flows of the countries involved.

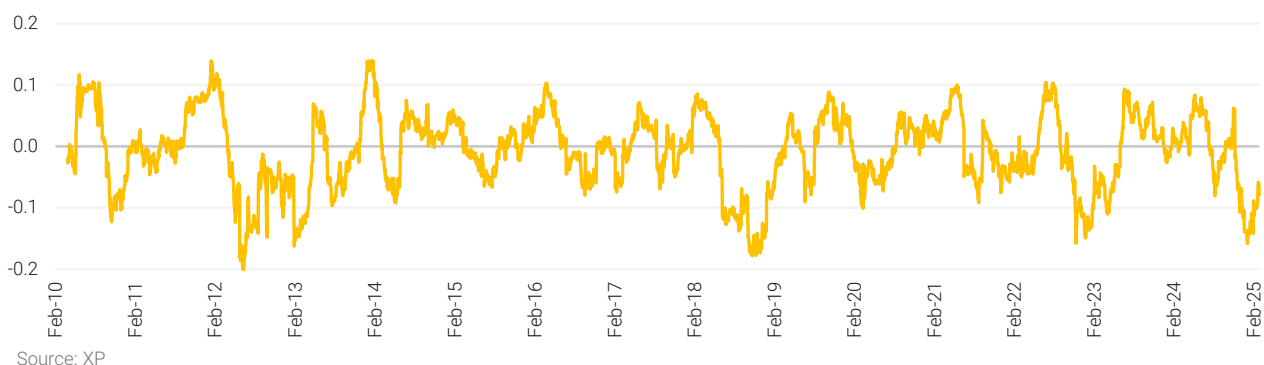
Correlation among EM currencies vs. BRL with EM peers

Average weighted by the trade flow; 60 business days window



Difference between the correlation among EM currencies vs. BRL with EM peers

Average weighted by the trade flow; 60 business days window

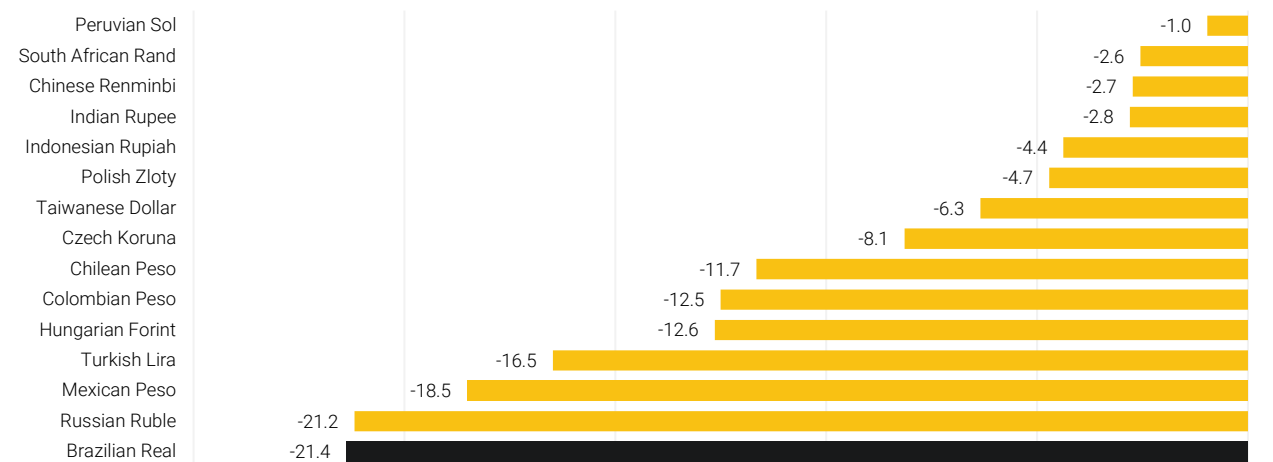


Most of the time, the BRL correlates with the emerging peers in a very similar way to their correlation with each other. Nonetheless, from the exchange rate depreciation of the second half of 2024 onwards, the BRL has become detached from its peers. It records a correlation with other currencies 0.16 pp lower than that seen between the other emerging currencies in the period – we observed similar results during the election cycles of 2018 and 2022. The current correlation of the BRL remains below the others, but to a lesser extent (0.08 pp).

Appendix I

The BRL depreciated more than its EM peers in 2024 against the US dollar

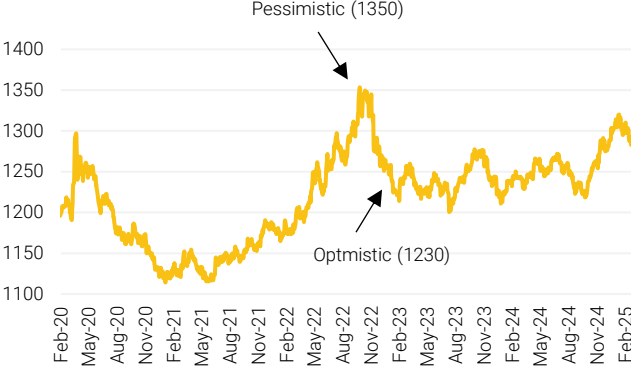
Spot returns in 2024 (%). Negative = depreciation.



Source: BBG, XP

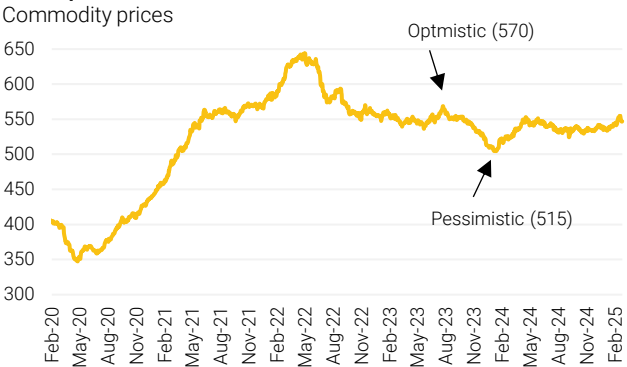
Appendix II

BBG Dollar Index



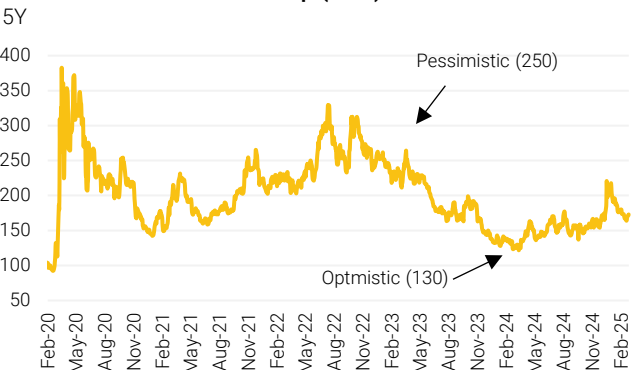
Source: BBG, XP

CRB Spot Index



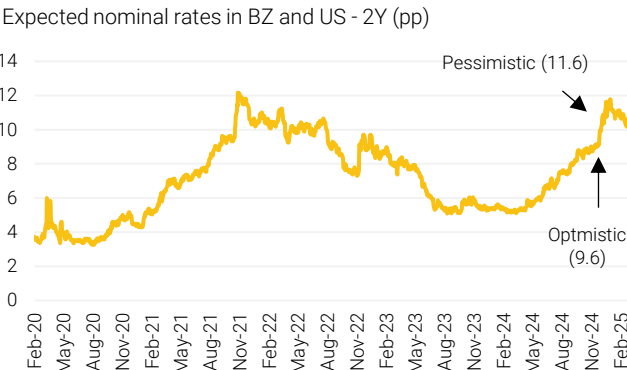
Source: BBG, XP

Brazilian Credit Default Swap (CDS)



Source: BBG, XP

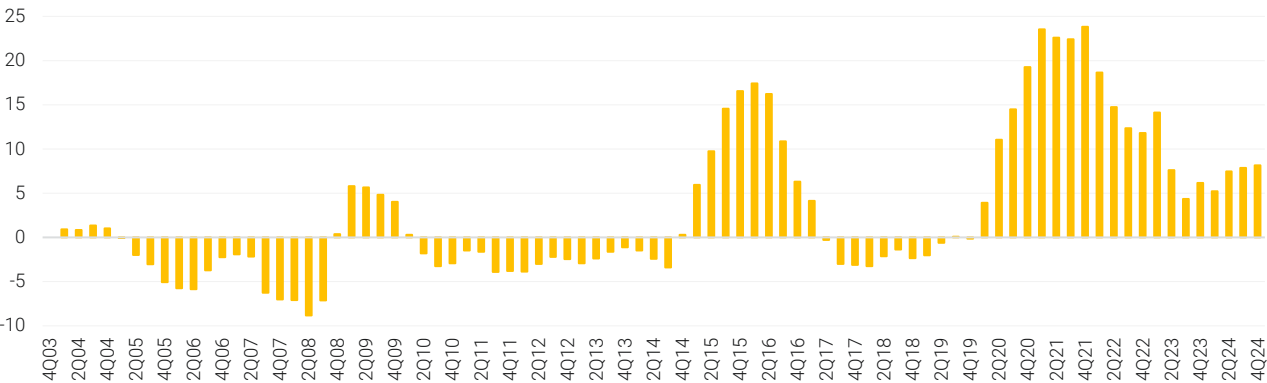
Interest rate differential



Source: BBG, XP

Appendix III

The BRL remains misaligned compared to economic fundamentals, though the gap has narrowed in recent years



Source: IBGE, BCB, BBG, World Bank, Conf. Board, XP

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16. Investment in options is the purchase or sale rights of a good shall be negotiated at a price fixed at a future date, and the purchaser of the negotiated duty should pay a premium to the seller as in a secure agreement. Operations with these derivatives are considered very high risk for presenting high risk and return relationships and some positions present the possibility of losses higher than the capital invested. The recommended duration for the investment is short-term and the customer's assets are not guaranteed in this type of product.
17. Investment in terms are contracts for the purchase or sale of a certain number of shares at a fixed price for settlement within a specified period. The term of the contract is freely chosen by the investors, complying with the minimum period of 16 days and a maximum of 999 days. The price will be the value of the added share of a portion corresponding to the interest-which are set freely on the market, depending on the term of the contract. Every transaction in the term requires a guarantee deposit. These guarantees are provided in two forms: coverage or margin.
18. Investments in futures markets are subject to significant loss of principal. a commodity is an object or price determinant of a future contract or other derivative instrument, which may substantiate an index, a fee, a movable value or a physical product. Commodities are considered high risk investments, which include the possibility of price fluctuation due to the use of financial leverage. The recommended duration for commodity investments is short-term and customers' assets are not guaranteed in this type of product. Market conditions and the macroeconomic scenario can affect the performance investments.
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