TAC ECONOMICS

CURRENCY FORECASTS

A set of robust quantitative tools to support FX risk mitigation policies

May 2024

A reminder of our methodology

- We have developed a range of quantitative tools to support FX risk mitigation policies, with a distinction between short- to medium-term projections and long-run projections.

- We utilize a combination of econometric equations, quantitative measures derived from TAC ECONOMICS’ proprietary tool for country-risk assessment RiskMonitor, and Monte Carlo simulations to generate robust forex projections. For LT projections, we rely solely on econometric equations.

Econometric equations

- The first set of quantitative tools uses **traditional econometric equations** to relate nominal exchange rates (against the USD or EUR, depending on the local monetary or FX regime) with key macroeconomic variables that significantly impact currencies.

- **Estimations are calibrated on a long period** (at least early 2000s) in order to capture as best as possible trends and underlying forces.

Quantitatives measures derived from Risk monitor

- The second set of quantitative measures is based on outputs from TAC ECONOMICS' proprietary tool for country-risk assessment RiskMonitor. This tool uses data mining techniques to analyze **non-linear relationships between economic variables and specific imbalances**, as well as the relationship between these imbalances and the degree and nature of risk, without needing to construct scenarios for explanatory variables.
- RiskMonitor outputs including an **Exchange Rate Risk Rating**, the level of which is associated with a non-gaussian distribution of probability for the exchange rate. RiskMonitor also provides **Early Warning Signals for unexpected / systemic shocks**, including on the currency value.

Monte-Carlo simulations

- To enhance the robustness of our projections, we employ **Monte Carlo simulations**, a mathematical technique used to estimate possible outcomes of uncertain events.

- This method generates a **set of potential trajectories** based on a probability distribution for any variable with inherent uncertainty. Each simulation uses different values for the explanatory variables, and the process is repeated thousands of times to produce a wide range of likely outcomes. **These multiple trajectories are obtained by introducing variations, or "shocks," to the projections of the explanatory variables**.

Predicting currency crises with LTSM and GRU neural networks

- Development of a new and innovative research introducing an early warning system (EWS) for currency crises.
- Our approach involves leveraging sophisticated recurrent neural networks, specifically **Long Short-Term Memory (LSTM)** and **Gated Recurrent Unit (GRU) neural networks**. Originally designed for language processing, these advanced models are proving instrumental in deciphering the complexities of forecasting macroeconomic and financial landscapes particularly thanks to a gate mechanism that identifies non-linear relationships by differentiating between short and long term.
- In our first application of these models to set up an EWS for currency crises for 68 currencies quoted against the USD between 1995 and 2020, **LSTM and GRU models significantly outperform traditional benchmark models**. In addition to better detecting currency crises, **these models enable us to improve the accuracy of crisis signals within a two-year window (timing and continuity).**

FX Forecasts coverage

Quarterly forecast of major currency rates from 3 to 18-months ahead

EUR/USD	USD/BRL	USD/MXN
AUD/USD	USD/CNY	EUR/PLN
EUR/GBP	USD/INR	USD/RUB
USD/NOK	USD/IDR	USD/ZAR
USD/JPY	USD/KRW	USD/TRY

Any currency can be added on request

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Illustration on USD/BRL

- The Brazilian Real depreciated to USD/BRL 5.3 (+9.3% against the US Dollar) on April 17, 2024, with reduced volatility due to clear monetary guidance. However, it has since reappreciated to USD/BRL 5.1 in the past three weeks due to the decreased attractiveness of the US Dollar.

- Our model predicts **further strengthening of the BRL against the USD**, though at a slower pace than previously expected.
- The currency **is expected to gradually appreciate to USD/BRL 4.5 by September 2025,** supported by robust trade performance and upcoming reductions in the US Fed Fund rate, which will sustain the favorable carry.

TAC ECONOMICS Projections
(Mixed econometric and RiskMonitor approach)

	Spot May 6th	Sep. 2024	Mar. 2025	Sep. 2025
USD/BRL	5.07	4.88	4.67	4.46
EUR/BRL	5.47	5.46	5.36	5.11

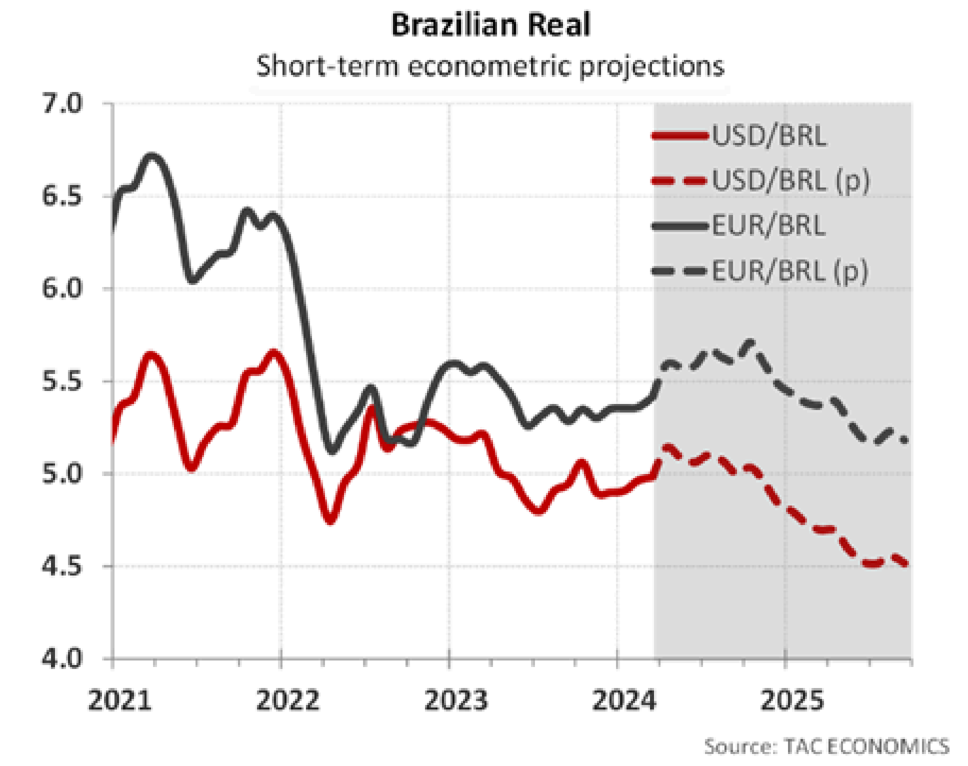


Illustration on USD/JPY

- In early January, the USD/JPY fell below 145 due to BoJ's hints at ending its ultra-accommodative monetary policy. However, JPY resumed depreciating in Q1 as the BoJ's neutral stance couldn't counter a strong USD, and by April, USD/JPY peaked at 160 before dropping below 154, likely due to unconfirmed interventions by Japan's Ministry of Finance.

- We maintain a **short-term volatility scenario** forJPY/USD, with a **potential for a return to USD/JPY 149 at the end of the projection horizon.**

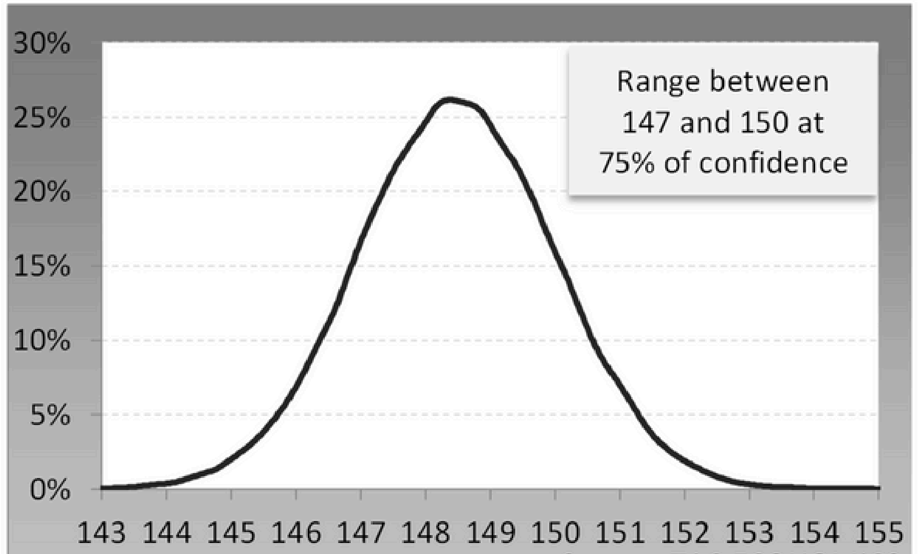
TAC ECONOMICS Projections

	Spot May 6th	Sep. 2024	Mar. 2025	Sep. 2025
USD/JPY	154	153	148	149

Monte-Carlo simulations

Monte-Carlo simulations - USD/JPY
Confidence interval at 18 months - September 2025

	75%	90%	95%	99%
High	150.2	151.0	151.5	152.4
Low	146.7	146.0	145.5	144.5



Source: TAC ECONOMICS

Any question?

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