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The Medium-Run Equilibrium Exchange Rate, Remittances, and External Adjustment in Mexico

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Abstract

This study examines the influence of the trade balance and remittances on the Mexican peso–U.S. dollar exchange rate. To this end, a Vector Error Correction (VECM) model is estimated, incorporating key macroeconomic variables such as the interest rate, inflation, potential Gross Domestic Product (GDP), current account, terms of trade, and remittances. The model accounts for Johansen's cointegration approach and captures the long-run equilibrium relationships among the variables. The empirical results provide evidence of cointegration, reveal dynamic adjustments to shocks through impulse response functions, and indicate that remittances exert a limited effect on the exchange rate, which primarily adjusts in response to movements in the current account and other macroeconomic fundamentals. The study is limited by the non-static nature of exchange rate dynamics but has important policy implications in the context of recent migration policies and the fiscal treatment of remittances by the U.S. government. The novelty of the study lies in explicitly assessing the role of remittances, which are not an effective exchange rate stabilization mechanism, and shows that external adjustment in Mexico operates mainly through the current account.

JEL Classification: F31, F24, C32, F32, F41

Keywords: Exchange rate; Remittances; Balance of trade; Current account; Vector Error Correction model.

El tipo de cambio de equilibrio de mediano plazo, las remesas y el ajuste externo en México

Resumen

Este estudio examina la influencia de la balanza comercial y de las remesas en tipo de cambio peso-dólar. Se estima un modelo de Vector de Corrección de Error (VEC) incorporando variables macroeconómicas clave como la tasa de interés, la inflación, el PIB potencial, la cuenta corriente, los términos de comercio y las remesas, utilizando el enfoque de cointegración de Johansen y capturando relaciones de equilibrio a largo plazo entre variables. Los resultados proporcionan evidencia de cointegración y ajustes dinámicos ante shocks indicando que las remesas ejercen un efecto limitado sobre el tipo de cambio, que se ajusta respondiendo a movimientos en la cuenta corriente y otros fundamentos macroeconómicos. El estudio está limitado por la naturaleza no estática de la dinámica cambiaria, pero presenta implicaciones en el contexto de políticas migratorias y el tratamiento fiscal de las remesas por el gobierno estadounidense. La originalidad del estudio radica en evaluar explícitamente el papel de las remesas, que no constituyen un mecanismo efectivo de estabilización cambiaria, y en mostrar que el ajuste externo en México opera principalmente a través de la cuenta corriente.

Clasificación JEL: F31, F24, C32, F32, F41

Palabras clave: Tipo de cambio, remesas, balanza comercial, cuenta corriente, modelo de Vector de Corrección de Error

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1. Introduction

The exchange rate is a key financial variable, linking a country's domestic economy with the rest of the world (Bush and López Noria, 2021). The exchange rate influences macroeconomic variables such as inflation and economic growth (Cruz Aké et al., 2015; Demir and Razmi, 2021), and it shapes agents' decisions regarding consumption and investment (Benavides, 2016). Although the U.S. dollar is the most traded currency and influences the global real economy, its position is challenged by the Chinese renminbi, which will expand its influence in the next decades (Siddiqui, 2020; Bruno and Shin, 2023; Ghahremani and Nguyen, 2025), and will be more present because of diversification strategies among central banks (Arslanalp et al., 2022). The Mexican peso's status as Latin America's most liquid currency is a result of deep economic, commercial, financial, and manufacturing ties with the U.S., solidified after NAFTA (Cruz Aké et al., 2012; Díaz Rodríguez and Bucio, 2018; Cabral et al., 2021). However, as an emerging market, Mexico's trade performance remains vulnerable to exchange rate volatility and the overarching influence of the U.S. dollar (Umeaduma & Dugbarrey, 2023; Villarreal-Samaniego et al., 2024). Given the importance of international trade, cross-border transactions' records are essential for effective monetary policies via the balance of payments.

The International Monetary Fund (IMF) standardizes the records for member countries (Tebrake and Sánchez-Muñoz, 2025). According to Black et al. (2012), the balance of payments categorizes international transactions into the current account, which records trade in goods and services; the capital account, which includes securities and foreign direct investment; and the financial account, which tracks foreign exchange holdings. A current account showing expenditures exceeding income indicates a deficit position.

Persistent current account deficits lead to currency depreciations, as the demand for foreign currencies exceeds their supply (Umeaduma and Dugbartey, 2023). The balance of payments approach accounts for internal and external equilibrium by adjusting the currency in response to trade imbalances, remittances, foreign direct investment, and capital flows (Dvornak et al., 2005; Umeaduma and Dugbartey, 2023). According to Dvornak et al. (2005), an economy reaches equilibrium when the exchange rate aligns with two key macroeconomic states: internal balance, characterized by the economy operating at its full capacity, and external balance, which is defined by a sustainable capital position.

The objective of this study is to estimate the medium-run equilibrium exchange rate of the Mexican peso using the balance of payments framework, with a specific focus on assessing the role of remittances as a novel contribution. The medium-run exchange rate can be interpreted as the exchange rate consistent with macroeconomic equilibrium, in particular an external balance compatible with underlying capital flows (Dvornak et al., 2005). To this end, the analysis adopts the methodological approach proposed by Williamson (1983) and Dvornak et al. (2005), which integrates the internal–external balance concept within a Vector Error Correction (VEC) model. Our work looks for the possible influence of remittances on the exchange rate as a novelty.

The paper is structured as follows: Section 2 discusses the Mexican context; Section 3 outlines the methodological framework; Section 4 describes the variables employed; and Sections 5 and 6 present the empirical results and conclusions, respectively.

2. Mexican context

2.1. Institutional framework and monetary policy in Mexico

Mexico's pursuit of macroeconomic stability has been a central policy objective for decades, underpinned by the institutional independence of its central bank (Banxico) since 1993 (Del Tedesco Lins, 2025). Nevertheless, this trajectory has been marked by significant disruptions. Following a period of rapid economic expansion between 1960 and 1982, Mexico faced a severe external debt crisis that culminated in default, prompting the nationalization of the banking sector. The subsequent policy response entailed a comprehensive stabilization and structural adjustment program aimed at controlling inflation, consolidating public finances, and reducing the dominance of state-owned enterprises within the production structure. These reforms unfolded within a broader context of market-oriented liberalization, including Mexico's accession to the General Agreement on Tariffs and Trade (GATT) and the negotiation of the North American Free Trade Agreement (NAFTA) with the United States and Canada (Meza, 2021).

By the early 1990s, financial account inflows to emerging economies in Latin America and Asia intensified, facilitated by financial deregulation and trade liberalization that reduced the role of the state in economic activity (Harms, 2025). In Mexico, however, this period was characterized by heightened political uncertainty and widening fiscal imbalances, financed through the issuance of U.S. dollar–denominated Treasury bills. As investors reassessed the risks associated with financial globalization, financial account outflows ensued, exposing the fragility of Mexico's fixed exchange rate regime (Harms, 2025). The fixed exchange rate system constrained the accumulation of adequate international reserves (Téllez-León and Venegas-Martínez, 2013), leading Mexico to adopt a floating exchange rate framework in 1994. This transition represented a critical policy shift intended to enhance the economy's capacity to absorb external shocks and mitigate spillovers to the real sector (Meza, 2021; Kemme and Koleyni, 2017). The new exchange rate regime was complemented by the introduction of an inflation-targeting framework, consolidating Banxico's mandate to preserve price stability as the cornerstone of monetary policy (Kemme and Koleyni, 2017). Following BPM6 conventions, capital movements discussed in this section correspond to transactions recorded in the financial account, including portfolio and other investment flows[3].

The adoption of inflation targeting in Mexico reflects a broader global trend toward monetary frameworks that emphasize price stability and credibility, contributing to the achievement of single-digit inflation rates and aligning with the floating exchange rate regime. This approach operates through the public announcement of explicit inflation targets, with policy adjustments guided by the Taylor rule or one of its variants (Pérez Caldentey and Vernengo, 2020). Under this framework, the short-term interest rate serves as the primary monetary policy instrument. Ceteris paribus, an increase in the policy rate tends to appreciate the domestic currency, thereby reducing the domestic-

[3] According to the IMF Balance of Payments and International Investment Position Manual, Sixth Edition (BPM6), the balance of payments is composed of the current account, the capital account, and the financial account (IMF, 2009). The financial account records cross-border transactions involving financial assets and liabilities, including direct investment, portfolio investment, financial derivatives, other investment, and reserve assets. In contrast, the capital account is limited to capital transfers and the acquisition or disposal of non-produced, non-financial assets. This classification is consistent with the balance of payments statistics reported by the Bank of Mexico through its Economic Information System (SIE).

currency prices of tradable goods included in the consumer price index. However, the resulting currency appreciation typically dampens net exports and aggregate demand through expenditure-switching effects.

Nevertheless, the transmission mechanism may become more complex in the presence of balance sheet effects arising from currency mismatches. In such cases, an appreciation of the exchange rate can strengthen the financial positions of firms and financial intermediaries with foreign-currency liabilities, thereby enhancing credit conditions and potentially stimulating economic activity (Brandao-Marques, 2020). Since 2015, however, the Mexican peso has exhibited a persistent appreciation trend, which may reflect subdued economic performance and has introduced heightened uncertainty in other macroeconomic aggregates (Saldaña-Zepeda et al.., 2020). Mexico's commitment to maintaining low inflation through relatively high interest rates has, in turn, weakened investment incentives. Concurrently, the increasing concentration of political power in the ruling party has raised concerns regarding institutional quality and democratic governance (Del Tedesco Lins, 2025).

2.2. Exchange rate importance and its relationship with other macroeconomic variables

The significance of the exchange rate in Mexico's economy derives from the dominant role of the U.S. dollar in global transactions and from Mexico's position as the United States' principal trading partner. This interdependence generates a complex and dynamic interaction between the peso and the dollar across both the short and long run (Saldaña-Zepeda et al.., 2020; Villarreal-Samaniego et al.., 2024). Given its extensive linkages with other macroeconomic variables, the exchange rate plays a pivotal role in macroeconomic adjustment processes, particularly during periods of financial distress such as the Global Financial Crisis and the COVID-19 pandemic (Villarreal-Samaniego et al.., 2024). In such episodes, the exchange rate functions as a key adjustment mechanism that cushions the impact of external shocks on the domestic economy (Bush and López Noria, 2021).

Fluctuations in the peso–dollar exchange rate are primarily driven by external factors, underscoring the importance of maintaining a stable and credible macroeconomic framework to mitigate uncertainty and limit exchange rate pass-through effects to inflation and output (Saldaña-Zepeda et al.., 2020). While these authors emphasize the stabilizing benefits of a floating exchange rate regime, Capasso et al.. (2019) argue that exchange rate management should constitute an explicit policy objective, given its profound influence on economic growth and the trade balance. Empirical evidence further suggests that exchange rate movements affect aggregate GDP (Benavides-Perales and Borrego-Salcido, 2024), particularly through their impact on manufacturing real output (Nalin and Moreno-Brid, 2022), although other studies present conflicting findings (Médici et al.., 2021). Therefore, understanding the determinants and transmission channels of exchange rate dynamics is essential for assessing Mexico's macroeconomic stability and policy effectiveness in an increasingly integrated global economy.

Capital flows are closely intertwined with exchange rate dynamics (Benavides-Perales and Borrego-Salcido, 2024). In emerging economies, capital inflows often induce real currency appreciation, which strengthens balance sheets and generates collateral effects associated with foreign-currency liabilities held by firms and financial institutions. The improved valuation of these

liabilities enhances borrowing capacity and stimulates credit expansion (Aydin and Yavuz, 2022). Moreover, sustained inflows of foreign capital allow countries to finance current account deficits, thereby maintaining higher levels of investment without necessitating a reduction in domestic consumption (Ibarra, 2011).

Exchange rate fluctuations also exert a significant influence on the trade balance (Benavides-Perales and Borrego-Salcido, 2024), particularly in emerging markets, where external competitiveness is sensitive to currency movements (Umeaduma and Dugbartey, 2023). This conditions also reflects on in volatility on the trade balance (Cantú-Esquivel et al., 2025). Persistent current account deficits are a source of concern for most governments, as growing imbalances can undermine external sustainability and heighten vulnerability to financial instability or crisis (Cavdar and Aydin, 2015). Empirical evidence further indicates that current account deficits are positively associated with public expenditure but inversely related to the consumer price index (CPI) and the unemployment rate (Cavdar and Aydin, 2015). Additionally, fluctuations in global liquidity conditions have been found to influence exchange rate trajectories, amplifying both depreciation and appreciation pressures through financial channels (Loría and Nalin, 2023). Hence, the interaction between capital flows, exchange rate movements, and external balances constitutes a critical transmission mechanism linking financial globalization to macroeconomic stability in emerging economies such as Mexico.

The exchange rate maintains intricate linkages with key macroeconomic variables, exhibiting causal relationships and both positive and negative feedback effects. Empirical evidence reveals a bidirectional long-run causality between inflation and the exchange rate (Deka and Dube, 2021). Variations in exchange rate levels directly affect export competitiveness and firms' pricing strategies; a depreciation of the domestic currency enhances export performance by reducing relative prices in international markets (Umeaduma and Dugbartey, 2023). However, excessive volatility in the exchange rate can deter foreign investment and generate upward pressure on inflation (Bush and López Noria, 2021). This volatility is mirrored in global financial risk indicators such as the S&P 500 Volatility Index (VIX), sovereign credit risk measures, the systemic risk captured by the Emerging Markets Bond Index (EMBI), and the TED spread, all of which shape the exchange rate risk premium—that is, the compensation investors demand for holding currency-denominated assets (Benavides, 2016). The uncertainty generated by heightened volatility tends to intensify during electoral cycles and recessions (Bush and López Noria, 2021).

Under such conditions, the exchange rate pass-through mechanism significantly influences producer, consumer, and importer prices (Rodríguez Carranza et al.., 2020). Persistent depreciation episodes, in particular, elevate the general price level in the Mexican economy (González and Saucedo, 2018). Although a weaker currency may initially deteriorate the trade balance, the effect typically reverses over time as exports respond to improved competitiveness, consistent with the J-curve hypothesis (Bahmani-Oskooee et al., 2021). Moreover, the exchange rate amplifies the transmission of monetary policy, affecting both output and inflation (Brandao-Marques et al., 2020). This transmission is more effective in economies with independent central banks and transparent monetary frameworks (Brandao-Marques et al., 2020).

In practice, central banks often respond to depreciation pressures by tightening monetary policy. Mexico exemplifies this pattern, as its policy response to exchange rate fluctuations tends to be stronger than its reactions to inflation or output-gap deviations—a phenomenon commonly

referred to as "fear of floating" (Juhro et al., 2022). Consequently, policy adjustments become necessary when stability pressures emerge, particularly under high inflation or widening current account deficits (Juhro et al., 2022). Economic growth could accelerate if the monetary authority narrows the interest rate differential, thereby allowing a controlled depreciation of the peso, which could insulate the Mexican economy from cyclical downturns in the United States (Ibarra, 2011). Fiscal policy also interacts withexchange rate behavior: government consumption tends to depreciate the nominal exchange rate without affecting the real rate, while public investment induces nominal depreciation and, in the case of large shocks, modest real appreciation. These findings underscore the complementary role of fiscal policy in supporting economic growth and advancing long-term development objectives (Cruz and Sánchez-Vargas, 2021).Overall, the interplay between capital flows, exchange rate dynamics, and macroeconomic policy responses constitutes a fundamental transmission mechanism through which external shocks, financial conditions, and domestic policy choices shape Mexico's economic stability and growth trajectory.

The dynamics of the peso-dollar relationship have been modeled using different approaches. The Purchasing Power Parity (PPP) assumes that the cost of a market basket comprising goods and services is the same in two countries (Wallace, 2017). Studies confirming the PPP hypothesis include Gómez Aguirre and Rodríguez Chávez (2012), Wallace (2017), and Loria and Nalin (2023), and remark on the integration between Mexico and the U.S. while highlighting price convergence occurring at a very rapid rate. These studies accounted for structural breaks and cointegration, but worsening conditions in terms of trade alter the long-run equilibrium and lead to qusi-PPP (Noriega and Medina 2003). Salas Ortiz and Gómez Monge (2015) linked the nominal interest rate differential to exchange rate behavior, while Ogaki and Santaella (2000) explored the relationship between term structure and exchange rate in the context of Mexico's floating system. Landa Díaz (2023) expanded this approach by integrating inflation, termas of trade, and risk premium in the cointegration framework to explain the exchange rate dynamics in the short and long term. Capasso et al. (2019) concluded that, in the long-run, the interest rate has not statistically significant influence on the exchange rate.

2.3. The influence of remittances

Household income in Mexico is derived from remuneration for productive factors, social transfers provided by the government, and foreign remittances (Delgado López and Fonseca-Zendejas, 2023). The largest volume of remittances originates from the United States, as migrants transfer funds to support their families in Mexico (Wojcik, 2025). These remittances generate a range of positive social outcomes, including increased school enrollment and educational attainment, higher investment in human capital, improved health expenditures, and reductions in malnutrition, food insecurity, and infant mortality (Azizi, 2018). Remittances also yield economic benefits. For instance, households receiving international remittances tend to spend more on tourism compared to those receiving domestic transfers (Mora-Rivera et al.., 2019).

Remittance flows exhibit countercyclical behavior, typically increasing in response to economic shocks (Zaarour et al.., 2024). For instance, during the COVID-19 pandemic, remittances from the United States to Mexico remained robust due to U.S. fiscal stimulus measures and the depreciation of the peso, which enhanced the real value of transfers and enabled migrants to sustain

financial support despite widespread economic disruptions (Bansak et al.., 2025). The legal status of migrants further shapes remittance behavior: undocumented immigrants tend to increase transfers as a precautionary measure in response to perceived deportation risks, whereas documented migrants generally do not adjust remittances under similar conditions (Weber and Massey, 2023). Beyond economic effects, remittance flows may also carry social and political implications, including the potential to exacerbate anti-immigrant sentiment in host countries (Amuedo-Dorantes, 2014).

Remittances play a critical role in development, serving as a source of income for households with migrant members, alleviating poverty, and enhancing investment and wealth accumulation by decoupling household well-being from domestic economic fluctuations (Tyburski, 2023; Kpodar and Imam, 2024; Ojeyinka and Ibukun, 2023; Zaarour et al.., 2024). In emerging economies, remittances constitute a significant share of GDP, stabilize family income, and provide a buffer against global economic volatility, thereby reducing the exposure of policymakers to external shocks (Singer, 2010).

The impact of remittances on labor markets is nuanced. While they provide economic security, remittances may also reduce labor supply by creating dependency, and they have been shown to decrease female labor force participation (Amuedo-Dorantes, 2014; Azizi, 2018). Furthermore, there exists a bidirectional causal relationship between the exchange rate and economic growth, as well as between the exchange rate and remittance flows. Policymakers can promote economic growth by implementing technologies such as e-wallets and digital networks to lower the cost of remittance transfers, which positively affects remittance inflows in the short term, typically stabilizing within a quarter at elevated levels (Usman, 2023; Kpodar and Imam, 2024). Empirical evidence also suggests that real currency depreciations have a more pronounced negative effect on remittances than real appreciations (Apergis and Cooray, 2018).

The financial and banking sectors also present positive effects related to remittances. The financial system expands and increases the depth of the banking sector and the number of accounts per capita in the presence of remittances (Demirgüç-Kunt et al., 2011; Villarreal-Samaniego et al., 2024). The share of the number of deposits regarding GDP is also higher in the presence of remittances (Demirgüç-Kunt et al., 2011). Other positive effects are the increase in foreign exchange earnings and reserves (Apergis and Cooray, 2018). Remittances have effects on the real exchange rate by contributing to appreciation (Lopez et al., 2007), and also have an influence on the government's macroeconomic policies (Singer, 2010) because remittances are important for the poorest households and, therefore, policymakers in developing countries encourage remittance flows even more (Kpodar and Imam, 2024). Not all remittance effects are positive. Remittances have negative effects on payroll taxes because of the reduction in labor supply. These reductions can be tackled by increases in sales taxes (Lopez et al., 2007). Talking about the negative effects of remittances, when the recipient country´s currency appreciates, it dampens exports and stimulates imports, which increases the current account deficit, while harming the competitiveness of the exported goods (Amuedo-Dorantes and Pozo, 2004; Amuedo-Dorantes, 2014).

3. Methodology and data

The estimation of the model relies on two key assumptions: stationarity of the data (typically achieved at first differences) and the existence of cointegrating relationships among the variables (Sujianto, 2020). Stationarity is crucial because nonstationary variables do not revert to their long-

term mean following a random shock, which can lead to spurious regression results (De la Cruz Martínez, 1999). Stationarity is typically assessed using the Dickey-Fuller and KPSS (Kwiatkowski-Phillips-Schmidt-Shin) tests. These tests also inform the selection of the appropriate number of lags for the analysis.

In addition, it is expected that the variables exhibit cointegration, indicating the presence of long-term equilibrium relationships. Cointegration captures long-run associations but does not provide information about short-term dynamics, which are equally important (De la Cruz Martínez, 1999). The Johansen cointegration test is employed to verify the presence of cointegration and to determine the number of cointegrating relationships, denoted as *rrr*. In this study, the trace statistics from the Johansen test is used to identify the cointegrating vectors. The cointegration assumption is assessed using a VAR (Vector Autoregressive) model with the form in Equation (1). The variables in the set are g≥2 and $I(1)$, while the VAR has k lags. The VAR is turned into a VEC model to use the Johansen test. The VEC framework incorporates short-run dynamics while accounting for deviations from the long-run equilibrium implied by cointegration (De la Cruz Martínez, 1999). The model specification follows the form presented in Equation (2). To use the Johansen test (Brooks, 2014), where $\Pi = (\sum_{i=1}^{k} \beta_i) - I_g$, and $\Gamma_i = (\sum_{j=1}^{i} \beta_j) - I_g$. This model considers k lags and g variables with (g≥2), and $I(1)$, i.e., variables in first differences. $\Delta\gamma_t$ represents the dependent variable in first differences, the matrix Π, which captures the cointegration relationship, contains α and β′, the adjusting speed to equilibrium and the cointegration vectors for the long-run. The dependent variable has a coefficient matrix Γ attached to it. The cointegrating relationship is normalized regarding the dependent variable, which in this case is Exchange Rate, ER_t. To demonstrate the validity of the model, tests are conducted to verify the assumptions of serial correlation, stability, normality, and heteroscedasticity. Finally, results about impulse-response functions are presented.

$$\gamma_t = \beta_1\gamma_{t-1} + \beta_2\gamma_{t-2} \dots + \beta_k\gamma_{t-k} + \upsilon_t \qquad (1)$$

$$g * 1g * gg * 1 \quad g * gg * 1 \quad g * gg * 1 \quad g * 1$$

$$\Delta\gamma_t = \Pi\gamma_{t-k} + \Gamma_1 + \Delta\gamma_{t-1}\Gamma_1 + \Gamma_2\Delta\gamma_{t-2} + \cdots + \Gamma_{k-1}\Delta\gamma_{t-(k-1)} + u_t \qquad (2)$$

The dependent variable in the model is the nominal exchange rate (EX). The independent variables are the interest rate differential (IR), inflation rate (INFL), real GDP (GDP), current account as a percentage of the GDP (CA), terms of trade (TOT), and remittances (REM). The sample covers from 2005Q1 to 2025Q1. The data source for all variables is Banxico. Figure 1 shows all the data used in its original form. The variable GDP is transformed by using the Hodrick-Prescott (HP) filter in order to get the potential output. The original variable used is the real GDP 100=2018. These variables are selected following Dvornak et al. (2005). IR captures the monetary policy and the carry trade dynamics, while INF impacts competitiveness and the currency value. GDP captures the economic performance of the economy and represents the internal sustainability. The external sustainability is represented by CA, while TOT is important for emerging commodity-exporter countries. This model also includes REM, the main source of foreign exchange inflows, according to the National Population Council (CONAPO, 2022). This work take into account remittances, some of which will be subject to taxes starting January 1, 2026. Mexico is the main destination for remittances with 65.000 million dollars in 2024 (Brooks, 2025), and the study of the impact of these taxes on other macroeconomic

variables is relevant for the rest of the countries and Mexico's economic dynamics. Finally, we present the interpretation of impulse-response functions.

As shown in Figure 1, panel g, EX, the dependent variable in this study, presents a stable behavior during the first years of the sample. After the subprime crisis, EX presents an upward trend with a peak in January 2020. Since one of the objectives of this work is to evaluate the influence of remittances on EX, it is important to state how remittances behave. Remittances show an increase in 2020 corresponding to the effects of the COVID-19 pandemic (Figure 1, panel f). It matches the affirmations by Zaarour et al. (2024) and Bansak et al. (2025). There is also an increase in remittances in 2024, possibly in response to the victory of Donald Trump and the possibility of the application of threatening immigration policies. These effects were highlighted by Weber and Massey (2023). The long-run behavior of remittances has a positive trend, as well as TOT (Figure 1, panel e), while the effects of the COVID-19 pandemic are also present on inflation and GDP (Figure 1, panels b and c, respectively). The current account (CA) has presented periodic surpluses since 2020, peaking in July 2020, coinciding with the COVID-19 pandemic (Figure 1, panel f). This period also matches the increases in remittances, a possible reason for the surplus since the Mexican economy was paralyzed during the extended quarantine.

Figure 1. Variables under analysis from 2005 until 2025 (quarterly data)

Source: own elaboration applying EViews computer language.

4. Results

Table 1 shows the unit root test for the group of variables used. This result supports the idea of a common non-stationary process with order I(1). This also indicates that the appropiated number of lags in the model is 1, supported by the Bayesian Information Criterion (BIC). The tests for unit roots in individual variables are available upon request. Regarding the Johansen test, the results are

presented in Table 2. These results indicate the presence of 3 cointegrating relationships and confirm the long-run equilibrium between the variables in the model, and justifies their use. The significance level used is 0.05. The equation resulting from the application of the VEC models is presented in (3). All statistics but INF are significant. The impact of each variable on EX is presented in Table 3, considering an increase of 1% in the independent variable. The coefficients indicate the changes in the magnitude of the dependent variable. For example, an increase of 1% in IR, depreciates 1.14% the Mexican peso. Way contrary, an increase of 1% in GDP, appreciates the Mexican peso in 1.08x10-6. The other variable appreciating the peso, is REM, which increase represents an appreciation of 7.8x10-4. The other variables in the model depreciate the peso according to magnitudes in the coefficients of Equation (3).[4]

$$EX_t = 6.9993 + 1.139IR_{t-1} + 2.1232INF_{t-1} - 1.08\ x\ 10^{-6}GDP_{t-1} + 3.1809CA_{t-1} + 0.0797TOT_{t-1} - 0.00078REM_{t-1} \quad (3)$$

Table 1: Group unit root test

Method	Statistic	Prob. **	Cross-sections	Observations
Null: unit roots (assumes common unit root process)				
Levin, Lin & Chu t*	-0.06092	0.4757	7	541
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.80400	0.2107	7	541
ADF - Fisher Chi-square	19.2905	0.1541	7	541

**Probabilities for the Fisher test are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Source: own elaboration applying EViews computer language.

An improvement in the current account (CA) is associated, in the long run, with a higher USD/MXN, i.e. a weaker peso. This result is consistent with balance-of-payments adjustment mechanisms, whereby peso depreciation enhances external competitiveness and contributes to current-account improvements, rather than current-account surpluses leading to sustained currency appreciation. Within the VECM framework it deviations from the long-run relation generate adjustment dynamics governed by the error-correction terms. For instance, if the exchange rate equation exhibits a statistically significant loading coefficient, peso depreciation acts to restore long-run equilibrium following external imbalances. The sign of the cointegrating coefficient is therefore consistent with a system in which external adjustment operates through the exchange rate rather than through quantities alone.

A higher Mexican–US interest rate differential is associated, in the long run, with a higher USD/MXN. Since a higher USD/MXN means peso depreciation, the result says: Higher Mexican interest rates relative to US rates are associated with a weaker peso in the long run. That sounds counter-intuitive at first — but it is actually very standard once you think beyond short-run Uncovered Interest Parity (UIP). This result is consistent with the presence of a risk premium,

[4] All these estimated coefficients are significant at the 95% confidence level.

whereby higher domestic interest rates compensate investors for increased macroeconomic and exchange-rate risk, rather than generating a sustained appreciation of the currency. In other words, Mexico must offer higher interest rates as compensation for holding peso assets, and this compensation is associated with a structurally weaker currency.

Regarding remittances, the coefficient aligns with theoretical expectations, indicating an appreciation effect on the real exchange rate, although the magnitude of this effect is limited. This finding is consistent with López et al.. (2007), who highlighted the appreciation effects of remittances on the real exchange rate. Similarly, the coefficient for GDP corroborates existing literature: as a primary indicator of economic performance, GDP growth tends to strengthen the peso. Previous studies have demonstrated that GDP affects the exchange rate (Nalin and Moreno Brid, 2022; Benavides-Perales and Borrego-Salcido, 2024) while simultaneously influencing overall economic growth (Demir and Razmin, 2021; Villarreal-Samaniego et al.., 2024; Uzuner et al.., 2025). These findings underscore the importance of coordinated and effective monetary and fiscal policies in supporting sustainable economic growth (Ibarra, 2011; Cruz and Sánchez-Vargas, 2021)..

The impulse response functions are presented in Figure 2. Regarding an increase in IR, the peso reacts with persistent depreciation (Figure 2, panel a). The effect is amplified in the short run but stabilizes around 0.3 in the long run after 6 months. The depreciation following an interest rate shock suggests that monetary tightening is perceived as a response to heightened macroeconomic or financial risk, outweighing the conventional interest rate channel. The EX reacts to shocks in inflation with a small depreciation (Figure 2, panel b). The effect intensifies in months 2 and 3 but turns into appreciation in the long run. The subsequent appreciation may reflect delayed monetary policy responses aimed at stabilizing prices and the exchange rate.

Regarding the effect of GDP on EX, it presents a positive and sustained trend (Figure 2, panel c). This response suggests the dominance of the trade channel over productivity effects because higher economic activity increases import demand, leading to a deterioration of the trade balance and higher demand for foreign currencies. This mechanism generates persistent depreciation pressures even when the input increases. The CA has negative effects on EX in the short and long runs (Figure 2, panel d). The initial shock in TOT generates instability, but as external purchasing power improves due to better TOT conditions, the peso appreciates (Figure 2, panel e). Finally, the effect of REM innovations on EX signifies a positive response in the short run, i.e., the peso depreciates in the short run, but after 3 months, remittances strengthen the peso, but the effect is quantitatively limited (Figure 2, panel f).

The VECM results indicate that the long-run equilibrium level of the USD/MXN exchange rate is primarily anchored by real economic activity and structural external flows rather than by monetary policy instruments. Higher GDP and remittance inflows are associated with peso appreciation, while improvements in the terms of trade and the current account coexist with a more depreciated equilibrium exchange rate, reflecting external adjustment and competitiveness mechanisms. Together with the positive interest-rate differential coefficient, these findings suggest that monetary policy is most effective in influencing short-run exchange-rate dynamics, whereas sustained exchange-rate strength depends on real growth, external income stability, and macroeconomic fundamentals.

Figure 2. Impulse-Response functions.

Source: own elaboration applying EViews computer language.

5. Conclusions

The significance of the exchange rate for the Mexican economy stems from its close interconnection with the United States. These linkages influence multiple dimensions of economic activity and affect household income through remittances, which in turn condition the use of banking and financial services. This study highlights the role of international trade and remittance flows in shaping the peso–dollar exchange rate.

Using a Vector Error Correction (VECM) model, we identified cointegrating relationships among key macroeconomic variables. The results indicate that the exchange rate is closely linked to the trade balance, GDP, and interest rates. The latter underscores the pivotal role of the central bank in stabilizing the exchange rate while simultaneously controlling inflation.

The analysis also demonstrates the relevance of the current account for monetary policy, given its magnitude and statistical significance within the VECM framework. Overall, the model confirms the presence of cointegration and long-run equilibrium among the variables considered.

Regarding remittances, the study finds a modest but statistically significant effect on the exchange rate, consistent with their role as a stabilizing financial inflow. Future research could periodically revisit these relationships to assess the evolving influence of remittances on the peso–dollar exchange rate, particularly in light of potentially restrictive U.S. immigration policies.

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