

The remittance–trade balance nexus in Egypt: Does financial development matter? (2006 – 2025)

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Keywords

Egypt, Exchange Rate, Financial Development, NARDL, Remittances, Trade Balance

Abstract

Worker remittances constitute Egypt's largest single source of foreign exchange, yet the country's merchandise trade balance has remained structurally in deficit throughout a period of sustained remittance growth. This paper investigates whether remittance inflows worsen Egypt's trade balance, whether financial development moderates this relationship, and whether the trade balance responses to positive and negative remittance shocks are symmetric.

Using quarterly time series data spanning 2006Q1 to 2025Q3 – 79 observations encompassing four exchange rate regime shifts and three IMF programme episodes – the study estimates a Nonlinear Autoregressive Distributed Lag (NARDL) model that decomposes remittances into positive and negative partial sum series, incorporates an explicit remittance–financial development interaction term, and controls for structural breaks associated with the 2016 EGP float, the 2022–2023 parallel market crisis, and the 2024 IMF Extended Fund Facility.

The bounds test confirms long-run cointegration among all model variables. A one percentage point increase in remittances as a share of GDP is associated with a 3.228 percentage point deterioration in the trade balance in the long run, consistent with the boomerang hypothesis. Financial development significantly attenuates this effect in the short run, though the long-run moderating channel remains constrained by Egypt's historically shallow credit markets. A Wald test confirms strong asymmetry: remittance surges inflict larger and more persistent trade balance damage than equivalent contractions provide relief, with each boom–bust cycle leaving a residual structural deterioration. The 2016 EGP float emerges as the dominant structural break, exerting a coefficient of -5.548 that dwarfs all other determinants.

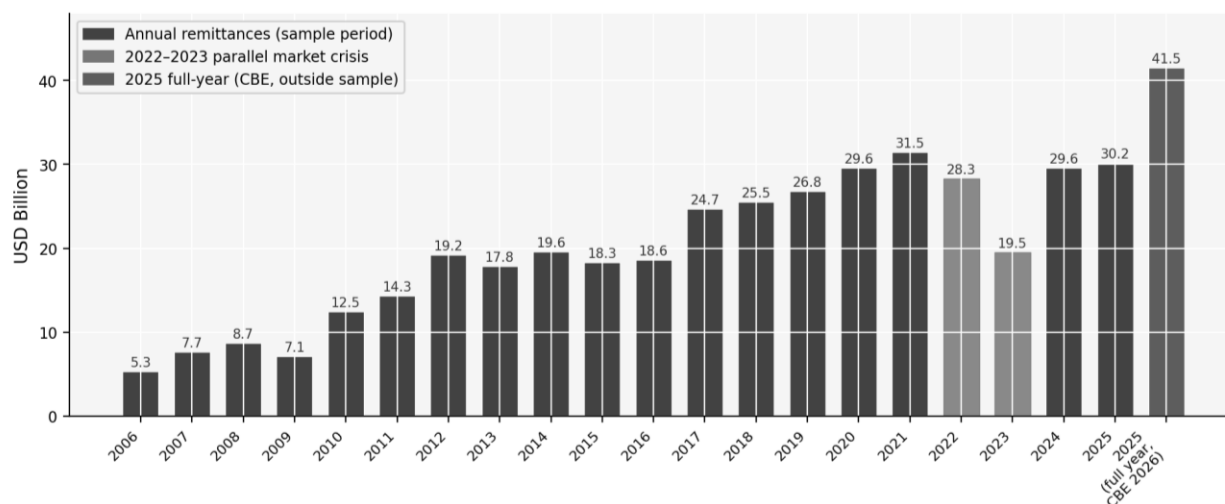
These findings imply that policies maximising remittance inflows carry a hidden trade balance cost not offset during downturns. Expanding household access to domestic financial instruments and diversifying Egypt's export base are identified as necessary conditions for breaking the remittance–trade balance trap under the current IMF programme.

Introduction

Egypt received a record USD 41.5 billion in worker remittances in 2025 – more than it earned from tourism, more than it earned from the Suez Canal, and more than it received from any other single source of foreign currency. By every conventional measure, inflows of this magnitude should exert a stabilising effect on a country's external accounts. Yet Egypt's merchandise trade deficit has remained structurally persistent throughout the period of rising remittances, averaging approximately negative 12 percent of GDP annually between 2006 and 2025, and reaching USD 48.4 billion – equivalent to 14 percent of GDP – in 2024 alone. The central question this paper addresses is straightforward: why do growing remittance inflows not translate into an improving trade balance? The answer, this study argues, lies not in the volume of inflows but in the capacity of Egypt's financial system to convert those inflows into productive economic activity rather than import expenditure.

Egypt ranks consistently among the world's foremost remittance-receiving economies. Inflows grew from USD 5.3 billion in 2006 to USD 31.5 billion in 2021, progressively displacing tourism, petroleum exports, and Suez Canal revenues as the dominant source of foreign exchange in Egypt's balance of payments. Between 2022 and 2023, however, formal remittance receipts contracted sharply – from USD 28.3 billion to USD 19.5 billion, a cumulative decline of 38 percent – as households and Gulf-based workers

diverted transfers through a parallel foreign exchange market that at its peak offered a premium exceeding 50 percent above the official exchange rate. The simultaneous contraction of Suez Canal revenues from mid-2023, driven by the Red Sea security crisis, compounded the resulting foreign exchange shortage and intensified pressure on Egypt's external position. The March 2024 Extended Fund Facility agreement with the International Monetary Fund, which unified the official and parallel exchange rates at approximately EGP 49 per US dollar, restored formal remittance channels and catalysed a recovery to USD 29.6 billion by year-end 2024. According to the Central Bank of Egypt (2026), full-year remittance inflows reached USD 41.5 billion in 2025 – a 40.5 percent increase year-on-year and the highest annual total ever recorded – underscoring both the structural depth of Egypt's remittance dependency and the acute sensitivity of formal inflows to exchange rate policy.



Note: 2006–2025Q3 from authors' quarterly dataset; 2025 full-year figure from CBE (2026).
Source: Central Bank of Egypt, Balance of Payments; CBE (2026).

Figure 1: Annual Remittance Inflows to Egypt, 2006–2025 (USD billion)

A plausible explanation for this paradox centres on the depth of Egypt's financial system and its capacity to channel remittance receipts toward productive uses. When domestic financial intermediation is insufficient, remittance receipts tend to remain within household consumption circuits, generating demand for imported goods and thereby aggravating rather than ameliorating the trade deficit. Whether this mechanism is empirically operative in Egypt, and whether it is conditioned by the level of financial sector development, is the central question this paper addresses. The theoretical and empirical literature bearing on these questions is reviewed in Section 2.

Against this background, the study is motivated by the following research questions. First, do remittance inflows exert a statistically significant effect on Egypt's merchandise trade balance over the period 2006Q1 to 2025Q3? Second, does the level of financial development moderate the direction and magnitude of that effect? Third, are the trade balance responses to positive and negative remittance shocks symmetric, or do they operate through asymmetric channels? Fourth, how did the structural breaks associated with the 2016 EGP float, the 2022–2023 parallel market crisis, and the 2024 IMF programme alter the remittance–trade balance nexus?

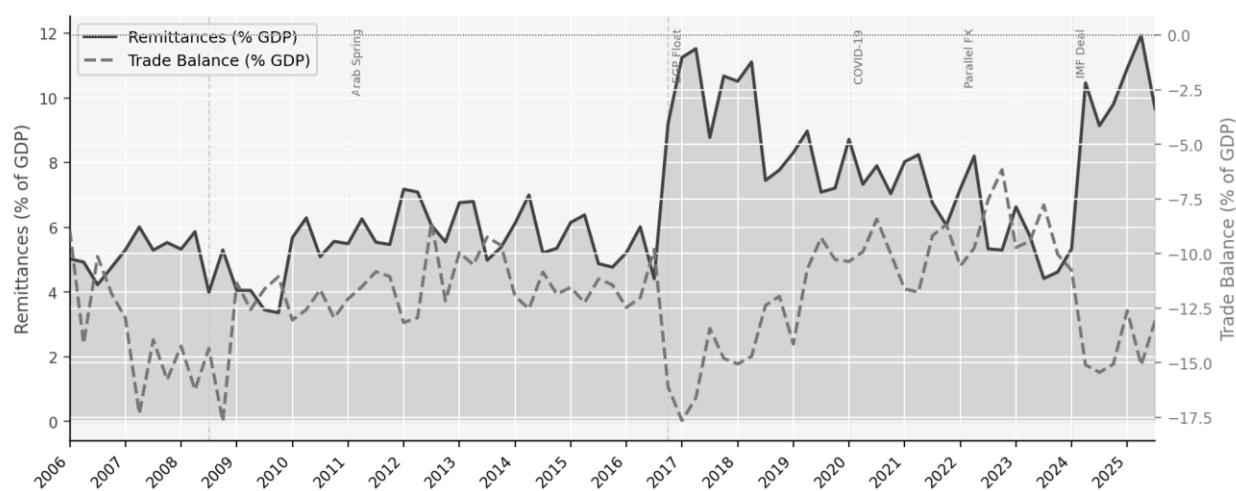
The study pursues four corresponding objectives: to construct and analyse the most temporally comprehensive quarterly dataset of Egypt's trade balance determinants in the extant literature, spanning 79 observations from 2006Q1 to 2025Q3; to estimate the direct effect of remittances on the trade balance while controlling for exchange rate dynamics and financial sector depth; to test whether financial development significantly moderates the remittance effect through an explicit interaction term; and to derive empirically grounded policy implications for the design of exchange rate policy, financial inclusion strategy, and the governance of formal remittance channels under IMF programme conditionality.

Three hypotheses are advanced. H1: remittance inflows exert a negative effect on Egypt's merchandise trade balance. H2: financial development moderates this relationship, such that deeper financial

intermediation attenuates the negative trade balance effect of remittances. H3: the trade balance effects of positive and negative remittance shocks are asymmetric, with the deterioration associated with surges exceeding the improvement associated with equivalent contractions.

This study makes three contributions to existing literature. It is the first, to the author's knowledge, to model financial development explicitly as a moderator of the remittance–trade balance relationship for Egypt, through the introduction of a remittance–financial development interaction term, enabling direct estimation of the conditional marginal effect of remittances at varying levels of financial sector depth. It employs an asymmetric empirical framework suited to the structural breaks and nonlinearities that characterise Egypt's macroeconomic trajectory over nearly two decades, capturing dynamics that conventional symmetric models would obscure. And it extends the empirical sample to encompass the 2024 IMF programme episode, advancing the analytical frontier beyond the endpoints that constrain most existing studies on Egypt's external sector.

The remainder of the paper is organised as follows: Section 2 reviews the literature, Section 3 describes the methodology, Section 4 presents the results, and Section 5 concludes with policy implications and directions for future research.



Source: Central Bank of Egypt, Balance of Payments (various issues); Ministry of Planning; authors' calculations.

Figure 2: Remittance Inflows and Trade Balance, Egypt, 2006Q1-2025Q3 (Quarterly, % of GDP)

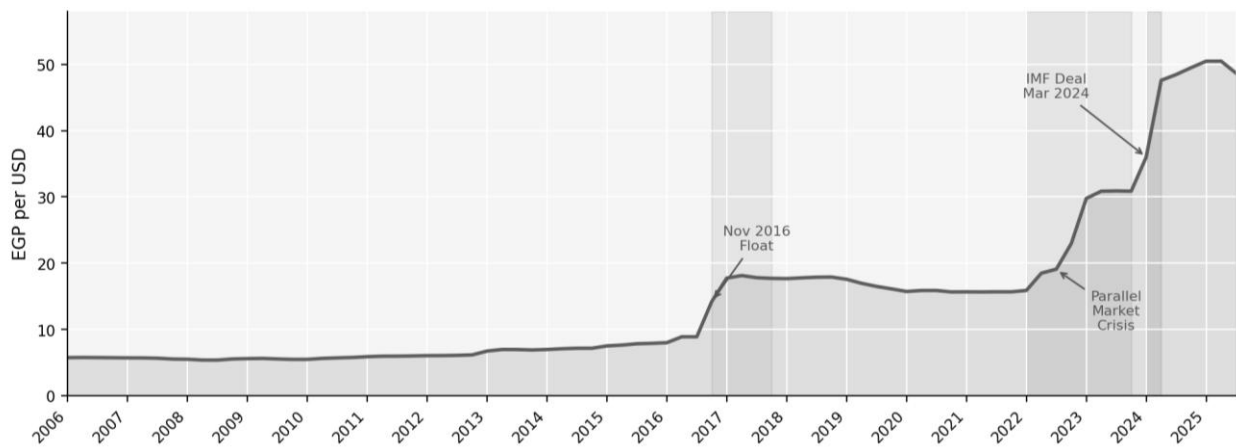
Literature review

Theoretical framework

The theoretical foundations of this study draw on three interrelated bodies of economic thought: the Marshall-Lerner condition and J-Curve hypothesis, which govern the relationship between external financial flows and trade balance dynamics; the Dutch Disease literature, which addresses the macroeconomic consequences of large foreign exchange windfalls; and the financial intermediation literature, which establishes the conditions under which household income receipts are transformed into productive investment rather than consumption expenditure.

The Marshall-Lerner condition holds that a depreciation of the nominal exchange rate will improve the trade balance if and only if the sum of the price elasticities of export and import demand exceeds unity. In the context of remittances, this condition is relevant in two respects. First, remittance inflows augment the supply of foreign exchange and may, depending on the exchange rate regime, exert an appreciating effect on the real exchange rate, thereby eroding export competitiveness and reducing the domestic cost of imports – a mechanism closely related to the Dutch Disease identified by Corden and Neary (1982), wherein a resource windfall appreciates the real exchange rate and crowds out tradeable sector production. Second, the J-Curve hypothesis posits that the trade balance response to an external shock is time-dependent: in the short run, quantity adjustments lag price adjustments, and the trade balance may worsen before it improves. Applied to remittances, this implies that even if sustained inflows eventually contribute

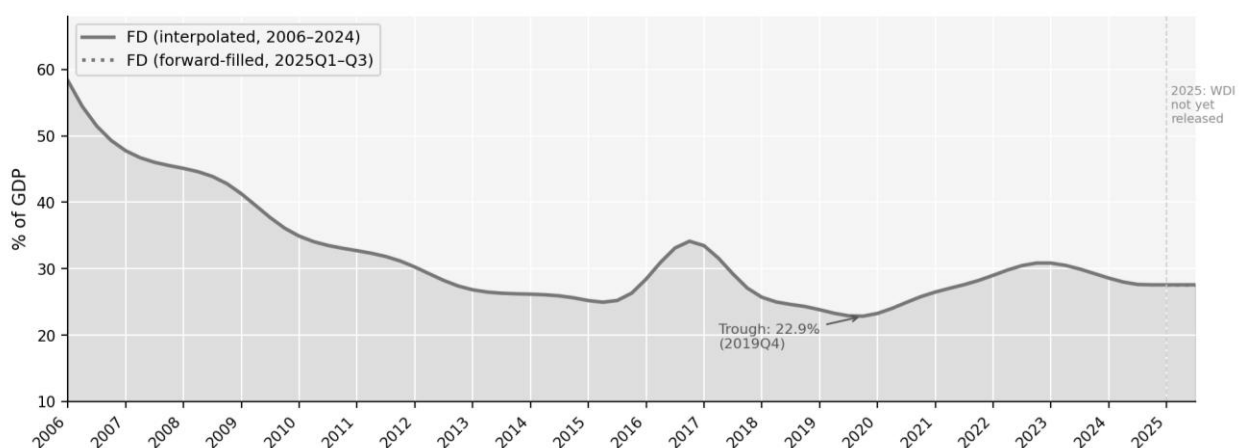
to tradeable-sector investment and export capacity, the short-run effect is likely to be dominated by import demand stimulation.



Source: Investing.com / Central Bank of Egypt; authors' calculations.

Figure 3: USD/EGP Nominal Exchange Rate, Egypt, 2006Q1-2025Q3 (Quarterly Average)

The boomerang effect, formalised by Farzanegan and Hassan (2016), extends these insights into a coherent framework specifically applicable to remittance-receiving economies. The central proposition is that when remittance receipts are consumed rather than invested – whether due to household preference, the absence of financial instruments, or the non-tradeable nature of available investment opportunities – they stimulate demand for imported goods and thereby deteriorate the trade balance. The magnitude of the boomerang effect is thus inversely related to the productive absorption capacity of the receiving economy, of which financial sector development is the most tractable empirical proxy. Financial development, measured in this study as domestic credit to the private sector as a share of GDP, conditions whether remittances are absorbed productively or circulate within consumption circuits. In Egypt, this measure declined from 49.3 percent of GDP in 2006 to a trough of 22.8 percent in 2019, recovering only modestly to 27.6 percent by 2024 – a trajectory that reflects chronic crowding out of private credit by large-scale government borrowing and that situates Egypt firmly among remittance-receiving economies with limited intermediation capacity. This empirical context directly motivates the construction of the remittance-financial development interaction term ($REM \times FD$) employed in the present study: a positive and statistically significant coefficient on this term would indicate that financial development attenuates the boomerang mechanism, while an insignificant or negative coefficient would suggest that intermediation capacity does not moderate the import-demand channel.



Note: Annual WDI data (World Bank) interpolated to quarterly via cubic spline; 2025Q1-Q3 forward-filled at 2024 value.
Source: World Bank, World Development Indicators (FS.AST.PRVT.GD.ZS); authors' calculations.

Figure 4: Financial Development (Domestic Credit to Private Sector, % of GDP), Egypt, 2006Q1-2025Q3

Taken together, these theoretical frameworks generate a coherent and testable set of predictions that map directly onto the three hypotheses advanced in Section 1. Remittances are expected to exert a negative effect on the trade balance through the boomerang and Dutch Disease channels, with the magnitude of this effect conditioned negatively by the level of financial development.

Empirical literature

Remittances and financial development

The relationship between remittances and financial development has attracted substantial theoretical and empirical attention, with the dominant strand of literature treating financial sector depth as a complement to, and amplifier of, the productive uses of remittance inflows. Azizi (2020), in a panel study covering 102 developing countries over the period 1990 to 2015, finds that remittances exert a positive and statistically significant effect on financial development indicators including domestic credit and bank deposits, suggesting that remittance-receiving households generate demand for formal financial services that deepens the banking sector over time. This complementarity hypothesis is reinforced by Adekunle et al. (2022), who examine sub-Saharan African economies and find that the growth-enhancing effect of remittances is conditional on the level of financial development, with the marginal benefit of remittances rising significantly in countries with more developed banking sectors.

Hussein, Mohieldin and Rostom (2017) complicate this optimistic picture, documenting that remittance inflows across MENA have not consistently deepened financial markets because a substantial share flows through informal channels – hawala networks and cash couriers – that bypass the formal banking system entirely. The parallel market episode of 2022–2023, during which Egyptian households routed a substantial share of remittances outside formal banking channels, provides a contemporaneous illustration of this fragility. Pandikasala, Vyas and Mani (2022) provide evidence from India that the causality may run in both directions, with financial development itself attracting greater remittance inflows – a feedback dynamic that underscores the endogeneity concerns motivating the inclusion of the interaction term in the present study.

Remittances, exchange rate dynamics, and trade balance

The empirically supported view identifies the boomerang mechanism as the dominant channel in economies characterised by shallow financial systems and consumption-oriented remittance usage. Farzanegan and Hassan (2016) show for Iran that remittance inflows are associated with a deterioration of the trade balance through the stimulation of import demand, with the effect intensifying during periods of real exchange rate appreciation. Critically, their findings suggest the response is asymmetric: the trade balance deterioration during remittance surges is larger and more persistent than the improvement observed during equivalent contractions, providing direct empirical motivation for H3 of the present study. Qutb (2022), examining Egypt directly, finds that remittances are positively associated with import growth in the long run, providing direct evidence that the boomerang mechanism operates within the Egyptian context.

Egypt-specific empirical work, while still limited in volume, has begun to establish a country-level evidence base. Bahloul (2018) documents a long-run cointegrating relationship between remittances and the current account in Egypt, though without isolating the trade balance component or introducing financial development as a moderating variable. ElMasry (2021) examines the macroeconomic consequences of remittance volatility in Egypt and finds that sharp contractions have significant downstream effects on domestic demand and the import bill.

The boomerang effect and the moderating role of financial development

The integration of financial development as a moderating variable within the remittance–trade balance framework represents the frontier of this literature, and it is here that the present study makes its primary contribution. The theoretical case for such moderation rests on the established observation that financial intermediation transforms the use of income: households with access to formal credit, savings instruments, and investment vehicles are better positioned to translate remittance receipts into durable capital accumulation rather than immediate consumption expenditure. Conversely, in the absence of effective

intermediation, remittances function as windfall household income, the bulk of which is consumed, with a significant portion allocated to imported goods.

Adekunle et al. (2022) provide cross-country evidence consistent with this moderation hypothesis, demonstrating that the growth dividend of remittances is significantly larger in more financially developed economies, implying a conditional rather than universal relationship between remittance inflows and their macroeconomic consequences. Hussein et al. (2017) advanced a related argument in the MENA context, suggesting that financial sector reforms oriented toward improving remittance-receiving households' access to formal banking could substantially alter the character of inflows. Neither study, however, explicitly tests financial development as a moderator of the trade balance effect of remittances, nor introduces an interaction term permitting direct estimation of the conditional marginal effect – the methodological innovation that distinguishes the present paper.

For Egypt specifically, Sharaf and Shahan (2022) find that the remittance-financial development relationship is nonlinear, with remittances complementing financial development below a remittance-to-GDP threshold of 7.28 percent but substituting it above that level – a finding that directly motivates the inclusion of financial development as a conditional moderator in the present study rather than as a simple additive control.

Research gap

The existing literature leaves three gaps this study addresses. No Egypt-specific study has tested whether financial sector deepening moderates the remittance-trade balance relationship using an asymmetric framework and an explicit interaction term – existing contributions either examine remittances as a growth determinant or treat financial development and remittances as parallel rather than interacting regressors. No study incorporates the post-2022 parallel market crisis, the 2024 IMF Extended Fund Facility, or the record 2025 remittance inflows within a quarterly econometric framework. And no study has examined whether the ongoing digitalisation of remittance channels – including Egypt's InstaPay network and Gulf-corridor fintech platforms – alters the transmission mechanism between inflows and trade balance outcomes. The present study addresses each of these gaps.

Research methodology

Data and variable construction

The study uses quarterly time series data spanning 2006Q1 to 2025Q3, yielding 79 observations across exchange rate regime shifts and three IMF programme episodes. Data are sourced from the CBE quarterly Balance of Payments statistical releases, the Ministry of Planning national accounts, and the World Bank World Development Indicators. Variable definitions and sources are summarised in Table 1.

The trade balance (TB) and remittances (REM) are expressed as percentages of GDP to control for Egypt's substantial nominal expansion over the sample. To operationalise the asymmetric framework, REM is decomposed into positive and negative partial sum series following Shin, Yu and Greenwood-Nimmo (2014), where REM^+ captures cumulative surges and REM^- captures cumulative contractions – allowing the data to determine whether the trade balance responds differently to rising versus falling remittance income rather than imposing symmetry as an assumption. Financial development (FD) is interpolated from annual WDI data to quarterly frequency using a cubic spline. Three structural break dummies – D2016, D2022, and D2024 – are incorporated to prevent regime shifts from biasing the long-run coefficient estimates.

Table 1: Variable Definitions and Data Sources

Variable	Definition	Source
TB	Merchandise trade balance (% of GDP)	Central Bank of Egypt, Balance of Payments
REM	Worker remittance inflows (% of GDP)	Central Bank of Egypt, Balance of Payments
REM⁺	Partial sum of positive changes in REM	Authors' construction
REM⁻	Partial sum of negative changes in REM	Authors' construction
FD	Domestic credit to private sector (% of GDP)	World Bank WDI
EXR	USD/EGP nominal exchange rate (quarterly average)	Central Bank of Egypt
REM×FD	Remittance-financial development interaction term	Authors' construction
D2016	Structural break dummy: EGP float (2016Q4 onward)	Authors' construction
D2022	Structural break dummy: parallel FX crisis (2022Q1 onward)	Authors' construction
D2024	Structural break dummy: IMF EFF agreement (2024Q1 onward)	Authors' construction

Table 1: Variable Definitions and Data Sources

Model specification and estimation strategy

The Nonlinear Autoregressive Distributed Lag (NARDL) model of Shin, Yu and Greenwood-Nimmo (2014) is estimated. This framework is chosen over symmetric ARDL because H3 cannot be tested within a linear model, which by construction restricts positive and negative remittance effects to be equal. NARDL is further preferred over VECM because it accommodates the mixed I(0)/I(1) integration profile confirmed by unit root testing without requiring all variables to share the same order of integration. The estimated error correction model is:

$$\Delta TB_t = \alpha + \rho TB_{t-1} + \beta' X_{t-1} + \sum_{i=1}^p \phi_i \Delta TB_{t-i} + \sum_{i=0}^q \theta' \Delta X_{t-i} + \pi' D_t + \varepsilon_t$$

Where:

- $X_t = (REM_t^+, REM_t^-, FD_t, EXR_t, (REM \times FD)_t)'$
- $D_t = (D2016_t, D2022_t, D2024_t)'$

The lag order $p=2$ is selected by the Akaike Information Criterion. Long-run coefficients are recovered as $-\beta_x/\rho$. Long-run asymmetry is tested via a Wald test of $H_0: \beta_1 = \beta_2$. Integration order is confirmed using ADF and PP unit root tests applied in levels and first differences. Long-run cointegration is assessed via the Pesaran, Shin and Smith (2001) bounds test F-statistic against Case 3 critical values with $k=6$. Model adequacy is verified through the Breusch-Godfrey, Breusch-Pagan, Jarque-Bera, and CUSUM tests. All estimation is conducted in R.

Findings and results

Pre-estimation diagnostics

The ADF and PP unit root tests confirm that all variables are integrated of order one, with no variable reaching I(2) (Table 2). Where the two tests conflict at levels, the ADF is adopted as the primary criterion, as the PP test is known to over-reject the unit root null in the presence of structural breaks by misinterpreting break-induced variance as mean reversion. The bounds F-statistic of 6.600 clears the one

percent upper critical bound of 4.43 (Table 3), confirming a genuine long-run cointegrating relationship among all model variables.

Variable	ADF (Level)	ADF (1st Diff)	PP (Level)	PP (1st Diff)	Order
TB	0.269	0.010**	0.010**	0.010**	I(1)
REM	0.045*	0.045*	0.018*	0.010**	I(1)
FD	0.511	0.063	0.709	0.027*	I(1)
EXR	0.928	0.234	0.984	0.010**	I(1)

Note: p-values reported. * $p < 0.05$; ** $p < 0.01$. ADF is the primary criterion; PP reported as robustness check.

Table 2: Unit Root Test Results

F-statistic	k	5% I(0)	5% I(1)	1% I(0)	1% I(1)
6.600***	6	2.45	3.61	3.15	4.43

Note: *** $p < 0.01$. Critical values from Pesaran, Shin and Smith (2001), Case 3 (unrestricted intercept, no trend), $k=6$.

Table 3: ARDL Bounds Test for Cointegration

The boomerang effect: remittances and the trade balance

The long-run coefficient on REM^+ is -3.228 and statistically significant at the five percent level (Table 4), confirming H1. Every one percentage point increase in remittances as a share of GDP is associated with a 3.228 percentage point deterioration in the merchandise trade balance in the long run. At the household level, Egyptian remittance recipients allocate a substantial share of inflows to imported consumer goods – electronics, vehicles, household appliances – that the domestic manufacturing base cannot competitively supply. At the macroeconomic level, remittance surges coincide with episodes of EGP pressure, as households convert inflows into foreign currency assets or imported durables, amplifying the import bill at precisely the moment when the current account can least absorb it. The effect materialises immediately: the short-run coefficient on $\Delta REM^+ t_{-1}$ is -3.034 ($p=0.017$, Table 5). The long-run coefficient on REM^- is -2.622 but does not reach conventional significance ($p=0.101$), indicating that remittance contractions do not produce a statistically reliable long-run trade balance improvement – a result that foreshadows the asymmetry confirmed formally in Section 4.3.

The exchange rate finding adds a further layer. The long-run coefficient on EXR is $+0.296$ ($p=0.021$), meaning that EGP depreciation worsens rather than improves the trade balance – inconsistent with the Marshall-Lerner condition. Egypt's import basket of food, fuel, and consumer durables is relatively price-inelastic, while the export base is too narrow and insufficiently price-responsive to generate compensatory gains within a quarterly horizon. The three major devaluations of 2016, 2022, and 2024 therefore compounded rather than corrected the trade imbalance in the near term.

The error correction term of -0.774 ($p=0.000$) indicates that 77.4 percent of any deviation from long-run equilibrium is corrected within one quarter – a fast adjustment by MENA standards. Two structural features explain this speed: Egypt's extreme import dependency means income shocks transmit almost immediately into import demand, and the CBE's remittance repatriation policies channel inflows into the official banking system rapidly, compressing the lag between remittance receipt and macroeconomic effect.

Variable	Coefficient	Std. Error	t-value	p-value
REM ⁺	-3.228	1.571	-2.055	0.045*
REM ⁻	-2.622	1.570	-1.670	0.101
FD	-0.543	0.274	-1.979	0.053
EXR	0.296	0.124	2.386	0.021*
REM×FD	0.087	0.048	1.821	0.074
ECT (ρ)	-0.774	0.193	-4.006	0.000***

Note: * $p < 0.05$; *** $p < 0.01$. Long-run coefficients derived as $-\beta/\rho$. ECT = error correction term.

Table 4: Long-Run Coefficients

Variable	Coefficient	Std. Error	t-value	p-value
$\Delta \text{REM}^+_{t-1}$	-3.034	1.227	-2.473	0.017*
$\Delta \text{REM}^-_{t-1}$	-2.126	1.092	-1.947	0.057
ΔFD_{t-1}	-1.592	0.684	-2.328	0.024*
$\Delta (\text{REM} \times \text{FD})_{t-1}$	0.087	0.035	2.462	0.017*
D2016	-5.548	1.507	-3.681	0.001***
D2022	1.358	1.271	1.069	0.290
D2024	-2.424	1.720	-1.409	0.164
$R^2 = 0.634$	Adj. $R^2 = 0.491$	$F = 4.445***$	$p = 0.000$	$n = 76$

Note: * $p < 0.05$; *** $p < 0.01$. ΔEXR_{t-1} and ΔTB_{t-1} omitted (insignificant). Observations: 76 after lag adjustment.

Table 5: Short-Run Coefficients and Model Fit

Financial development, asymmetry, and the 2016 turning point

The interaction term REM×FD is positive and significant in the short run (0.087, $p=0.017$), confirming that financial depth attenuates the trade balance deterioration associated with remittance surges. When households have access to domestic savings instruments, a share of inflows is absorbed into the financial system rather than spent on imports. The long-run interaction coefficient is directionally consistent but statistically borderline ($p=0.074$), reflecting the shallow and volatile trajectory of Egypt's financial sector over the sample – insufficient variation to identify the long-run channel precisely. H2 is partially supported.

The Wald test for long-run asymmetry yields $F=12.498$ ($p=0.0008$), strongly confirming H3. A one percentage point remittance surge worsens the trade balance by 3.228 points in the long run, while an equivalent contraction improves it by only 2.622 points – a structural gap of 0.6 percentage points of GDP per cycle. Each boom-bust cycle leaves the trade balance cumulatively worse. The mechanism is consumption stickiness: households expand durable imports during surges but do not fully reverse them during contractions, drawing instead on savings or domestic credit to sustain spending. The policy implication is direct: containing the import surge during remittance booms is more effective than attempting to stimulate the trade balance during contractions.

The 2016 EGP float dummy carries the largest coefficient in the model at -5.548 ($p=0.001$), confirming that the November 2016 exchange rate unification constituted a dominant structural break in Egypt's trade balance dynamics – one that dwarfs the marginal effects of remittances and financial development. The 2022 and 2024 dummies are insignificant once the 2016 break is controlled for, suggesting that by the time of subsequent adjustments, importers and financial institutions had partially adapted their behaviour to a floating-rate environment. All diagnostic tests pass (Table 6), and the CUSUM statistic remaining within bounds throughout 2006–2025 confirms parameter stability across the full range of macroeconomic episodes in the sample.

Test	Statistic	p-value	Conclusion
Breusch-Godfrey (order 4)	LM = 6.703	0.152	No serial correlation [Pass]
Breusch-Pagan	BP = 18.223	0.635	No heteroskedasticity [Pass]
Jarque-Bera	$X^2 = 1.363$	0.506	Residuals normally distributed [Pass]
CUSUM	Within bounds	—	Parameter stability confirmed [Pass]

Note: All tests conducted on model residuals. CUSUM assessed at 5% critical bounds throughout 2006–2025.

Table 6: Diagnostic Test Results

Discussion and conclusions

The NARDL results for 2006Q1–2025Q3 support all three hypotheses – H1 fully, H2 partially, and H3 strongly – and collectively build a coherent and policy-relevant account of how remittances interact with Egypt's structural trade vulnerabilities.

Egypt's remittances function as an import accelerant rather than a balance-of-payments stabiliser. This finding aligns with and substantially extends the boomerang effect framework of Farzanegan and Hassan (2016), demonstrating its persistence across two decades, different exchange rate regimes, and three IMF programmes. The long-run coefficient of -3.228 is larger in magnitude than the estimates reported by Qutb (2022) and consistent with the upper range documented by Farzanegan and Hassan (2016) across MENA economies, suggesting that Egypt's import dependency amplifies the boomerang effect relative to regional peers. Egypt therefore faces a structural trap: the two most available levers for current account management – remittance promotion and exchange rate adjustment – both carry perverse short-to-medium-term trade balance consequences.

Financial development offers a partial exit from this trap. Deeper credit markets redirect remittance inflows toward domestic savings instruments and away from imported consumption, attenuating the boomerang effect in the short run. However, the chronic shallowness of Egypt's financial sector – driven by government borrowing crowding out private credit – has prevented this channel from maturing into a robust long-run moderator. Because remittance surges inflict structurally larger and more persistent trade balance damage than equivalent contractions provide relief, policies that maximise remittance inflows carry a hidden and non-recoverable trade balance cost. A dimension this study cannot yet fully capture, but which warrants explicit acknowledgement, is the accelerating digitalisation of Egypt's remittance infrastructure.

The rollout of InstaPay, the expansion of mobile wallet penetration among remittance-receiving households, and the growing share of Gulf-corridor transfers routed through licensed fintech platforms have begun to compress the informality gap that historically limited the financial development dividend from remittance inflows. If digital channels succeed in routing a larger share of remittances through formal financial instruments, the moderating role of financial development documented here – currently constrained and statistically borderline in the long run – may strengthen materially over the coming years. This represents both a research opportunity and a policy lever: investment in digital financial infrastructure is not separable from trade balance management under the current IMF programme, but is a direct complement to it.

The 2024 IMF programme's emphasis on exchange rate flexibility, fiscal consolidation, and private sector development addresses several of the structural vulnerabilities identified here – but its effectiveness will depend on whether fiscal space is directed toward the two conditions this paper identifies as necessary: deepening financial intermediation and diversifying the export base.

Three policy recommendations follow directly from these findings. First, expanding household access to formal financial instruments – postal savings certificates, mobile banking products, and diaspora bonds – is a trade balance management instrument, not merely a financial inclusion objective. Second, macroprudential tools should be calibrated to contain the import surge during remittance booms rather than attempting to stimulate recovery during contractions, which the data show to be structurally limited.

Third, investment in digital remittance infrastructure – InstaPay, mobile wallets, fintech corridor platforms – directly complements both recommendations by routing inflows through formal channels, reducing the informality gap, and enabling more targeted macroprudential responses.

Limitations and future research

Several limitations of this study should be acknowledged. First, the interpolation of annual financial development data to quarterly frequency using a cubic spline, while standard in the applied time series literature, introduces a degree of measurement error into the FD variable that may attenuate the precision of the long-run interaction coefficient. Future research would benefit from a quarterly FD measure derived directly from CBE banking sector statistics, which would allow for sharper identification of the financial development moderation channel.

Second, the trade balance variable captures merchandise trade only, excluding services exports – most significantly Suez Canal revenues and tourism receipts – which constitute a substantial and volatile component of Egypt's current account. Including services would provide a more complete picture of how remittances affect Egypt's overall external position.

Third, the NARDL framework does not disaggregate remittances by source country or household income quintile. Gulf-sourced and European-sourced remittances likely carry different import propensities, and integrating household survey data with aggregate time series methods would allow future research to identify these heterogeneous channels more precisely.

Fourth, the sample ends in 2025Q3, capturing only the early phase of the 2024 IMF programme. Revisiting these estimates with a post-programme sample, once exchange rate unification, fiscal consolidation, and financial sector reform have matured, would represent a valuable extension of the current findings.

Fifth, this study models remittances as an aggregate flow without distinguishing between transfers routed through formal banking channels, digital platforms, and informal networks. As Egypt's digital payment infrastructure matures – through InstaPay adoption, mobile wallet expansion, and fintech corridor growth – the behavioural and macroeconomic consequences of remittance inflows are likely to diverge across these channels. Future research incorporating channel-level remittance data would allow for sharper identification of whether digital intermediation alters the boomerang mechanism documented here.

Author's Note

This research was conducted independently. The author declares no conflicts of interest.

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