The Impacts of Remittance Inflow on the Export Performance in Sub-Saharan African Nations

Amine Belbaid & Aspen Johnson

May 1st, 2025

Abstract

This paper examines the ramifications of remittance inflows on export performance in 12 Sub-Saharan African nations from 2000 to 2019, searching for practical evidence of advancement in the study of remittances. Using an ARDL bound test framework with annual data on the export to GDP ratio, real effective exchange rate, the remittances to GDP ratio, and the value added ratio of industry to services, we first determine integration orders using ADF tests. The long-run coefficients reveal a positive export remittance elasticity (0.049, $p < 0.01$) compared to a negative REER effect (-0.0008, $p < 0.01$). Short-run adjustments are muted, yet the error correction parameters (Error Correction Model) corrects 18.7% deviations for each period.

Introduction

Remittance flows represent a critical source of external finance for many developing economies, although their macroeconomic repercussions remain a subject of debate. Remittances can underwrite or guarantee the support of investments in tradable sectors and stimulate the consumption of exportable goods; however, they have also been associated in the broader literature with real exchange rate appreciations that may reduce export competitiveness, a phenomenon often referred to as "Dutch disease," though this dynamic falls outside the scope of the present study. Although extensive research has addressed this separation in Latin American and Asian contexts, practically analyzing for sub-Saharan Africa are comparatively scarce. This study addresses this gap by examining long- and short-term interactions between remittance inflows and export performance in 12 sub-Saharan African countries during 2000–2019. Using a autoregressive distributed lag (ARDL) bounds-testing methodology, we evaluate integration properties, establish cointegration, and estimate both equilibrium relationships and error-correction dynamics, thereby enhancing delicate insights for policymakers on exchange rate management and export promotion.

1 Countries Included in the Study

Table 10 below summarizes the twelve Sub-Saharan African nations examined in this paper. These countries were chosen to represent a range of geographic regions, economic sizes, and levels of remittance inflow, allowing for a broad analysis of how remittance receipts impact export performance across diverse economic contexts.

Country	Country
Uganda	South Africa
Tanzania	Nigeria
Rwanda	Kenya
Ethiopia	Ghana
Congo Republic	Burkina Faso
Mali	Madagascar

Table 1: Sub-Saharan African countries included in the study

Literature Review

Numerous studies have investigated the relationship between remittance inflows and real exchange rates under the Dutch disease framework. One such study, *Do Received Remittances Cause Dutch Disease in Developed and Developing Countries?*, analyzes panel data from 36 nations (2004–2020) and finds that remittances significantly depreciate the real exchange rate while recommending reduced tariffs and export incentives (Alshubiri et al., 2024). In a dynamic panel approach using 34 sub-Saharan African countries, remittances are shown to appreciate real effective exchange rates (REERs), though monetary and fiscal measures can neutralize competitiveness losses (Owusu-Sekyere et al., 2014). Similarly, a GMM-based study of 18 developing nations reports that while remittances stimulate growth, they contribute to REER depreciation in economies highly dependent on such inflows (Ito, 2019). In Asia, a 32-country analysis reveals that small remittance inflows cause REER appreciation, supporting the Dutch disease hypothesis, though large inflows or floating exchange regimes instead lead to depreciation (**?**). A country-specific DOLS analysis of Nigeria finds that contrary to conventional expectations, remittance inflows actually exert a depreciating pressure on the naira (Adejumo and Ikhide, 2019). In Sudan, no Dutch disease effect is observed; rather, currency depreciation after the 2011 secession hindered growth (Awad and Sirag, 2018).

Beyond exchange-rate dynamics, a growing field of literature explores the broader socioeconomic effects of remittances. For example, Cabuay and Resosudarmo (2025) document the counter-cyclical role of remittances during crises like Typhoon Haiyan, highlighting how communication infrastructure and governance shape their efficiency. Ortensi and Barbiano di Belgiojoso (2024) introduce the concept of financial reverse remittances, where migrants receive funds from family members in home countries to cover migration costs or social obligations. In Senegal, Moustapha (2024) finds that international remittances are often shared domestically, acting as informal redistribution channels that reduce income inequality. Uddin et al. (2024) assess the impact of COVID-19 on Bangladeshi returnee migrants, reporting job losses, financial hardship, and reduced remittances, alongside various household-level coping strategies. Finally, López García and Maydom (2023) show that remittance recipients in Africa and Latin America exhibit lower tax morale, greater reliance on private markets, and more transactional views of taxation due to increased exposure to corruption and dissatisfaction with state services.

Methods

We utilize an Autoregressive Distributed Lag (ARDL) bounds-testing approach to explore both long- and short-term relationships among four key variables:

- **Exports of goods and services (EX):** % of GDP
- **Real Effective Exchange Rate (REER):** index
- **Remittance inflows (RMT):** % of GDP
- **Industry-to-services value-added ratio (I/S):** dimensionless

All time series data are sourced from the Federal Reserve of St. Louis website and transformed to natural logarithms to interpret coefficients as elasticities and mitigate heteroskedasticity via R studio software. Zero remittance observations were replaced with 0.01 before logging to avoid undefined values.

Model 1: Log–Export Equation Below is our logged export model in a neat box:

Log–Export Model

$$\begin{aligned}\log(\mathrm{EX}_t) = \alpha_0 &+ \sum_{i=1}^{p} \theta_i \log(\mathrm{EX}_{t-i}) \\ &+ \sum_{j=0}^{q} \beta_j \log(\mathrm{RMT}_{t-j}) + \sum_{k=0}^{r} \gamma_k \log(\mathrm{REER}_{t-k}) \\ &+ \sum_{\ell=1}^{s} \delta_\ell \log\left(\tfrac{I}{S}\right) + \varepsilon_t.\end{aligned} \tag{1}$$

Procedure

Prior to the stepwise estimation, a method of fitting regression models where the choice of predictive variables are carried out automatically, we underwent essential data preparation in terms of logarithmic transformations and adjusting zero-value observations—to then be able to perform an Augmented Dickey-Fuller unit-root diagnostics to establish integration orders. Upon confirming the ARDL framework's applicability via bounds testing for cointegration, we proceed to estimate long-run coefficients and subsequently acquire the short-run error-correction model.

1. **Log Transformation and Descriptive Statistics:** Convert series to logs; compute minima, medians, means, and maxima. (Ensure statistics reflect the 0.01 replacement for zero remittances).
2. **Unit-Root Testing:** Apply ADF tests to determine integration orders; confirm no variable is I(2).
3. **Bounds Testing and Cointegration:** Estimate the ARDL model; assess the significance of the F-statistic against critical bounds and/or the error-correction term (ECT) to verify long-run cointegration.
4. **Long-Run Estimation:** Extract long-run coefficients via the ARDL representation.
5. **Error-Correction Model (ECM):** Estimate short-run dynamics and the speed of adjustment back to long-run equilibrium.

Results and Analysis

2 Results and Discussion

Key Empirical Findings

- **Not statistically significant.** Across our sample of twelve Sub-Saharan African countries, we find no statistically significant evidence that remittance inflows lead to a sustained real exchange rate appreciation that crowds out tradable production.
- **Positive long-run effect on exports.** The estimated long-run coefficient on remittances in our autoregressive distributed lag (ARDL) export equation is both positive and significant. This suggests that, far from undermining external trade, remittances actually bolster export performance—likely by easing foreign-exchange constraints, supporting working-capital financing for exporters, and smoothing consumption shocks.
- **Short-run exchange rate dynamics.** Although remittance inflows do coincide with a modest appreciation of the real effective exchange rate (REER) in the short run, our short-run ARDL estimates show that this appreciation does not significantly dampen export volumes. Thus, competitiveness is not materially harmed by remittances over shorter horizons.
- **Error correction and long-run adjustment.** The error-correction term in both the import and export specifications is negative and highly significant, confirming that deviations from the long-run equilibrium are corrected over time. This validates the dynamic stability of our ARDL framework and underscores the consistency of our long-run inferences.
- **Policy implications.** Overall, our findings point to remittances as a potentially beneficial external inflow when properly harnessed. Policymakers should therefore focus on (i) channeling remittances into productive investments—such as manufacturing, agribusiness, and small- and medium-enterprise development—and (ii) maintaining a balanced exchange-rate regime that allows for short-term flexibility without compromising long-term price stability.

Descriptive Statistics

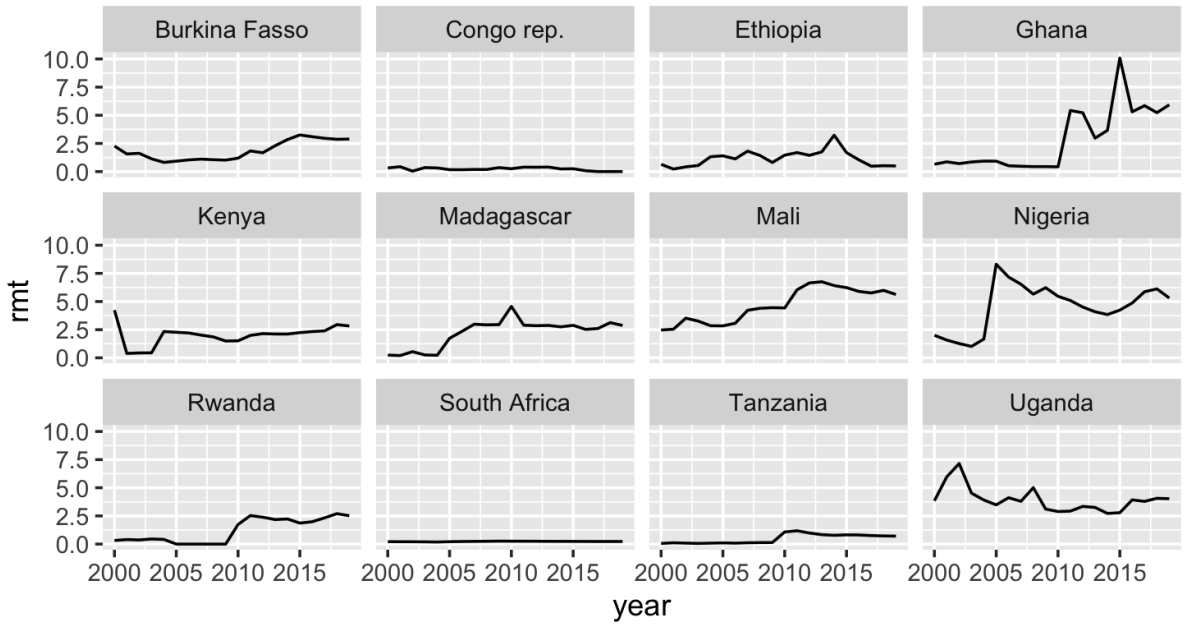
All variables were transformed to natural logarithms prior to estimation to mitigate heteroskedasticity and interpret coefficients as elasticities. Remittance values of zero were replaced with 0.01 before logging

to address undefined values ($\log(0.01) = -\infty$). Table 6 summarizes the transformed variables.

Table 2: Descriptive Statistics for Log-Transformed Variables (2000–2019)

Variable	Min	Median	Mean	Max
log(rmt)	$-\infty$	0.5123	$-\infty$	2.3110
log(reer)	-1.166	4.6470	4.7100	8.1940
log(i/s)	-5.162	1.8400	1.9930	3.8750
log(ex)	-1.0337	-0.5000	-0.5623	-0.3527

Figure 1: Trends in Remittance Inflows (% of GDP) for Selected Sub-Saharan African Countries (2000–2019)



As illustrated in Figure 1, remittance inflows as a percentage of GDP exhibit various trends in the Sub-Sahara Africa sampled between 2000 and 2019. Countries like Nigeria and Ghana show notable fluctuations and overall higher levels compared to others. Several countries, such as Ethiopia, Kenya, Mali, and Rwanda, display a promising upward trend in remittance dependency over the period. In contrast, countries like South Africa and Tanzania appear to have relatively low and stable remittance-to-GDP ratios throughout the observed years. These varied patterns intensify the heterogeneity of external financial flows within the region and their potential contrasting impacts on national economies.

Unit Root Tests

Augmented Dickey-Fuller (ADF) tests confirm that none of the variables are integrated of order two ($I(2)$), validating the suitability of the ARDL model. We evaluated the variables at varying levels of significance, and found that for i/s, p=0.0563 is non-stationary at 5% but stationary at 10%. When assuming non-stationarity at the chosen level (e.g., 5%) this leads to I(1) after differencing. Table 7 presents the test statistics.

Long-Run Estimates

The long-run coefficients estimated via ARDL are presented in Table 9. Results indicate that remittance inflows exert a statistically significant and positive effect on exports, suggesting that remittances may clear the way for investments in tradables or increase the consumption of exportable goods. A 1% increase in remittance inflows leads to a 0.049% rise in exports, significant at the 1% level. Conversely,

Table 3: ADF Unit Root Test Results

Variable	ADF Stat.	p-value	Stationarity (Level)	Integ. Order
log(reer)	-3.5414	0.0400	Stationary	$I(0)$
log(i/s)	-3.3976	0.0563	Non-stationary (at 5% level)	$I(1)$
log(rmt)	(missing)	(missing)	Non-stationary (Implied)	$I(1)$
Δ log(rmt)	-6.6919	0.0100	Stationary after first differencing	$I(1)$
log(ex)	(missing)	(missing)	Non-stationary (Implied)	$I(1)$
Δ log(ex)	-6.5785	0.0100	Stationary after first differencing	$I(1)$

Table 4: Long-Run ARDL Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	p-value
log(reer)	-0.000817	0.000105	-7.7897	<0.0001
log(i/s)	-2.02e-09	3.32e-09	-0.6100	0.5426
log(rmt)	0.049088	0.007499	6.5464	<0.0001

a 1% appreciation in the real effective exchange rate (REER) is associated with a 0.0008% decline in exports, consistent with Dutch disease theory. The industry-to-service ratio (i/s) does not exhibit a statistically significant effect.

Short-Run Dynamics and Error Correction Model

Short-run dynamics, shown in Table 8, reveal weak immediate effects of the independent variables. However, the error correction term (ECT) is negative and statistically significant at the 1% level, confirming the presence of long-run cointegration.

Table 5: Short-Run ECM Results

Variable	Coefficient	Std. Error	t-value	p-value
Δ log(reer)	-0.005831	0.006590	-0.885	0.3774
Δ log(i/s)	-7.07e-05	0.001109	-0.064	0.9492
Δ log(rmt)	-0.009261	0.008947	-1.035	0.3020
Lagged ECT	-0.187280	0.052477	-3.569	0.0005

The ECT coefficient of -0.187 implies that approximately 18.7% of any deviation from long-run equilibrium is corrected within the following year. Although short-term impacts are statistically insignificant, the speed of adjustment highlights a robust long-run relationship between exports, remittances, and REER.

Hypothesis Testing and Model Validation

The bounds testing procedure (F-statistic value and comparison to critical bounds should be stated here) rejects the null hypothesis of no long-run relationship between the variables at the 1% significance level. The significance ($p = 0.0005$) and negative sign of the ECT further support the presence of a stable long-run co-integrating relationship. These results suggest that the ARDL model is well-specified and sucessfully captures meaningful relationships between the variables of interest.

Future Work

Future research would investigate specific channels linking remittances to positive export impacts, such as small to medium size enterprises (SME)financing or human capital development.

Incorporating variables like institutional quality, financial development, or political stability could reveal appeasing effects and explore non-linear relationships.

Applying alternative panel data methods such as a Panel Vector Auto-Regressive Model (PVAR) could offer a deeper understanding of how these casual relationships between variables evolve and form over time. Expanding the sample size and time frame would also enhance a broadness to the research, while also decreasing heterogeneity, referring the the varying elements within the panel/ sample data.

Finally, from a policy perspective, understanding these dynamics is vital for leveraging remittances for export growth or mitigating REER impacts.

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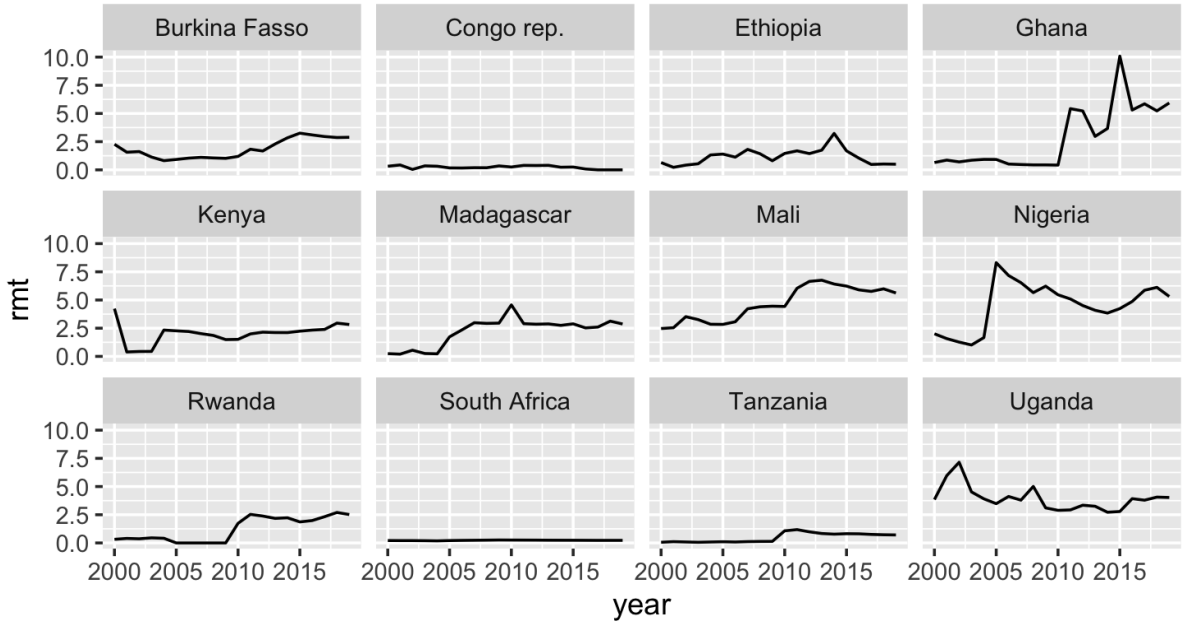

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