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Do governance indicators have a role in remittances-growth nexus in Egypt?

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Abstract

Purpose — Drawing on annual data from 1996 to 2022, this study aims to examine the effect of Egypt's real GDP growth.

Methods — Autoregressive Distributed Lag (ARDL) and Cointegration techniques are applied by first examining the stationarity of the series by utilizing the Augmented-Dicky-Fuller (ADF) unit root test. The bound cointegration test is then implemented to evaluate the existence of cointegration among the variables.

Findings — The results indicate that the GDP growth rate has a long-run positive relationship with remittance inflows in Egypt. This paper also finds that the average governance indicators in Egypt, including government effectiveness, political stability, control of corruption, regulatory quality, voice and accountability, and the rule of law, can help facilitate the long-term impact of remittances on GDP growth.

Implication — The findings suggest that maintaining high levels of governance indicators is crucial for Egypt to benefit from remittances and promote its economic growth.

Originality/value — The study is a pioneer in incorporating average governance indicators into the remittance-growth nexus study for Egypt. The study aims to examine whether governance quality affects the remittance–growth nexus and whether a threshold level of average governance indicators exists below which remittance inflows fail to stimulate economic growth.

Keywords — Remittances, economic growth, ARDL model, governance indicators.

Introduction

Remittance[1] plays an essential role in economic prosperity by facilitating the transfer of money from migrant employees to their households. This process is expected to revive global remittance flows, with annual averages of approximately US$123.7 billion from 1970 to 2000, US$418 billion in 2010, and US$766 billion in 2022. In recent years, remittance flows to developing countries have surpassed the total amount of foreign direct investment and official development assistance, and this disparity is increasing (World Bank, 2024). According to the DESA (2020) report, remittances initially go to lower-middle-income countries, with a higher share allocated to low-income countries. According to the OECD, Egypt is the fifth-highest recipient of remittances globally, with USD 28.3 billion in 2022, accounting for approximately 10% of its GDP. The importance of

[1]Workers' or migrant remittances are defined as a portion of migrants' earnings, sent home in cash or goods, to support their families.

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this paper lies in the fact that remittances play a more significant role in the inflows of global capital into several emerging economies. This is especially true for Egypt, where remittances have three times the impact as foreign direct investment (FDI) and foreign aid. Analyzing the impact of remittances has received much attention since the 1990s (see Elsadig & Rahim, 2023).

Remittances are attracting increasing attention due to the substantial volume of outflows to developing countries and their significant impact on the economies of receiving nations. Egypt is among the top five emerging economies receiving remittances in 2023. Remittances to the MENA region increased by 80.6%, around US $67 billion, between 2010 and 2022, whereas the growth rate for all low and middle-income countries combined was 95.2%. The top nine MENA countries in terms of remittance recipients in 2022 are Egypt, Morocco, Jordan, Yemen, Tunisia, Algeria, Sudan, Turkey, and Iraq (see Figure 1), with the highest and lowest ranked countries receiving US$28.33 and US$0.6 billion, respectively, according to the World Bank (World Bank, 2024).

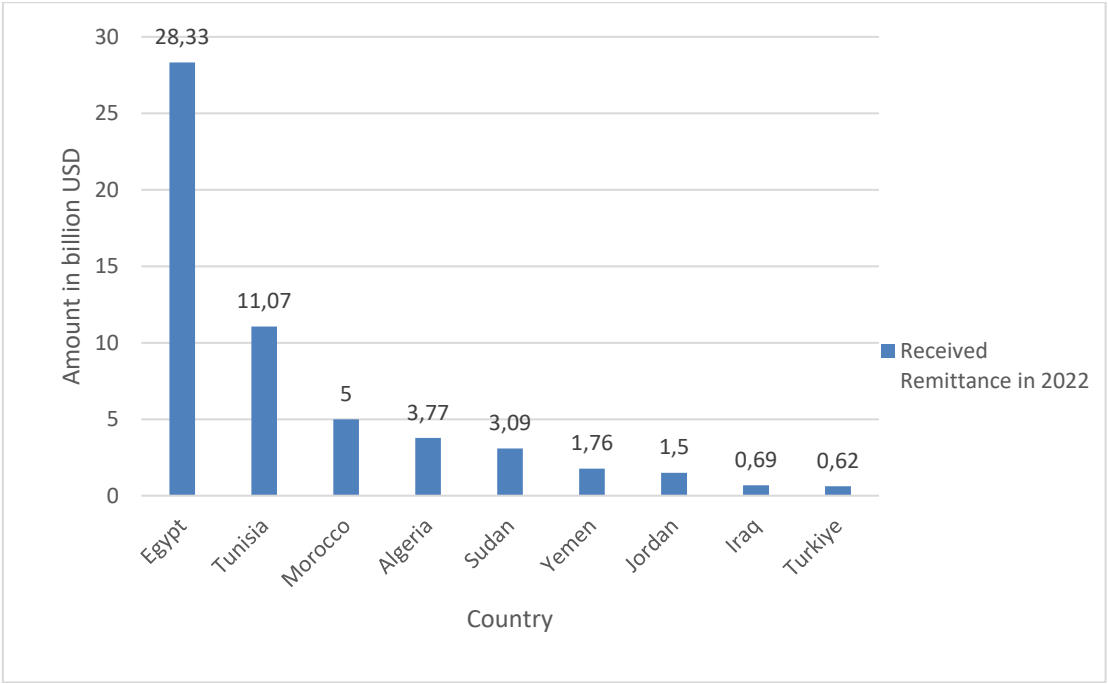

Figure 1. Top 9 remittance-receiving countries in the MENA region.

Chenery (1967) postulates that the Harrod-Domar growth model has been used to explain how developing countries can close the savings-investment gap by taking advantage of remittances and foreign inflows. As a developing country, Egypt has benefited significantly from remittances sent by millions of Egyptians working overseas to support their families and communities; remittances are an essential source of income for the country. Egypt's economy relies heavily on remittances, as they provide a reliable source of foreign currency and help maintain the nation's balance of payments. Additionally, remittances support economic growth and the fight against poverty, enhancing the living standards of millions of Egyptians. One of the main advantages of Egypt is its large population of more than 100 million in 2022, with over half of its citizens aged 25 and below. As a result, Egyptians have become highly mobile and established strong communities throughout most Arab states, especially in Libya, Iraq, Jordan, and the Gulf Cooperation Council states (Sadiq & Tsourapas, 2021). Economic remittances were seen as a significant source of personal income in Egypt.

Despite remittances' growing importance in overall international financial inflows, the nexus between remittances and economic growth has yet to be extensively explored, especially in Egypt. Also, several empirical studies exploring the relationship between remittance inflow and economic growth are inconclusive. While some studies found remittances to be positively linked with economic growth (Abdulai, 2023; Yavuz & Bahadir, 2022; Cazachevici et al., 2020;

Matuzeviciute & Butkus, 2016; Rehman et al., 2021; Chowdhury, 2016), others found no significant or negative relationship between economic growth and remittances (Alhassan, 2023; Anetor, 2019; Jushi et al., 2021; Sutradhar, 2020; Ustarz & Issahaku, 2017; Sobiech, 2015). The results of these studies vary due to variations in the data and methodology employed, as well as the specific conditions of each country under study. The relationship between remittances and economic growth has attracted significant attention in recent years; however, the literature has yet to establish the nature of this relationship. Some literature suggests that remittances stimulate economic growth by increasing consumption; however, other research finds that remittances have a negative or no effect on economic growth. Olayungbo and Quadri (2019) examined the association between remittance inflows, financial development, and economic growth in 20 sub-Saharan African countries from 2000 to 2015. Applying the PMG estimates and vector autoregressive (VAR) techniques, the study revealed a positive long-run and short-run relationship between remittances and human development. Rehman et al. (2021) examined the impact of remittance inflows on private investment in six Western Balkan countries using the GMM methodology from 2000 to 2017. Their findings revealed that remittance inflows positively influenced private investment and improved economic growth in these countries.

Similarly, Islam (2022) examined the association between remittances and economic growth using data for the period 1986-2019, applying a panel of selected Asian economies and employing generalized least squares (GLS) and fully modified ordinary least squares (FMOLS) techniques. The results of this study suggest that remittances are a key factor in improving the economic growth of the countries under study. Imai et al. (2014) investigated the impact of remittances on GDP per capita growth using annual panel data for 24 Asia-Pacific countries from 1980 to 2009. Using the same technique, Chowdhury (2016) assessed the basic Solow growth model by examining the relationship between foreign remittances and financial development for 33 top remittance recipient developing countries from 1979 to 2011. The results indicate that remittances significantly influenced economic growth. The most recent study by Abdulai (2023) examined the impact of remittances on GDP growth in Ghana from 1990 to 2020, utilizing the ARDL estimation technique. The results show a long-run relationship between remittances and several macroeconomic indicators, namely population growth rate, FDI, unemployment rate, inflation, and globalization, with economic growth.

While the above literature shows that the inflow of remittances directly or indirectly promotes the economic growth of recipient countries by improving financial development indicators, several studies have concluded that remittances are negatively linked to or have no effect on economic growth. Using the VAR model, Jushi et al. (2021) examined the relationship among remittances, trade openness, foreign direct investment (FDI), and economic growth in Western Balkan countries. Their results suggested that remittances are insignificant in explaining the variation in economic growth of these countries. Sobiech (2015) examined the effect of remittances on economic growth in a panel of 54 developing countries from 1970 to 2010.

Similarly, Oteng-Abayie et al. (2020) used the ARDL technique to investigate the impact of remittances on economic growth in Ghana's case. Their results revealed that the economic growth of Ghana County is negatively affected by the long-term inflow of remittances. Tchekoumi and Nya (2023) applied panel smooth threshold regression (PSTR) and the Generalized Method of Moments (GMM) to analyze the impact of migrant remittances on economic growth across six African countries in the CEMAC zone from 1990 to 2018. The results show that remittances can affect the economic growth of these countries, depending on their levels of trade openness, political stability, and private investment.

The literature on the impact of remittances on economic growth shows that it not only fails to provide a clear-cut answer on the specific impact of remittances on economic growth but also overlooks the role of average governance indicators and their moderating effect on remittance inflows, which can enhance growth. This study narrows the gap in the previous literature by focusing on Egypt, which has been underrepresented in studies, and by controlling for the role of governance to capture the quality of institutions in Egypt using the ARDL technique. The current study fills this gap in the literature by employing a more sophisticated econometric technique and

including governance quality indicators to evaluate the impact of remittances on economic growth in Egypt. The remainder of this study is organized as follows. Section 2 outlines the methodology and data employed. Section 3 presents the estimation results and offers a discussion of the results. Section 4 concludes.

Methods

Data Source

The study relies on macro-level data from 1996 to 2022, constructed from the World Bank (2024) Database. Firstly, the study employs unit root tests to establish the stationarity of the series using the Augmented Dickey-Fuller (ADF) method (Dickey & Fuller, 1979). It then employs the bound cointegration test to evaluate the series's cointegration after ensuring that no unit roots are present. The bound F-statistic is used to test the null hypothesis of no level cointegration against the alternative of level cointegration. We reject the null hypothesis and accept the alternative that there is a long cointegration between the variables if the calculated F-statistic is greater than the critical value from the F-statistic of the upper bound. We estimate the conditional ARDL long-run model to examine the long-run association among the series. In determining the responsiveness of growth rate to remittances in functional form, the study follows the empirical model of (Bucevska, 2022; Abdulai, 2023) with a modification by adding the role of governance indicators as follows:

$$\mathrm{GDP} = f\ (\mathrm{INF}, \mathrm{POPGRO}, \mathrm{FDI}, \mathrm{REMIT}, \mathrm{GOV.IND}, \mathrm{UNEMP}, \mathrm{TRADE}, \mathrm{ODAA}, \mathrm{GOV.EXP}, \mathrm{INVES}) \quad (1)$$

where REMIT is the remittances received, INF is the inflation rate measured by the consumer price index (CPI), and GOV.IND is the average of six governance indicators to measure the quality of institutions in Egypt; UNEMPT is the unemployment rate. The rest of the variables are defined in Table 1.

Table 1. Variables and their Measurements

Variable	Measurement	Symbol	Unit	Source
GDP growth rate	Annual percentage growth rate of GDP at market prices based on constant local currency (2015 prices)	GDP	Percent	World Bank
Inflation rate	Inflation measured by the percentage change in the consumer price index (CPI).	INF	Percent	World Bank
Population growth rate	The annual population growth rate for year t is the exponential rate of growth of the midyear population from year t-1 to t, expressed as a percentage.	POPGRO	Percent	World Bank
Foreign direct investment	Foreign direct investment is the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This series shows net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors and is divided by GDP	FDI	Percent of GDP	World Bank
Remittances	International migrants' remittances are received as a share of GDP.	REMIT	Percent of GDP	World Bank
Quality of institutions	It is the average of six governance indicators, including government effectiveness, political stability, control of corruption, regulatory quality, voice and accountability, and the rule of law, to measure the quality of institutions in Egypt.	GOV. IND	Estimated	World Bank

Variable	Measurement	Symbol	Unit	Source
Unemployment rate	the share of the labor force that is without work but available for and seeking employment	UNEMP	Percent	World Bank
Trade	Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.	TRADE	Percent of GDP	World Bank
Net official development assistance	Net official development assistance is the disbursement flows. Net official development assistance (ODA) consists of disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies of the members of the Development Assistance Committee (DAC), by multilateral institutions, and by non-DAC countries to promote economic development and welfare in countries and territories in the DAC list of ODA recipients.	ODAA	Percent of GDP	World Bank
Government expenses	Cash payments for operating activities of the government in providing goods and services. It includes compensation of employees (such as wages and salaries), interest and subsidies, grants, social benefits, and other expenses, including rent and dividends.	GOV.EXP	Percent of GDP	World Bank

Model

The linear form of Equation 1 is as follows:

$$GDP_t = a_0 + a1\ INF_t + a_2\ POPGRO_t + a_3\ FDI_t + a_4\ REMIT_t + a_5\ GOV.IND_t + a_6\ UNEMP_t + a_7 TRADE_t + a_8\ ODAA_t + a_9\ GOV.EXP + \varepsilon_t \quad (2)$$

There are several advantages of using the ARDL approach in this study. Firstly, it is more reliable to model a series of different orders to capture the short- and long-run impacts of our interest variables. Secondly, it has an apparent superiority over the conventional or widely utilized cointegration models of the Johansen test (Johansen & Juselius, 1990) and Engle-Granger (Engle & Granger, 1987). More importantly, the advantage lies in its capacity to generate hypotheses about the estimated coefficients in the long run with small samples (Menegaki, 2019) and its approach to endogeneity by incorporating lags into the model (Abdulai, 2023). The ARDL method estimates both short and long-run parameters simultaneously and is specified as follows:

$$\begin{aligned} \Delta\ GDP_t = {} & \beta_0 + \beta_1\ GDP_{t-1} + \beta_2\ INF_{t-1} + \beta_3\ POPGRO_{t-1} + \beta_4\ FDI_{t-1} + \beta_5\ REMIT_{t-1} + \beta_6\ GOV.IND_{t-1} + \beta_7\ UNEMP_{t-1} + \beta_8\ TRADE_{t-1} + \beta_9\ ODAA_{t-1} + \beta_{10}\ GOV._{t-1} + \\ & \sum_{r=1}^{q} \varphi_1\ \Delta\ GDP_{t-r} + \sum_{r=1}^{k} \varphi_2\ \Delta\ INF_{t-r} + \sum_{r=1}^{k} \varphi_3\ \Delta\ POPGRO_{t-r} + \\ & \sum_{r=1}^{k} \varphi_4\ \Delta\ FDI_{t-r} + \sum_{r=1}^{k} \varphi_5\ \Delta\ REMIT_{t-r} + \sum_{r=1}^{q} \varphi_6\ \Delta\ GOV.IND_{t-r} + \\ & \sum_{r=1}^{k} \varphi_7\ \Delta\ UNEMP_{t-r} + \sum_{r=1}^{k} \varphi_8\ \Delta\ TRADE_{t-r} + \sum_{r=1}^{k} \varphi_9\ \Delta\ ODAA_{t-r} + \\ & \sum_{r=1}^{k} \varphi_{10}\ \Delta\ GOV.EXP_{t-r} + \mu_t \end{aligned} \quad (3)$$

In equation (3) Δ is the difference operator, and β0 is the intercept term. At the same time, β1, β2, β3, β4, β5 β6 β7 β8 β9, and β10 represent the coefficients of the long-run relationship between the variables in the model, whereas, φ1, φ2, φ3, φ4, φ5 ,φ6, φ7, φ8, φ9 and φ10 reflect the coefficients of the short run dynamics, q indicate lags of the regressors, and μ t represent the error residuals. The null hypothesis for the bounds testing of our model is that the coefficients of the lag-level variables are zero; hence, there is no cointegration among the included variables.

After revealing a cointegration among variables, both short- and long-run relationships would be specified. Therefore, the short-run coefficients are determined by estimating an error correction model (ECM) as follows:

$$\Delta GDP_t = \sum_{j=1}^{p} \varphi_1 \Delta GDP_{t-j} + \sum_{j=1}^{q} \varphi_2 \Delta INF_{t-j} + \sum_{j=1}^{q} \varphi_3 \Delta POPGRO_{t-j} + \sum_{j=1}^{q} \varphi_4 \Delta FDI_{t-j} + \sum_{j=1}^{q} \varphi_5 \Delta REMIT_{t-j} + \sum_{j=1}^{q} \varphi_6 \Delta GOV.IND_{t-j} + \sum_{j=1}^{q} \varphi_7 \Delta UNEMP_{t-j} + \sum_{j=1}^{q} \varphi_8 \Delta TRADE_{t-j} + \sum_{j=1}^{q} \varphi_9 \Delta ODAA_{t-j} + \sum_{j=1}^{q} \varphi_{10} \Delta GOV.EXP_{t-j} + \Phi ECM_{t-1} + \mu_t \quad (4)$$

Where Φ measures the speed of adjustment toward the long-run equilibrium level and should be significantly negative. In a structural ECM, the long-run equilibrium level is progressively reached by at least one linear combination of variables at a constant adjustment rate (Abdulai, 2023). Diagnostic tests will ensure the model is stable and free of heteroskedasticity and serial correlation.

Results and Discussions

Descriptive Statistics

Table 2 provides a comprehensive descriptive analysis of the distributions of the variables. Notably, it shows that the average value of remittance inflow to Egypt over the study period is 6.39 percent of GDP. Over 25% of Egyptians reside in developed countries (Zohry, 2013).

Over the period under study, the gross domestic product has grown at an average rate of 4.429%, indicating that Egypt's growth rate is quite robust. On average, Egypt received more official development assistance (ODA) (21.452 percent growth) than foreign direct investment (FDI) (2.295 percent growth). Egypt relies heavily on ODAA and needs to do more to incentivize foreign direct investment. Investment recorded the third-highest mean (18.729 as a share of GDP) over the period, suggesting that capital formation and technical progress still account for approximately 19 percent of economic growth. For standard deviation, which measures the variation of the observed variable from its mean, government expenditure (GOV.EXP) and trade openness (TRADE) are the most volatile, while population growth is the most stable. Governance indicators that capture the quality of institutions in Egypt recorded the lowest mean of -3.88 over the studied period. The negative figure may reflect that little has been done to control corruption, improve transparency, and maintain a high level of political stability and the absence of violence.

Table 2. Descriptive Statistics of the Variables

Variables	Observation	Mean	Std. Dev.	Min	Max
GDP	33	4.429	1.579	1.125	7.156
INF	33	9.989	5.882	2.269	29.506
POPGROTH	33	2.085	.213	1.569	2.564
FDI	33	2.295	2.221	-.204	9.348
REMIT	33	6.397	2.756	2.856	14.583
GOV. IND	32	-.6129	.2002	-.9146	-.3109
UNEMP	33	9.904	1.796	6.591	13.154
TRADE	33	46.956	10.752	29.856	71.680
ODAA	32	21.452	.862	18.755	23.001
GOV.EXP	33	10.761	1.571	7.268	12.755

Note: Source: Authors' calculations.
Data Source: World Bank Development Indicators

Figure 2 assesses the trend of remittances and economic growth over the period. It shows that remittances and GDP remained positive and fluctuated stochastically until 2010. Remittances increased slightly throughout the Egyptian Revolution in 2011 despite a significant decline in GDP. Both remittances and GDP growth fluctuated from 2012 to 2016 and increased afterward. Low production and economic growth occurred during this period due to more violent, unstable

government institutions, which created uncertainty. The impact of the COVID-19 pandemic, which has affected psychological well-being and global sustainability, has negatively decreased remittances and economic growth.

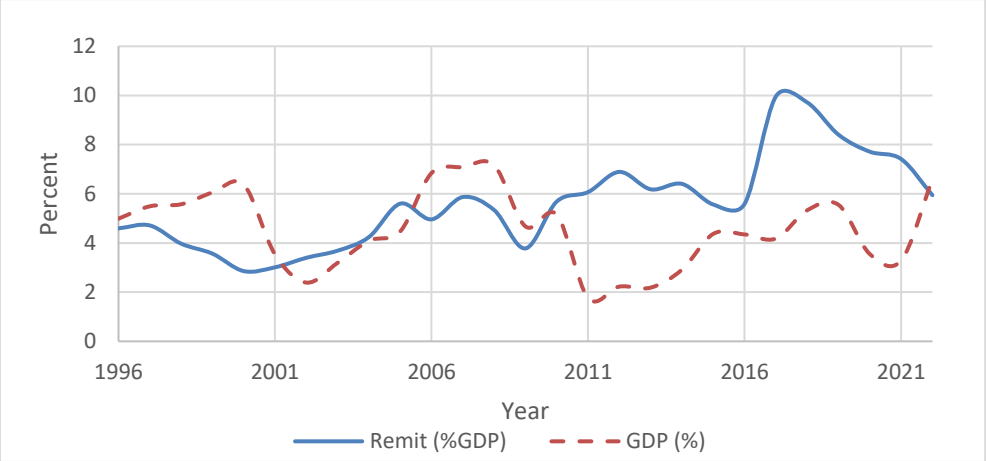

Figure 2. The Trend of Gross Domestic Product and the Receipt of Remittances as % of GDP

Stationarity Test

Conducting a stationarity test is crucial when dealing with time series data, as it allows for the identification and prevention of spurious regressions in the model. Several studies have confirmed that time series are non-stationary, providing spurious results that are unsuitable for forecasting, analysis, or policymaking (Nkoro & Uko, 2016). To test the stationarity of the individual series in the regression model and determine the order of integration of the variables, the Augmented Dicky Fuller (ADF) test is applied for this process.

Table 3 shows the unit root test statistics. It indicates that when the model includes an intercept, none of the variables were stationary at levels, except for inflation and GDP, but they became stationary after first differencing. The ARDL model can be used since none of the model's variables are integrated of order 2 (I(2).

Table 3. Unit Root Test Result (ADF)

Variable	Level Form ADF		First Differenced ADF	
	Intercept	Prob.	Intercept	Prob.
GDP	−3.154	0.023**	5.981	0.000 ***
INF	−3.482	0.016**	−6.153	0.000 ***
POPGRO	2.322	0.975	−3.842	0.008 ***
FDI	−1.701	0.374	−4.421	0.001 ***
REMIT	−0.572	0.285	−5.924	0.000 ***
GOV.IND	−1.326	0.604	−6.210	0.000***
UNEMP	−2.324	0.180	−2.677	0.091*
REMIT_GOV.IND	−2.173	0.220	−3.937	0.005***
TRADE	−2.085	0.280	−5.013	0.000 ***
ODAA	−1.306	0.695	−6.243	0.000 ***
GOV.EXP	−2.589	0.240	−5.974	0.000 ***

Note: Source: Authors' calculations.
*, ** and *** denote significance at 10%, 5% and 1% levels respectively.

Bounds Test for Cointegration

Using the bound cointegration test to determine whether the data-generating process underlying a time series is trend or first-difference stationary, we applied the F-statistic to evaluate the significance of lagged levels of the variables in a univariate equilibrium correction model. The F-

statistic value of 13.250, as presented in Table 4, far exceeds the value of the upper bound, I(1), at a 5% significant level. As a result, we accept the alternative hypothesis and conclude that long-run joint cointegration exists.

The ARDL framework was applied to estimate the long-run coefficients after demonstrating a long-run relationship between gross domestic product (GDP) and the covariates using the bound test for cointegration. Table 4 shows that GDP has a long-run relationship with received remittances (REMIT), Inflation (INF), population growth (POPGRO), foreign direct investment (FDI), governance indicators (GOV.IND), unemployment rate (UNEMP), trade (TRADE), official developmental assistance (ODA), government expenditure (GOV.EXP) and the interaction of governance indicators and remittances (REMIT_GOV.IND). The coefficient on remittances is positive and statistically significant at the 5% level, suggesting that personal remittances positively affect long-run GDP growth. More precisely, a unit increase in remittance inflows increases growth in GDP by 9.28 units, ceteris paribus. The result is expected, as a portion of remittance inflows is used for feeding, and the rest is invested in developmental projects, thereby promoting economic growth.

Table 4. Bound Test Results

F- bounds Test H0: No level relationship				
Test Statistic	Value	Sig	I(0)	I(1)
F-Stat	13.2501	10%	1.91	3.02
K	8	5%	2.29	3.30
		2.50%	2.45	3.4
		1%	2.72	4.0

Source: Authors' calculations.

This result is consistent with those reported of Abdulai (2023), Islam (2022), Adnan et al. (2020), and Oteng-Abayie et al. (2020). It is, however, at variance with the findings of Ustarz & Issahaku (2017) and Sutradhar (2020). Additionally, foreign direct investment (FDI) is generally considered a key driver of economic growth, and our results show a positive relationship between FDI and economic growth. It suggests that, in the long run, FDI contributes to Egypt's economic growth. Foreign direct investment (FDI) is generally considered a key driver of economic growth, and the results in Table 4 indicate that, in the long run, FDI encourages economic growth in Egypt. The positive sign of FDI is consistent with expectations, as FDI inflows have increased significantly in developing countries and generate spillover effects in Egypt through technology transfer and human capital development. This result is in line with that of Sarker & Khan (2020) and Elsadig & Rahim (2023).

Table 5. The long-run effect of Remittance on GDP

Levels Equation Model: ARDL (1,1,2,0,2,2,1,1)			
Variable	Coefficient	Std. Error	Prob.
INF	-0.143	0.197	0. 130
POPGRO	37.251	5.754	0.000
FDI	0.911	0.162	0.000
REMIT	9.285	1.354	0.000
GOV.IND	0.602	0.131	0.000
REMIT_GOV.IND	- 0.819	0.123	0.000
TRADE	0.139	0.021	0.000
ODAA	0.341	0.159	0.051

Source: Authors' calculations.

Table 5 shows that, in the long run, trade openness, which proxies for globalization, exhibits the expected signs and contributes significantly to Egypt's economic growth. The

coefficient associated with trade openness indicated that Egypt's growth rate would increase by 0.139 percentage points for every percentage-point increase in trade volume, holding all other variables constant. All things being equal, population growth has a positive and significant impact on Egypt's long-term economic growth. Although numerous studies have examined these associations, there is a need for greater consensus on how population expansion influences economic growth (Arbia et al., 2023). While some studies demonstrate that robust population growth promotes economic growth (Peterson, 2017), others find evidence to the contrary (Alemu & Zegeye, 2024).

In the long run, official development assistance (ODA) has a positive, high-magnitude coefficient, as expected, suggesting that ODA eventually supports the expansion of Egypt's economy. More precisely, its coefficient indicated that Egypt's growth rate would increase by 0.341 for every percentage-point increase in official development assistance, holding all other variables constant. The outcome shows that inflation appears with a negative sign when introduced into the equation, suggesting that inflation at any level has a negative impact on economic growth. It is neither desired nor expected that inflation will improve Egypt's economic growth, as higher inflation typically does not lead to higher levels of income in the medium to long term, as it does not enhance economic development (Hadush et al., 2023). The unemployment variable is statistically significant in explaining the variation in GDP.

The governance indicators need to be included in the literature on the remittance-growth nexus. The coefficient of governance indicators is positive and statistically significant at the 5% level, indicating that average governance indicators have a positive impact on long-run GDP growth. A one percentage point increase in average governance indicators results in a 0.602 percentage point increase in GDP growth, holding all other variables constant. This finding is congruent with that of Acemoglu & Robinson (2012) and Han et al. (2014). Several studies also argued that remittances vary substantially across countries and regulatory environments (Authors & Leatherby, 2019). We therefore included the interaction term to capture the threshold of the average governance indicator level that can support remittances and have a beneficial influence on economic growth. The interaction term (REMIT_GOV.IND) adversely impacted growth in the long run, suggesting that increases in remittance inflows will continue leading to a decline in growth rate if estimated average governance indicators in Egypt remain within a threshold of 20%[2], holding all other variables constant.

Short-run Dynamics

The long-run, short-run, and error-correction term (ECT), which measures the rate of adjustment necessary to return to equilibrium following a disruption, are the three parts of the ARDL. As shown in Table 6 (CointEq), the ETC is statistically significant at the 1% level and exhibits the predicted negative sign. This result supports the bound test's earlier finding of a long-term link between the variables. The ETC proposes that GDP growth variations (i.e., growth above or below the equilibrium level) be adjusted at a rate of 1.491 units per year to maintain long-run convergence to equilibrium. According to short-term projections, remittances have a positive and considerable impact on GDP growth. However, the GDP growth is adversely and considerably affected by its one-lag time.

Table 6 indicates that, in the short term, trade and foreign direct investment have a positive and significant impact on GDP growth. Foreign direct investment (FDI) and official development assistance (ODA) have a positive and significant impact on GDP growth during their one-lag period. The interaction term between remittances and estimated average government indicators has a negative short-term impact on GDP growth. It implies that increased remittance inflows will sustain higher growth rates as long as Egypt's average government indicators remain above a threshold of 8.57%, all else equal.

[2] This figure is calculated using a threshold model established by Hansen (1999) and extended by Alfada (2023).

Table 6. Short-Run Remittance impact on GDP growth

ARDL Error Correction Regression Model: ARDL (1,1,2,0,2,2,1,1) Case 3: No Trend with Unrestricted Constant			
Variable	Coefficient	Std. Error	Prob.
C	-419.063	24.399	0.000
D(REMIT)	7.842	0.5243	0.000
D(REMIT(−1))	-2.233	0.212	0.001
D(FDI)	0.903	0.084	0.000
D(FDI(−1))	-1.191	0.145	0.000
D(REMIT_GOV.IND)	-1.891	0.061	0.000
D(POPT GROWTH)	120.411	11.545	0.000
D(POP GROW(−1))	-60.221	9.222	0.000
D(TRADE)	0.021	0.007	0.022
D(ODA)	0.815	0.079	0.000
D(INFLATION)	-0.081	0.122	0.013
D(INFLATION(−1))	-0.121	0.010	0.000
D(GOV.EXP)	0.772	0.021	0.000
CointEq(−1)*	-1.491	0.101	0.000
R-squared	0.949		
S.E. of regression	0.580		
Log-likelihood	-16.910		
Schwarz criterion	2.680		
F-statistic	42.248		
Prob(F-statistic)	0.000		

Note: Source: Estimation from data.

Residual and Diagnosis Test

Several diagnostic tests are conducted in this study to check the model's goodness-of-fit and the validity of the assumptions. The Jarque-Bera test, the Breusch-Godfrey serial correlation Lagrange multiplier (LM) test, and the Breusch-Pagan residual test are used to test for serial correlation, heteroscedasticity, and normality, respectively, to assess the stability and reliability of the estimated models used in this study. Since the probability value of the F-statistic is greater than the significance level of 5%, the findings in Table 7 show that the data have a normal distribution and that the model does not suffer from the heteroskedasticity issue.

Table 7. Results of Residual and Stability Tests

Method	**F- Statistic**	**Prob.**
Serial Correlation	29.622	Prob. F(2,6) = 0.001
Heteroscedasticity	11.842	Prob. F(20,8) = 0.446
Normality (Jarque-Bera)	1.390	0.520, Normal

Source: Estimation from data.

In the context of remittances and economic growth in Egypt, this paper provides valuable insights into the economic influence of remittance flows on economic growth from 1996 to 2022. The empirical results of the augmented ARDL bounds testing approach to cointegration suggested a long-run relationship between GDP and remittances received in Egypt. The rising flow of remittances into Egypt's economy supports its GDP growth in the long and short run. This result is consistent with those reported of Abdulai (2023), Islam (2022), Adnan et al. (2020), Oteng-Abayie et al. (2020), and Imai et al. (2014). It is, however, at variance with the findings of Ustarz & Issahaku (2017) and Sutradhar (2020).

Since most emerging economies rely on FDI to fuel economic expansion, the FDI coefficient was significant in both runs, as shown in previous results. Globalization, as proxied by trade openness, plays a significant role in determining economic growth in Egypt in both the short-

and long-run. These results support the idea that countries are embracing free trade to become more integrated, achieving quicker economic growth through the inflow of technology, goods, and services (Islam, 2022; Alamoudi, 2024). The result demonstrates that inflation enters the equation with a negative sign, indicating that, regardless of its magnitude, inflation negatively impacts economic growth. Since rising inflation does not raise income levels over the medium and long term and does not promote economic development, it is neither desired nor expected that inflation will accelerate Egypt's economic growth (Mohamed & Abdi, 2024).

The significant finding of this paper is that including governance indicators in the remittance-growth nexus. The significant impact of governance indicators suggests that, on average, they positively affect GDP growth in the long run, a result consistent with that of Acemoglu and Robinson (2012) and Han et al. (2014). Several studies also argue that remittances vary substantially across countries and regulatory environments (see Authors & Leatherby, 2019). It suggests that a high average of World Governance Indicators (WGIs) is necessary for Egypt to gain from remittances and accelerate its economic growth. Stated differently, Egypt may enhance its economic growth through remittance inflow only to the extent that its government maintains stability in governance metrics. Therefore, the analysis is based on the premise that, as long as Egypt remains above the average governance indicator threshold, remittance inflows can be highly beneficial in promoting sustained economic growth.

This finding underscores the crucial role of effective government indicators in driving economic growth. Countries with more robust governance indicators tend to achieve higher levels of economic growth, a finding that aligns with previous studies emphasizing the importance of governance in development. To further deepen our understanding, we have examined the threshold of the average governance indicators level that can support remittances to benefit economic growth. In doing so, we have included the interaction term between remittances and average governance indicators (REMIT_GOV.IND). The results indicate that increases in remittance inflows will continue to lower the growth rate if estimated average governance indicators in Egypt remain within a threshold of 20% threshold, holding all other variables constant. This result, along with several studies, suggests a nonlinear relationship between a country's institutional quality and economic growth. Dokas et al. (2023) have identified a corruption threshold beyond which the effect of corruption on economic growth shifts from positive to negative.

Additionally, Alfada (2023) finds that Indonesian provinces with low corruption levels experience economic growth when the number of corruption cases is below the corruption threshold. However, when it reaches a threshold, it impedes economic progress in provinces with high levels of corruption. Therefore, the impact of remittances and other macroeconomic variables varies across countries, depending on their quality of governance indicators.

Conclusion

This study offers comprehensive insights into the relationships among remittances, governance indicators, trade, foreign direct investment (FDI), and inflation and their effects on Egypt's economic growth from 1996 to 2022. The findings reveal a long-term positive relationship between remittances and GDP growth, with remittances acting as a catalyst for both short-term and long-term growth in Egypt. Foreign direct investment (FDI) and trade openness increasingly support economic expansion, while inflation consistently hampers growth prospects, underscoring the importance of price stability for sustainable development. Importantly, the interaction between remittances and governance quality highlights that effective governance not only strengthens the positive impact of remittances on growth but also mitigates the adverse impact of poor institutional quality. Furthermore, threshold analysis indicates that when governance indicators fall below a certain level, remittance inflows do not contribute to economic growth, suggesting that governance's impact on economic performance is nonlinear.

The results provide several important policy implications. First, improving governance by strengthening transparency and accountability and combating corruption is critical to maximizing the economic benefits of remittances. Improving institutional quality to meet and exceed

governance indicator thresholds can create a more conducive environment for economic growth by attracting remittances and ensuring their productive use. Second, policies to stabilize inflation must remain a priority, because inflation always hinders economic growth. Third, encouraging trade openness and maintaining FDI inflows is necessary to promote technology transfer and support sustainable growth. Finally, policymakers must be aware of the context-specific nature of macroeconomic variables and governance indicators so that they can effectively adapt governance reforms to support remittance inflows. Overall, these strategies can strengthen Egypt's economic resilience and increase remittance flows, thereby achieving long-term prosperity.

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