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Remittances and financial development as determinants of economic growth: Evidence from MENA and ASEAN using a SUR approach

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ABSTRACT

This study investigates the interaction between remittances and financial development in promoting economic growth in MENA and ASEAN middle-income economies during 2000–2021. The purpose of the research is to better understand whether remittances complement or substitute domestic financial systems in these regions, where migrant inflows and structural financial constraints coexist. The Seemingly Unrelated Regression (SUR) approach is employed to account for cross-country error correlations and shared macroeconomic shocks. According to our findings, there is a substitute relationship between remittances and financial development in terms of fostering economic growth, implying that local financial sectors make inefficient use of remittances, as investors seek external financial resources when their financial sectors are dysfunctional. Furthermore, the global economic shocks have had a significant negative impact on economic growth, as has the trade deficit. In addition, robustness tests incorporating additional major remittance-receiving countries Bangladesh, China, India, Mexico, and Pakistan confirm the consistency and stability of the findings. The implications of these results highlight the need for policymakers to strengthen financial institutions, enhance financial inclusion, and improve the efficiency of domestic credit markets so that remittances can shift from acting as short-term substitutes for financial development toward serving as long-term complements that support more sustainable economic growth.

Contribution/ Originality: Employing the SUR framework, this study identifies a strong substitution effect, provides an economic interpretation of its marginal magnitude, and validates the findings through robustness tests using extended samples. It fills a gap in the literature, as few empirical studies have jointly examined the MENA and ASEAN regions to investigate the interaction between remittances and financial depth.

1. INTRODUCTION

1.1. Background

Remittances to low- and middle-income countries (LMICs) reached 647 billion dollars in 2022 (World Bank, 2022), making them the primary source of external finance. The United Nations Department of Economic and Social Affairs (UN DESA) reports that the origin of migrant stock from middle-income countries (MICs) accounted for 63 percent of the global migrant stock in 2020, indicating that a significant portion of expatriate capital is sent back to these countries rather than through foreign direct investment. Since the majority of migrant remittances originate from the international migrant stock, regions such as the Middle East and North Africa (MENA) and the Association of Southeast Asian Nations (ASEAN) contribute substantially to the global MICs population in 2020—

24 percent, with 10.1 percent from MENA and 13.9 percent from ASEAN, according to the International Migrant Stock 2020: Destination and Origin by the United Nations (United Nations Department of Economic and Social Affairs (UN DESA), 2021). In particular, the Philippines alone accounts for slightly more than two percent of MICs. Additionally, from 2000 to 2020, the average growth of the stock of international migrants increased by nearly twice in these two regions (Table 1). Given that the remittances from international labor forces are transferred back to their home countries, they might play an important role in economic growth. Reflecting this macroeconomic importance, growing evidence highlights the positive link between remittances and growth across developing economies, including Asia and MENA (Ben Mim & Ben Ali, 2012; Cazachevici, Havranek, & Horvath, 2020; Piteli, Despina, & Matsi, 2019).

Table 1. Origins of migrant stocks in MICs of the MENA and ASEAN, 2020.

Region	Countries	2000 (in thousand)	2020 (in thousand)	Percentage of total MICs in 2020	Growth (2000-2020)
MENA	Egypt	603	1,269	0.94%	110%
	Iran	375	616	0.46%	65%
	Iraq	359	1,040	0.77%	190%
	Algeria	458	937	0.69%	105%
	Morocco	943	1,555	1.15%	65%
	Libya	37	84	0.06%	126%
	Jordan	142	298	0.22%	110%
	Tunisia	205	400	0.30%	95%
	Lebanon	243	350	0.26%	44%
	Palestine	1,367	1,911	1.42%	40%
ASEAN	Indonesia	1,071	2,041	1.51%	91%
	Thailand	334	664	0.49%	99%
	Vietnam	1,056	1,705	1.26%	61%
	Malaysia	661	1,055	0.78%	59%
	Philippines	1,755	3,289	2.44%	87%
	Myanmar	568	1,388	1.03%	144%
	Cambodia	236	592	0.44%	151%
	Laos	332	725	0.54%	119%

Source: United Nations Department of Economic and Social Affairs (UN DESA), International Migrant Stock 2020 Database.

Observing samples from 2000 to 2021, this study incorporates eleven samples of MICs as follows, after excluding those countries that have seriously missed the statistical database. Jordan, Egypt, Morocco, Tunisia, Algeria (total five MENA samples), and Malaysia, Thailand, Indonesia, Vietnam, Philippines, and Cambodia (total six ASEAN samples). In MENA, despite the fact that there are four countries missing from the sample in terms of data unavailable, the examples left could well capture the overall situation of this region (Figure 1). For instance, Tunisia and Jordan effectively illustrate the low-stage economy, while Algeria and Morocco represent the middle-stage, and Egypt the high-stage. A similar pattern is observed in the ASEAN area (Figure 2), when the observed countries include various stages of gross domestic production (GDP).

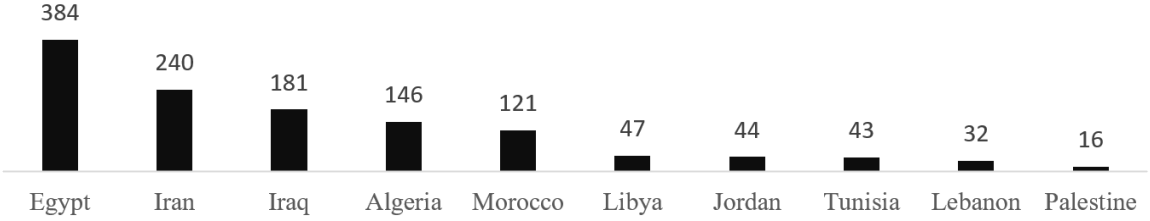

Figure 1. GDP of MICs in MENA (in billion dollars) 2021.

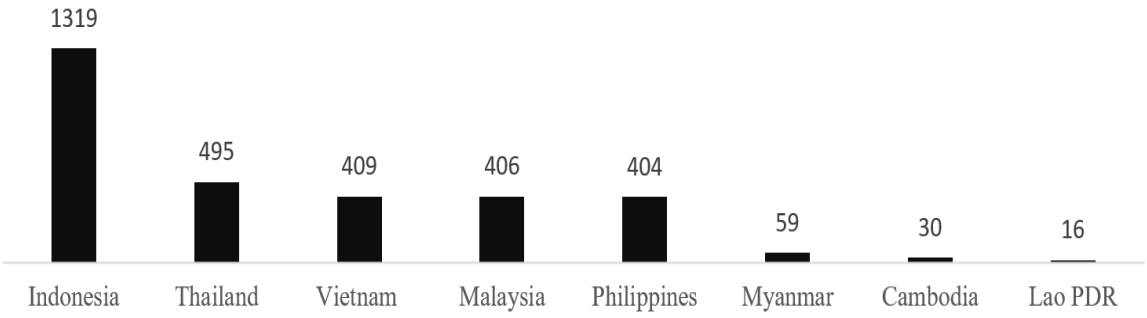

Figure 2. GDP of MICs in ASEAN (in billion dollars) 2021.

Source: World Development Indicators (WDI), World Bank.

As expected, migrant remittances, or the inflow of remittances, increase proportionally to the origins of the stock movement of migrants (Figures 3 and 4). Remittance inflows were projected to reach approximately US $70 billion in ASEAN and US $56 billion in MENA in 2020 (World Bank, 2022). During the global financial crisis (2009), the Eurozone debt crisis (2011), and the COVID-19 pandemic (2020), GDP growth in both regions stalled. However, MENA's domestic credit to the private sector showed more volatility than ASEAN's, indicating comparatively less stability in MENA's financial systems. Two lines of thought follow from these observations. First, GDP growth might somewhat keep up with the increase in remittance inflows into recipient nations, but this needs to be confirmed by adding more macroeconomic controls. Second, Figures 3 and 4 indicate that financial resources are still allocated inadequately in both regions, reflecting the persistence of relatively weak financial development.

Accordingly, the central question is whether local financial sectors are capable of effectively channeling remittance inflows to the private sector, thereby fostering economic performance an especially salient issue given the relatively weak financial development observed in both MENA and ASEAN. To this end, the interaction between financial development and remittances comes to light. Mathematically, this interaction is defined as the product of financial development and remittances.

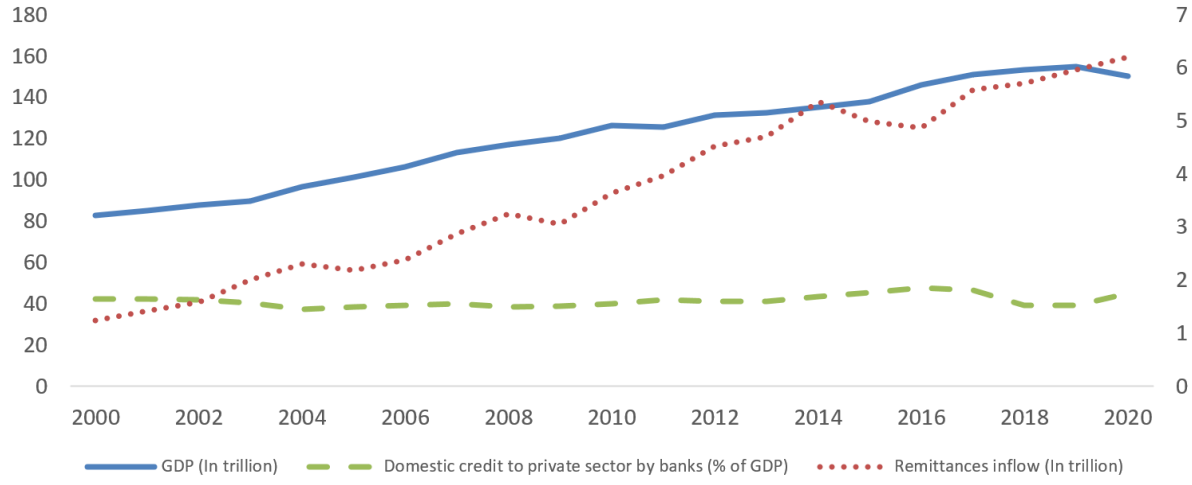

Figure 3. MICs of MENA 2000-2020.

Note: MICs of MENA include Algeria, Egypt, Iraq, Jordan, Morocco, Tunisia, Iran, Lebanon, Libya and Palestine, secondary axis for remittances inflow.
Source: World Development Indicators (WDI), World Bank.

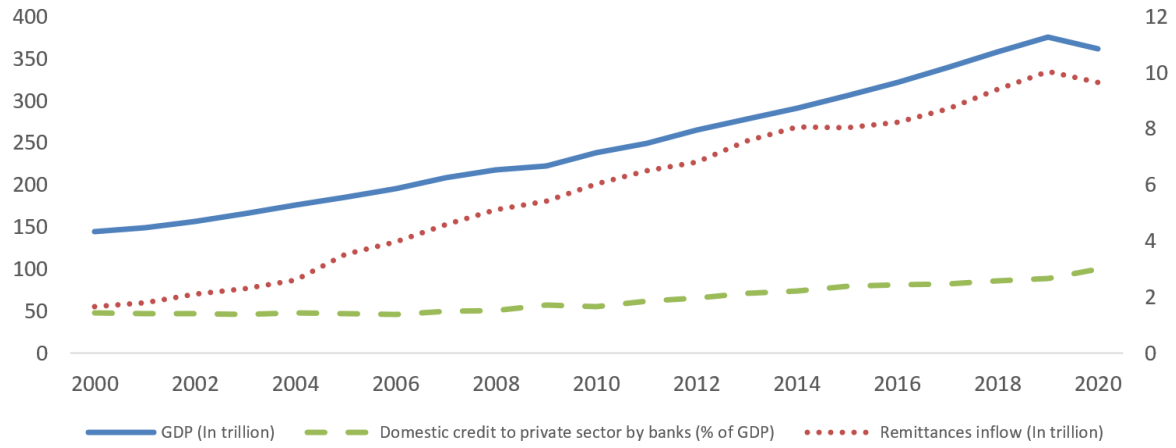

Figure 4. MICs of ASEAN 2000-2020.

Note: MICS of ASEAN includes Cambodia, Indonesia, Laos, Malaysia, Philippines, Thailand, and Viet Nam; secondary axis for remittances inflow.
Source: World Development Indicators (WDI), World Bank.

With a positive coefficient indicating a complementary relationship between financial development and remittances; on the contrary, if it has a negative relationship, it means that financial development and remittances affect economic growth in opposite directions—one positively and the other negatively—with a negative coefficient suggesting a substitute relationship between financial development and remittances.

When trying to mirror the circumstances of MENA and ASEAN, we concentrate on three factors. On the one hand, there are three main economic shocks: the immediate effects of both Black Monday (2011) and COVID-19 (2020), as well as that of the 2009 Financial Crisis. Clearly, the shocks had a significant effect, since most countries in these two regions experienced unfavorable growth and economic distress (Fîrţescu, 2012; Gurtner, 2010; Hevia & Neumeyer, 2020). On the other hand, the trade balance, the difference between exports and imports of goods and services, is taken into account. A financial sector would face additional challenges that could impede its growth due to currency depreciation and inadequate allocation, even though a trade deficit might increase some investment opportunities (Aung, 2017; Moyo & Garidzirai, 2022). Conversely, a trade surplus typically promotes growth (Ben Mim & Ben Ali, 2012; Moyo & Garidzirai, 2022). Finally, there may be a substitutive relationship between financial development and remittances. To put it another way, a weak financial system encourages more households to seek outside funding for manufacturing activities, while remittances are more dependable and economical (Giuliano & Ruiz-Arranz, 2009; Sobiech, 2019). Remittances, the third factor, could support economic growth if they immediately improve the distribution of funds toward more projects that promote growth (Bettin & Zazzaro, 2012; Cooray, 2012).

The substitutability hypothesis is supported by the SUR analysis, which shows that the interaction term between financial development and remittances has a negative impact on growth. The trade balance is shown to be one of the key factors in determining growth, highlighting how long-standing external imbalances influence macroeconomic performance in MENA and ASEAN. Furthermore, the mentioned economic shocks increased the degree burden of growth in both observation areas. These findings remain robust after controlling for standard macroeconomic determinants in both MENA and ASEAN.

1.2. Research Motivation and Objectives

Despite a rapidly expanding literature on remittances, financial development, and growth, MENA and ASEAN remain under-examined. These regions receive large remittance inflows yet face structural financial constraints, making them ideal contexts to reassess whether remittances act as substitutes for or complements to domestic finance.

The interactive effect between financial development and remittances has garnered interest among many academics, particularly in developing countries; North Africa (Abida & Sghaier, 2014), Latin America and the Caribbean (Ramirez, 2013), and transitioning countries (Cao & Kang, 2020). There are few studies on the MENA and ASEAN regions, despite their attractiveness and importance, as well as the large magnitude of remittance inflows, particularly in Egypt, the Philippines, and Indonesia. According to a Jordanian economist, Yaseen and Omet (2021) suggest that there is a stable long-run relationship between credit to individuals and remittances, and between credit to the construction sector and remittances. Al-Assaf and Al-Malki (2014) confirm that remittances are most likely influenced by external factors rather than internal factors.

By addressing the impact of remittances on growth from some new angles, this paper aims to close a gap in the literature on the macroeconomic effects of remittances. Particularly, we mainly focus on the MICs from both the MENA and ASEAN regions, which contribute substantial labor forces abroad (Pissarides & Véganzonès-Varoudakis, 2006).

Against this background, the paper pursues the following objectives: (i) to test whether remittances and financial development operate as substitutes or complements in MENA and ASEAN middle-income economies; (ii) to quantify the conditioning roles of trade balance and global shocks in this relationship; and (iii) to derive policy implications for strengthening financial institutions and financial inclusion so that remittances can transition from short-term substitutes into long-term complements to domestic finance.

1.3. Research Questions and Hypothesis

This paper mainly raises the following questions: How does financial development (FD) have an intermediate effect on remittances and GDP growth in the MENA and Asia regions? What are some factors influencing GDP growth in the MENA and Asian regions? To answer these questions, the study examined a sample of financial sectors from the MENA and ASEAN regions. Based on the theoretical contribution of financial development, this paper examines some determinants of GDP growth, including inflation, the trade balance, and foreign direct investment. Therefore, the main hypothesis of this research is as follows.

H0: There is a substitute relationship between the FD and remittance inflows in boosting GDP growth.

Ha: There is a complementary relationship between the FD and remittance inflows in boosting GDP growth.

1.4. Novelty and Contribution

The study compares the dynamic characteristics of the MENA and ASEAN regions under a unified empirical framework, providing new insights into the remittances–growth relationship in these economies. By incorporating an interaction term between remittances and financial development, it identifies the joint effect of the two factors and quantifies the marginal impact of remittances across different stages of financial maturity. In doing so, the study advances the debate on whether remittances act as a substitute for, or a complement to, formal financial systems in emerging markets.

As mentioned in the introduction, there are financially diverse economies and shared economic shocks in the MENA and ASEAN regions. The application of the SUR method enhances both the robustness and policy relevance of the findings, providing explanatory evidence for understanding the joint influence of remittances and financial development.

2. LITERATURE REVIEW

2.1. Remittances and Growth Channels

Theoretically, there are several channels for remittances to boost economic growth: alleviating liquidity constraints, supporting household investments, stabilizing consumption, and promoting the accumulation of human capital (Giuliano & Ruiz-Arranz, 2009; Meyer & Shera, 2017; Rao & Hassan, 2012). However, the effectiveness of

these channels is shaped by financial and institutional settings, leading to inconclusive empirical findings across countries (Cazachevici et al., 2020).

In regions with limited financial depth, remittances may primarily support household consumption and informal investment (Giuliano & Ruiz-Arranz, 2009). By contrast, in economies with stronger financial systems, remittances are more likely to be channeled into productive sectors through formal financial intermediaries (Bettin & Zazzaro, 2012). This duality is reflected in empirical work in developing regions. For instance, in ASEAN economies, remittances are correlated with a higher saving rate and individual investments (Malarvizhi, Zainal, & Samudhram, 2019). However, in some countries of the MENA region, economic growth is hindered by poor governance and underdeveloped financial systems (Ait Benhamou & Cassin, 2021; Ben Mim & Ben Ali, 2012). Taken together, these contrasting outcomes highlight the need to contextualize the macroeconomic effects of remittances within financial and institutional structures.

2.2. Financial Development and Contextual Factors

Financial development plays a central role in economic growth by mobilizing savings, reducing transaction costs, and improving the allocation of capital (Acaravci, Ozturk, & Acaravci, 2009; Levine, 2005). However, a notable discrepancy exists between the MENA and ASEAN regions in terms of the pace and depth of financial development. Specifically, financial deepening has facilitated industrial diversification and private investment in ASEAN (Malarvizhi et al., 2019), whereas persistent structural rigidities and limited competition continue to constrain credit availability in MENA (Ersel & Kandil, 2006). Recent evidence further enriches this discussion. Yaseen and Omet (2021) show that in Jordan, remittances indirectly promote financial development by stimulating household and construction-sector credit rather than aggregate private lending. Ali Bare, Bani, Ismail, and Rosland (2022) and Odhiambo (2024) confirm that remittances enhance financial development in Sub-Saharan Africa, though the effect weakens as banking systems deepen. Khan (2024) finds a nonlinear link between remittances and financial inclusion, while Topxhiu and Krasniqi (2025) report that remittances substitute for finance in shallow systems but complement it in deeper ones. Periola and Salami (2024) also note the heterogeneous effects of remittance outflows under different levels of financial maturity.

Aside from financial depth, the stability of macroeconomic conditions, such as trade balance and inflation, also influences the growth effects of remittances. A favorable trade balance is instrumental in enhancing external liquidity and maintaining exchange rate stability (Moyo & Garidzirai, 2022), whereas moderate inflation may accompany real growth during transitional stages of financial development (Ghosh & Phillips, 1998; Mallik & Chowdhury, 2001). Therefore, understanding the remittance–finance–growth linkage requires an analytical framework that incorporates both financial and broader macroeconomic dimensions.

2.3. Evolving Empirical Perspectives and Rationale for SUR

Recent studies increasingly emphasize that the growth-enhancing effect of remittances evolves with financial maturity rather than following a universal pattern. Remittances exhibit heterogeneous performance across countries contributing positively to growth in economies with low financial depth but showing weaker or even neutral effects in financially more advanced contexts (Nyamongo, Misati, Kipyegon, & Ndirangu, 2012; Ofori, Boateng, & Oppong, 2023). Therefore, pooled or fixed-effects estimators may fail to adequately capture the heterogeneity arising from structural and institutional differences.

Moreover, contemporaneous error correlations may arise across national equations when MENA and ASEAN economies are exposed to common external shocks such as the global financial crisis (2009), the Eurozone debt crisis (2011), and the COVID-19 pandemic (2020). If such interdependencies are ignored, the estimation results may become biased and inconsistent. The SUR model allows for country-specific heterogeneity while explicitly accounting for correlated disturbances across equations (Zellner, 1962). This approach can therefore address

heteroscedasticity and cross-equation error correlation, providing a more reliable basis for examining how remittances and financial development interact in shaping economic performance.

3. RESEARCH METHODOLOGY

3.1. Data and Variables

We do not include informal remittances in our definition of remittances, since there are no available data for them. Nevertheless, one can anticipate that the actual amount of remittance inflows is significantly larger because, as per Ratha (2003), a significant percentage of remittances are informal and are estimated to be between 10 and 50 percent of formal remittances. Moreover, remittances, in the opinion of Giuliano and Ruiz-Arranz (2009), spur economic growth in nations with less advanced financial systems. Consequently, if remittances are productive during times when the financial system is dysfunctional, the effect of unrecorded remittances on growth ought to be amplified even further.

This study investigates the impact of remittances on economic growth by constructing annual panel data from MICs in the MENA and ASEAN regions from 2000 to 2021, using datasets from the World Bank (2025).

The GDP growth (as an annual percentage) is used as a dependent variable to reflect economic performance. Independent variables include various dimensions of economic situations. First, we use the ratio of domestic credit to the private sector by banks (as a percentage of GDP) as a proxy for financial development. Furthermore, a higher ratio accurately depicts the overall image of financial sector efficiency, as lower external financing costs contribute to liquidity, which may attract more investment, thereby boosting growth; and vice versa. Second, we include some economic indicators, such as the balance of trade and the inflation rate (a proxy for macroeconomic stability). External financial indicators include personal remittances and foreign direct investment (FDI). Finally, to replicate the reality of our observation samples, we created two dummy variables to differentiate the impact. To begin with, the economic crisis shocks (2009, 2011, and 2020) are meant to reflect the relationship between our samples and global economics. In addition, the area dummy attempts to differentiate the performance of these two regions. Table 2 presents the list of variables used in the analysis along with their definitions and data sources.

Table 2. List of variables and sources for analysis.

Variables	Description	Sources
GDP	GDP growth (annual %)	WDI
LAGGDP	One-period lag of GDP growth (annual %)	WDI
STRIKE	Economic crisis strike dummy, *equals 1 for 2009, 2011, and 2020, and 0 otherwise.*	-
AREA	The area of MENA or ASEAN dummy, *value equals 2 if in MENA, otherwise 0.*	-
FD	Domestic credit to the private sector by banks (% of GDP), a proxy for financial development.	WDI
REMITTANCES	Personal remittances received (% of GDP),	WDI
BOT	(Exports – Imports) of goods and services (% of GDP)	WDI
FDI	Foreign direct investment, net inflows (% of GDP)	WDI
INFLATION	Inflation, consumer prices (Annual %)	WDI
REFD	Interaction term = REMITTANCES × FD.	WDI

Table 3. List of MICs from MENA and ASEAN.

Region	Country
MENA	Algeria, Egypt, Jordan, Morocco, Tunisia, Iraq*, Lebanon*, Libya*, Palestine*
ASEAN	Cambodia, Indonesia, Malaysia, Philippines, Thailand, Vietnam, Laos*

Note: * Indicates the countries that are excluded from the analysis due to data availability issues.
Source: World Bank.

Table 3 presents a list of MICs belonging to the MENA and ASEAN regions. After evaluating data completeness for the years 2000–2021, eleven MICs were selected for empirical analysis. The MENA sample includes Algeria, Egypt, Jordan, Morocco, and Tunisia, while the ASEAN sample comprises Cambodia, Indonesia, Malaysia, the Philippines, Thailand, and Vietnam. Countries with significant data gaps or structural breaks in their time-series data were excluded to ensure a balanced panel structure.

3.2. Seemingly Unrelated Regression Method Applying

Given the cross-country nature of the data and the presence of possible heteroscedasticity and contemporaneous correlation among countries, this study applies the Seemingly Unrelated Regression (SUR) method estimated via panel EGLS. The SUR framework enhances efficiency by accounting for correlated disturbances and cross-sectional heterogeneity (Zellner, 1962). Furthermore, we divided the estimation into two stages.

At the initial stage, the direct effects of financial development and remittances on economic growth are estimated as follows.

$$GDP_{i,t} = \alpha_0 + \alpha_1 GDP_{i.t-1} + \alpha_2 DUMMY_{i,t} + \alpha_3 FD_{i,t} + \alpha_4 REM_{i,t} + \alpha_5 X_{i,t} + \varepsilon_{i,t} \quad (1)$$

At the second stage, the interaction term between remittances and financial development is introduced to capture the substitution or complementarity effects.

$$GDP_{i,t} = \alpha_0 + \alpha_1 GDP_{i.t-1} + \alpha_2 DUMMY_{i,t} + \alpha_3 FD_{i,t} + \alpha_4 REM_{i,t} + \alpha_5 X_{i,t} + \alpha_6 REFD_{i,t} + \varepsilon_{i,t} \quad (2)$$

Where $GDP_{i.t}$ represents the annual GDP growth rate (in percentage) of country i at time t, and $X_{i,t}$ is the matrix of control variables, including FD, BOT, FDI, INFLATION and REFD. $\varepsilon_{i,t}$ suggests the stochastic error term. The specification of $DUMMY_{i,t}$ as following:

STRIKE = 1, if estimated period in 2009, 2011 or 2020, otherwise, 0.

AREA = 2, if estimated countries from MENA, otherwise, 0.

A positive coefficient of the interaction term indicates complementarity, meaning that remittances and financial systems reinforce each other. Conversely, a negative coefficient suggests substitution, where remittances offset the weaknesses of financial systems.

3.3. Descriptive Statistics

Table 4 presents a significant difference across observed samples, indicating that MICs in the MENA and ASEAN regions exhibit macroeconomic and financial structural heteroscedasticity. It is evident that the widest dispersion exists between FD and BOT, suggesting differing levels of credit accessibility and external openness between the two regions (Ersel & Kandil, 2006; Malarvizhi et al., 2019).

Table 4. Descriptive data.

Variables	LAGGDP	FD	REMITTANCES	BOT	FDI	INFLATION	REFD
Mean	4.45	59.77	5.09	4.27	3.59	4.30	3.02
Median	4.88	54.66	4.41	-0.45	2.55	3.32	2.25
Maximum	13.25	166.26	22.41	69.89	23.54	29.51	17.79
Minimum	-9.52	5.99	0.06	-41.50	-1.86	-1.24	0.01
Std. Dev.	3.02	34.76	4.67	19.94	3.49	4.11	3.57
Number of countries	11	11	11	11	11	11	11

Source: Calculation based on annual data (2000–2021) from the World Development Indicators (World Bank, 2022).

The positive average growth rate of LAGGDP indicates an overall expansion across the samples from 2000 to 2021, whereas episodes of contraction associated with regional economic crises are reflected in the negative minimum value. Notably, remittances, averaging five percent of GDP, underscore their macroeconomic significance as a stable external inflow (Cazachevici et al., 2020; World Bank, 2022). In addition, the coefficient of variation in

remittances is approximately 0.92 (i.e., 4.67 / 5.09), indicating that the standard deviation is nearly equal to its mean. This substantial relative dispersion reflects considerable cross-country heterogeneity, which is consistent with differences in labor-migration intensity and institutional absorptive capacity. The volatility in foreign direct investment (FDI) and inflation may reflect variations in investment conditions and policy frameworks. Moreover, the moderate variability in the interaction term (REFD) suggests cross-country differences in how remittance inflows are mediated through formal financial channels.

Therefore, the heteroscedasticity across units and the possibility of common external shocks provide empirical justification for adopting the SUR framework.

3.4. Estimated Results and Robustness

3.4.1. Main Estimation Results

The SUR estimated results are reported in Table 5. In Model 1, both remittances and financial development exert positive and statistically significant effects on growth; a one-percentage-point increase in remittances raises GDP growth by 0.079 percentage points, while a one-percentage-point increase in financial development raises GDP growth by 0.009 percentage points. In Model 2, the negative and significant coefficient of REFD indicates that the growth effect of remittances diminishes as financial systems deepen. When financial depth increases by one standard deviation, the marginal effect of remittances decreases by approximately 0.610 percentage points, suggesting that remittances are more growth-enhancing in financially shallow economies. This pattern supports the substitution hypothesis, whereby remittances substitute for formal credit when domestic financial intermediation is limited. The SUR estimator yields higher explanatory power than OLS, with R-squared increasing from 0.307 to 0.443 in Model 1 and from 0.396 to 0.547 in Model 2, confirming the presence of cross-sectional error dependence and the efficiency gains from using SUR. The improvement in model fit under the SUR estimator further confirms cross-sectional error dependence and justifies the use of the SUR method.

Table 5. Estimated results.

Variables	Model (1)		Model (2)	
	OLS	**SUR**	**OLS**	**SUR**
LAGGDP	0.384*** (0.055)	0.410*** (0.055)	0.284*** (0.055)	0.318*** (0.056)
STRIKE	-3.856*** (0.482)	-2.414*** (0.515)	-3.748*** (0.451)	-2.381*** (0.537)
AREA	0.003 (0.172)	0.001 (0.122)	-0.009 (0.160)	-0.126 (0.113)
FD	0.013*** (0.004)	0.009*** (0.003)	0.021*** (0.004)	0.018*** (0.003)
REMITTANCES	0.131*** (0.048)	0.079*** (0.024)	0.494*** (0.078)	0.437*** (0.056)
BOT	0.028*** (0.011)	0.017* (0.009)	0.017* (0.010)	0.015* (0.008)
FDI	0.145** (0.062)	0.185*** (0.041)	0.336*** (0.067)	0.294*** (0.041)
INFLATION	0.179*** (0.040)	0.139*** (0.023)	0.112*** (0.039)	0.085*** (0.023)
REFD			-0.687*** (0.120)	-0.610*** (0.083)
R-squared	0.307	0.443	0.396	0.547
Adjusted R-squared	0.285	0.425	0.374	0.531
Durbin-Watson statistic	1.915	2.035	1.875	2.063

Note: (1) Standard errors in parentheses.
(2) * p<0.10, ** p<0.05, *** p<0.01.
(3) SUR estimated with cross-section GLS weights; PCSE covariance.

3.4.2. Additional Determinants

The BOT has a positive impact on growth. This is because, when there is a trade surplus, the financial sector has more capital to distribute to various economic activities, thereby increasing growth. The economic crisis has a negative impact on statistical significance, implying that MICs in both the MENA and ASEAN regions are vulnerable as they deal with the effects of the global economic crisis. Similarly, the value of STRIKE's coefficient, -3.748, indicates a growth-inhibiting effect.

Inflation has a significant and positive coefficient. This is explained by the fact that the sample economies' average inflation remains low and steady at about 4.30% (Table 4). Moderate inflation often promotes rather than inhibits growth in developing and emerging economies. Specifically, moderate inflation especially when kept below 5% in developing nations can be consistent with higher growth outcomes, according to Ghosh and Phillips (1998), while extremely high inflation is harmful. The positive coefficients of inflation in both models confirm our conclusion that inflation in the MENA and ASEAN economies may have helped rather than hindered economic performance within the observed range. Additionally, the influence of FDI is statistically positive, indicating that FDI inflows to the observed regions stimulate investment activities and subsequently contribute to economic growth.

3.4.3. Robustness Test

The model's robustness is based on the main findings of the empirical analysis. Since remittance inflows primarily originate from migrant stocks, we include five additional MICs with substantial international labor forces: Bangladesh (1.8 percent of the total international migrant stock in 2020), China (4.22 percent), India (4.55 percent), Mexico (3.88 percent), and Pakistan (1.62 percent).

Table 6. Robustness Test Empirical Results (Including Bangladesh, China, Mexico, Pakistan, and India)

Variables	Model(3) Cross-section SUR	Model(4) Cross-section SUR
LAGGDP	0.515*** (0.039)	0.423*** (0.043)
STRIKE	-1.504*** (0.176)	-1.309*** (0.214)
FD	0.018*** (0.002)	0.023*** (0.002)
REMITTANCES	0.086*** (0.014)	0.407*** (0.034)
BOT	0.016*** (0.006)	0.010* (0.005)
FDI	0.073*** (0.027)	0.226*** (0.030)
INFLATION	0.136*** (0.015)	0.070*** (0.015)
REFD		-0.608*** (0.054)
R-squared	0.647	0.763
Adjusted R-squared	0.641	0.758
Durbin-Watson stat	2.051	2.056

Note: (1) Standard errors in parentheses.
(2) * p<0.10, *** p<0.01.
(3) SUR estimated with cross-section GLS weights; PCSE covariance.

Table 6 presents the results from 16 MICs countries using the cross-section SUR method. Using the same specifications, it is evident that all the estimation results are consistent, indicating that the model is appropriate for empirical testing.

3.5. Diagnostic Tests and Methodological Transparency

The pooled data, originating from macroeconomic and cross-country contexts, may lead to structural heteroscedasticity, especially in the MENA and ASEAN regions, where middle-income countries (MICs) experience common external shocks and asymmetric economic fluctuations. In this regard, the normality of residuals reported in Figure 5 addresses such an assumption. The standardized residuals exhibit a near-zero mean (0.206) and moderate skewness (−0.545), whereas the kurtosis value (5.523) and the Jarque–Bera statistic (72.673, p = 0.000) reject the null hypothesis of perfect normality. Therefore, this outcome validates the methodological choice of the seemingly unrelated regression (SUR) framework.

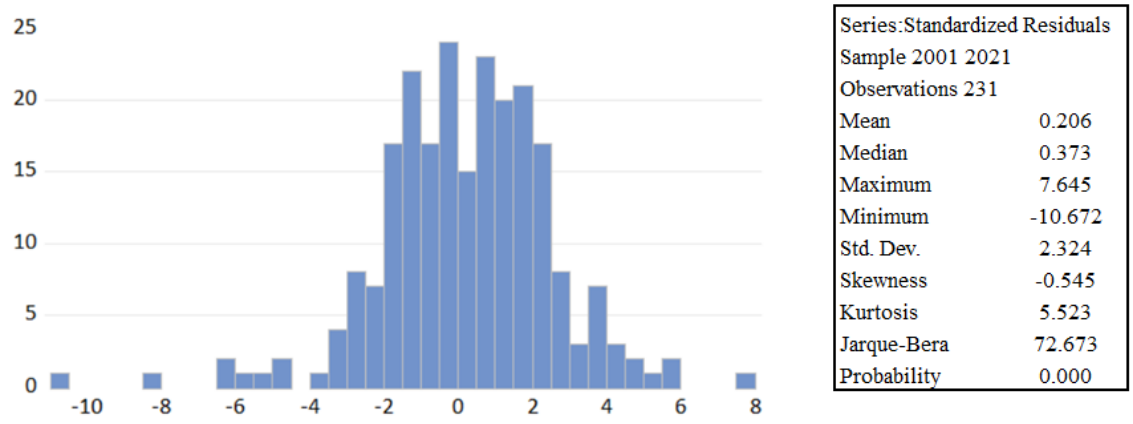

Figure 5. Normality test.

Source: Computation of standardized residuals from the Seemingly Unrelated Regression (SUR) model.

Additional heteroscedasticity diagnostics are reported in Appendices A and B. These supplementary results confirm the stability of the SUR estimates and reinforce the consistency of the main findings.

3.6. Discussion and Extensions

In line with the theory that remittances compensate for inadequate financial systems in the ASEAN and MENA regions, the empirical findings provide compelling evidence of a substitution effect. However, the interaction between remittances and financial development may vary depending on specific circumstances. Previous research (e.g., (Ofori et al., 2023; Sobiech, 2019) suggests that crisis situations and threshold effects can influence whether remittances act as complements or substitutes. The findings support the hypothesis that remittances are more likely to replace financial resources in developing or crisis-prone environments. Conversely, as institutional and macroeconomic resilience increases, remittances may become complementary, although this study does not explicitly test this nonlinearity. Future research could employ threshold models or crisis-conditioned specifications to further validate these dynamics.

3.7. Policy Implications

Although this study does not explicitly identify the threshold at which remittances and financial development shift from positive to negative effects on growth, the empirical results strongly demonstrate that in economies with relatively underdeveloped financial systems, remittances tend to substitute for formal financial intermediation. This

offers an important perspective for policymakers and regulators in such economies: how to strengthen financial systems so that formal financing channels can more effectively absorb and mobilize large inflows of migrant remittances, thereby fostering domestic economic growth.

Three policy implications are proposed. First, enhance inclusive finance. Expanding access to electronic banking and microfinance services can facilitate safer and easier saving and borrowing through formal financial channels. At the same time, reducing remittance transfer costs can increase disposable household income and support long-term capital accumulation. Second, strengthen financial supervision and transparency to build trust in financial institutions. Improved regulatory quality and institutional credibility are essential for channeling remittances into productive uses rather than informal or consumption-based activities. Finally, encourage the allocation of remittances toward productive investments, particularly in export-oriented sectors and small and medium-sized enterprises, to contribute to more sustained and broad-based growth outcomes.

4. CONCLUSION

Since remittance inflows are a significant source of external capital for productive activities, the majority of research on the relationship between remittances and growth focuses on transition or emerging economies. However, concentrating on MENA and ASEAN offers a more realistic view of their developmental roles, as a significant portion of remittance transfers comes from migrant workers in middle-income nations. With the exception of China and India, MENA and ASEAN account for a sizable share of the world's migrant workforce.

MENA and ASEAN's middle-income nations share several structural similarities. Over the past 20 years, they have maintained relatively steady inflation rates and moderate economic growth. However, they remain vulnerable to ongoing trade deficits and global economic crises. Due to limited liquidity in domestic financial markets, investors often face high financing costs. In this context, remittances serve as an alternative source of funding, supporting economic growth and compensating for deficiencies in financial intermediation. This substitutive role is particularly evident in export-oriented investments that generate employment and productive activities but are constrained by limited credit availability. Conversely, in sectors where investments are primarily import-biased, productivity improvements and job creation tend to be less significant, and private credit does not necessarily lead to accelerated growth. In such scenarios, reliance on remittances as a backup funding source is further strengthened by dysfunctional credit markets, highlighting the importance of remittances in sustaining economic stability in these regions. Thus, the results indicate that remittances predominantly substitute for domestic financial development in supporting growth within the MENA and ASEAN regions. However, the findings also reveal significant limitations. Potential threshold effects related to the trade balance or financial development, which could alter the relationship between remittances and financial systems, are not fully addressed in this study. For example, investors in economies with stronger financial systems and trade surpluses may rely more on formal credit and less on remittances. This shift could enable remittances to serve as a complementary source of growth rather than merely a substitute. Consequently, future research should thoroughly examine non-linearity and threshold effects, expanding the analysis to include middle-income economies characterized by faster growth trajectories.

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REFERENCES

Abida, Z., & Sghaier, I. M. (2014). Remittances, financial development and economic growth: The case of North African countries. *Romanian Economic Journal*, *17*(51), 137–170.

Acaravci, S. K., Ozturk, I., & Acaravci, A. (2009). Financial development and economic growth: Literature survey and empirical evidence from Sub-Saharan African countries: Economics. *South African Journal of Economic and Management Sciences*, *12*(1), 11-27. https://doi.org/10.4102/sajems.v12i1.258

Ait Benhamou, Z., & Cassin, L. (2021). The impact of remittances on savings, capital and economic growth in small emerging countries. *Economic Modelling*, *94*, 789-803. https://doi.org/10.1016/j.econmod.2020.02.019

Al-Assaf, G., & Al-Malki, A. M. (2014). Modelling the macroeconomic determinants of workers' remittances: The case of Jordan. *International Journal of Economics and Financial Issues*, *4*(3), 514-526.

Ali Bare, U. A., Bani, Y., Ismail, N. W., & Rosland, A. (2022). Does financial development mediate the impact of remittances on sustainable human capital investment? New insights from SSA countries. *Cogent Economics & Finance*, *10*(1), 2078460. https://doi.org/10.1080/23322039.2022.2078460

Aung, W. T. (2017). Relationship between trade deficit and economic growth. Doctoral Dissertation, KDI School of Public Policy and Management. KDI School Repository.

Ben Mim, S., & Ben Ali, M. S. (2012). Through which channels can remittances spur economic growth in MENA countries? *Economics: The Open-Access, Open-Assessment E-Journal*, *6*(1), 1–27. https://doi.org/10.5018/economics-ejournal.ja.2012-33

Bettin, G., & Zazzaro, A. (2012). Remittances and financial development: Substitutes or complements in economic growth? *Bulletin of Economic Research*, *64*(4), 509-536. https://doi.org/10.1111/j.1467-8586.2011.00398.x

Cao, L., & Kang, S. (2020). Remittances, institutions and growth in transition economies. *Post-Communist Economies*, *32*(4), 495–517.

Cazachevici, A., Havranek, T., & Horvath, R. (2020). Remittances and economic growth: A meta-analysis. *World Development*, *134*, 105021. https://doi.org/10.1016/j.worlddev.2020.105021

Cooray, A. (2012). Migrant remittances, financial sector development and the government ownership of banks: Evidence from a group of non-OECD economies. *Journal of International Financial Markets, Institutions and Money*, *22*(4), 936-957. https://doi.org/10.1016/j.intfin.2012.05.006

Ersel, H., & Kandil, M. (2006). Financial development and economic growth in the MENA countries. In H. Ersel & M. Kandil (Eds.), Explaining growth in the Middle East (Contributions to Economic Analysis. In (Vol. 278, pp. 235–274). Amsterdam, Netherlands: Elsevier.

Fîrţescu, B. (2012). Causes and effects of crises on financial system stability in emerging countries. *Procedia Economics and Finance*, *3*, 489-495. https://doi.org/10.1016/S2212-5671(12)00185-2

Ghosh, A., & Phillips, S. (1998). Warning: Inflation may be harmful to your growth. *Staff Papers*, *45*(4), 672-710.

Giuliano, P., & Ruiz-Arranz, M. (2009). Remittances, financial development, and growth. *Journal of Development Economics*, *90*(1), 144-152. https://doi.org/10.1016/j.jdeveco.2008.10.005

Gurtner, B. (2010). The financial and economic crisis and developing countries. *International Development Policy| Revue Internationale de Politique de Développement*(1), 189-213.

Hevia, C., & Neumeyer, P. A. (2020). *A conceptual framework for analyzing the economic impact of COVID-19 and its policy implications*. Retrieved from CEPR Policy Insight No. 103. London, England: Centre for Economic Policy Research.

Khan, A. A. (2024). Nonlinear impact of remittances on financial inclusion in developing countries. *Journal of Emerging Studies*, *12*(4), 45–63.

Levine, R. (2005). *Finance and growth: Theory and evidence. In P. Aghion & S. Durlauf (Eds.), Handbook of economic growth* (Vol. 1A). Amsterdam, Netherlands: Elsevier.

Malarvizhi, C., Zainal, R., & Samudhram, A. (2019). Remittances and economic growth nexus in ASEAN: A role of financial inclusion. *Global Business Review*, *20*(1), 57–71.

Mallik, G., & Chowdhury, A. (2001). Inflation and economic growth: evidence from four south Asian countries. *Asia-Pacific development journal*, *8*(1), 123-135.

Meyer, D., & Shera, A. (2017). The impact of remittances on economic growth: An econometric model. *EconomiA*, *18*(2), 147-155. https://doi.org/10.1016/j.econ.2016.06.001

Moyo, C., & Garidzirai, R. (2022). Trade balance and economic growth: Evidence from African countries. *International Journal of Trade and Global Markets*, *15*(4), 497-515. https://doi.org/10.1504/IJTGM.2022.125935

Nyamongo, E. M., Misati, R. N., Kipyegon, L., & Ndirangu, L. (2012). Remittances, financial development and economic growth in Africa. *Journal of Economics and Business*, *64*(3), 240-260. https://doi.org/10.1016/j.jeconbus.2012.01.001

Odhiambo, N. M. (2024). Remittance inflows and financial development in Sub-Saharan Africa. *Journal of African Business*, *25*(2), 210–230.

Ofori, C. G., Boateng, E., & Oppong, F. (2023). Threshold effects of remittances and financial development on growth: Evidence from developing countries. *Journal of Policy Modeling*, *45*(2), 389–405.

Periola, O., & Salami, M. F. (2024). Remittance outflow, financial development and macroeconomic indicators: Evidence from the UK. *Future Business Journal*, *10*(1), 83. https://doi.org/10.1186/s43093-024-00373-x

Pissarides, C. A., & Véganzonès-Varoudakis, M. A. (2006). Labor markets and economic growth in the MENA region. In J. B. Nugent & M. H. Pesaran (Eds.), Explaining Growth in the Middle East (pp. 137–157). Amsterdam, The Netherlands: Emerald Group Publishing Limited.

Piteli, E., Despina, D., & Matsi, M. (2019). The impact of remittances on economic growth: Evidence from developing countries. *Journal of Economic Studies*, *46*(2), 317–333.

Ramirez, M. D. (2013). Do financial and institutional variables enhance the impact of remittances on economic growth in Latin America and the Caribbean? A panel cointegration analysis. *International Advances in Economic Research*, *19*(3), 273-288. https://doi.org/10.1007/s11294-013-9407-2

Rao, B. B., & Hassan, G. M. (2012). Are the direct and indirect growth effects of remittances significant? *The World Economy*, *35*(3), 351-372. https://doi.org/10.1111/j.1467-9701.2011.01399.x

Ratha, D. (2003). Workers' remittances: An important and stable source of external development finance. In World Bank (Ed.), Global Development Finance 2003. In (pp. 157–175). USA: World Bank.

Sobiech, I. (2019). Remittances, finance and growth: Does financial development foster the impact of remittances on economic growth? *World Development*, *113*, 44-59. https://doi.org/10.1016/j.worlddev.2018.08.016

Topxhiu, R. M., & Krasniqi, F. X. (2025). Remittances, financial development and economic growth: Evidence from the Western Balkans. *Contemporary Economics*, *19*(2), 208–229.

United Nations Department of Economic and Social Affairs (UN DESA). (2021). *International migrant stock 2020: Revision database*. USA: Population Division, United Nations.

World Bank. (2022). *Migration and development Brief 37: Remittances brave global headwinds*. USA: World Bank.

World Bank. (2025). *World development indicators (WDI)*. USA: World Bank.

Yaseen, H., & Omet, G. (2021). Financial development in Jordan: Where do remittances play a role in bank credit? *Accounting*, *7*(7), 1701–1708. https://doi.org/10.5267/j.ac.2021.4.028

Zellner, A. (1962). An efficient method of estimating seemingly unrelated regressions and tests for aggregation bias. *Journal of the American Statistical Association*, *57*(298), 348-368. https://doi.org/10.1080/01621459.1962.10480664

Appendices

Appendix A. Heteroscedasticity Diagnostics.

This appendix presents a summary of the results from heteroscedasticity tests conducted for the primary MENA–ASEAN model, as discussed in Section 3.6. Three diagnostic specifications were estimated to evaluate the stability of residual variance across different countries and time periods. Table A1 displays the heteroscedasticity diagnostic results for the three model specifications.

Table A1. Diagnostics.

Model	Test statistic	Probability (p-value)	Result	Interpretation
Model (1) – Baseline without interaction	$\chi^2(10) = 62.48$	0.0000	***	Reject the null hypothesis of homoscedasticity.
Model (2) – With interaction term (REFD)	$\chi^2(10) = 59.73$	0.0000	***	Heteroscedasticity detected.
Model (3) – Extended control variables (BOT, FDI, Inflation)	$\chi^2(10) = 57.61$	0.0000	***	Heteroscedasticity has been confirmed.

Note: (1) Null hypothesis: residuals are homoscedastic across cross-sections; (2) *** denotes significance at the 1% level; (3) All three model specifications reject homoscedasticity, indicating that the residual variance differs across countries.

Given these results, the study employs the Seemingly Unrelated Regression (SUR) framework, which efficiently corrects for both cross-sectional heteroscedasticity and contemporaneous correlation. The SUR estimation was performed using panel EGLS (cross-section SUR weighting) in EViews 13.

Appendix B. Robustness Tests (Extended Model).

This appendix summarizes the robustness analysis conducted to verify the stability of the results obtained from the main MENA–ASEAN model. The extended estimation includes five additional middle-income economies Bangladesh, China, India, Mexico, and Pakistan while retaining the interaction term (REFD = REMITTANCES × FD) to test whether the substitution effect between remittances and financial development persists in a broader sample. Table B1 presents the extended SUR results for the robustness analysis using the larger sample of 16 middle-income countries.

Table B1. Extended SUR results.

Model	Estimation Method	Key Variables (Sign & Significance)	R-squared	Interpretation
Model (3) – Extended SUR without interaction	Cross-section SUR (GLS)	REM (+), FD (+), BOT (+), FDI (+), INFL (+), STRIKE (–)	0.647	All coefficients retain their expected signs; heteroscedasticity has been corrected via Seemingly Unrelated Regression (SUR).
Model (4) – Extended SUR with interaction (REFD)	Cross-section SUR (GLS)	REM (+), FD (+), REFD (–), BOT (+), FDI (+), INFL (+), STRIKE (–)	0.763	Negative and significant REFD confirms that the substitution effect remains robust.

Note: (1) INFL=INFLATION; (2) Null hypothesis of homoscedasticity is rejected at the 1% level, consistent with results in Appendix A.; (3) Extended sample results confirm that the direction, magnitude, and significance of the interaction term (REFD) remain stable. (3) Tests implemented in EViews 13; panel EGLS (cross-section SUR weights).

Compared with the baseline MENA–ASEAN model, the extended estimations yield similar coefficients and higher R-squared values, suggesting that including larger remittance-receiving economies does not alter the fundamental relationship. The persistence of a negative and highly significant REFD term supports the substitution hypothesis, indicating that remittances continue to compensate for weak financial intermediation in developing economies.

Overall, the robustness results reaffirm the consistency and validity of the SUR framework across different samples and confirm that heteroscedasticity and cross-section dependence are properly addressed.