The Impact of Workers' Remittances on the Economic Growth in Egypt:
A Financial Inclusion Perspective

prepared by

Ramy H Elazhary[1] ⓘD**, Fathy M. Eladham[2], Medhat M. Elakkad[3]**

Department of Economics, Faculty of Commerce,

Zagazig University, Egypt

---

[1] Lecturer of Economics.
[2] Master Degree Student.
[3] Professor of Economics.

Abstract

This study aims to evaluate the impact of remittances from overseas workers on Egyptian economic growth within the financial inclusion framework as a moderating factor. Utilizing annual time-series data from 2004 to 2020 and the boundaries test approach, which relies on the ARDL model, the study found a non-linear relationship between remittances from overseas workers and economic growth in both the short and long-run. This nonlinear relationship is represented as a U-shaped curve, suggesting that the beneficial impact of remittances on economic growth is only apparent when their growth rate exceeds 41.37 percent. This threshold was met in only three years: 2005, when remittances increased by 50.2%; 2007, with a growth rate of 43.6%; and 2010, with a growth rate of 74.2%. Furthermore, the study found that financial inclusion has an insignificant positive impact on economic growth in both the short and long runs. Furthermore, the degree of financial inclusion did not strengthen the relationship between remittances and economic growth. Based on the results of both Cohen's d effect size and the correlation indexes, the relationship between remittances and economic growth has significant practical importance, regardless of whether the growth rate of remittances exceeds or falls below the 41 percent threshold each year.

Keywords

Introduction:

Remittances from Egyptian workers abroad[4] have gained significant attention due to their role as a crucial foreign currency resource, contributing to the country's total foreign currency earnings. In the first quarter of 2022, remittances reached approximately $3.3 billion, exhibiting an annual growth rate of 12.8% compared to the same period in 2021, which was around $2.9 billion(CBE, 2022). Several factors, including the decline in tourism sector revenues, foreign direct investments, and capital flight during the Russian-Ukrainian war, have contributed to the reduction in foreign earnings.

The decline in traditional sources of income, such as the tourism sector, has prompted the need to explore alternative sources like remittances from workers abroad. Egypt's tourism sector has faced challenges since 2011 due to political conditions, and subsequent events like terrorist attacks and the COVID-19 pandemic have further hindered its recovery. The war in Ukraine has added to the challenges the tourism sector faces, highlighting the importance of remittances as a source of hard currency. The academic community has also shown interest in studying the development and growth of these financial flows resulting from working abroad or emigration(Dahiya & Kumar, 2020; Shehada, 2023).

Remittances from workers abroad play a crucial role in external financing for developing countries like Egypt, one of the major labor-exporting nations globally. Developing countries constitute around 79.9% of total remittances(IOM, 2022), surpassing other cash flows such as official

---

[4]Based on data from the International Organization for Migration (IOM) and the Central Agency for Public Mobilization and Statistics (CAPMAS), the estimated number of Egyptians living abroad in 2023 is approximately 9 million.

development assistance and foreign direct investment. Remittances have gained increasing importance due to their stability and sustainability, especially during economic and financial crises.

Financial inclusion, characterized by ease, speed, and transparency in financial transactions, has been a focus in Egypt. It aims to reduce costs, streamline service performance, and facilitate procedures, ultimately contributing to the country's credit rating, national income growth and reduced unemployment rates. The impact of financial inclusion on the Egyptian economy is crucial to be examined, particularly concerning the relationship between remittances from workers abroad and economic growth. Understanding the depth of this impact can shed light on the financial sector's flexibility and ability to implement financial inclusion measures in Egypt.

This study aims to measure the impact of remittances from workers abroad on Egyptian economic growth within the financial inclusion framework. By exploring this relationship, it seeks to determine the effectiveness of personal transfers in fostering economic growth. The research hypothesis suggests a positive relationship between personal remittances and financial inclusion, with financial inclusion reinforcing this relationship.

The research holds theoretical and practical significance, especially in the context of financial inclusion's increasing importance post-COVID-19 pandemic and the Russian invasion of Ukraine. Analyzing remittances from Egyptian workers abroad during the 2004-2020 period further contributes to the study's significance. Additionally, identifying strategies to enhance financial inclusion in Egypt by increasing remittance flows holds practical implications for the country's economic development.

Review of Literature:

Extensive research has focused on remittances from overseas workers and their potential impacts on economic growth. However, while various analyses have been conducted to determine the likely effect of remittances on economic growth, the literature has not thoroughly explored the mechanisms or motives behind this effect, despite the importance of factors such as financial inclusion.

Financial inclusion refers to providing financial services to individuals and enterprises excluded from the traditional financial system. Financial inclusion can profoundly impact economic growth by enabling people to save and invest more income. It not only facilitates the opening of businesses, increased consumer spending, and access to goods and services but also enhances financial security and reduces the likelihood of financial disasters.

In a study by (Liu et al., 2022) focusing on Belt and Road economies, the impact of financial inclusion on economic growth and environmental quality was examined using four different proxies for financial inclusion from both the supply-side and demand-side perspectives. The researchers applied the 2SLS and GMM methods and found that, among the financial inclusion variables, only the ATMs variable showed positive significance in the 2SLS approach. However, both ATMs and branches had positive significance when the GMM approach was employed. Similarly, (Al-Bakl & Al-Haddad, 2022)discussed the increasing importance of financial inclusion at local and international levels, emphasizing its effective role in economic development and contribution to sustainable development.

(Van et al., 2021) emphasized the significance of financial inclusion policies for economic growth, particularly in emerging markets. Their findings

revealed a positive relationship between financial inclusion and economic growth, especially in countries with lower incomes and a lower degree of financial inclusion.

Examining the Chinese context, (Ahmad et al., 2021)investigated the impact of digital financial inclusion and human capital on regional economic growth. They developed a new proxy for digital financial inclusion based on coverage, use, and digitization. The study found that digital financial inclusion and human capital significantly influenced regional economic growth in China. The researchers recommended investing in human capital development while promoting digital financial inclusion to achieve higher economic growth.

In Egypt, (Atiya et al., 2018)used SVAR models to analyze the impact of external financing components on sustainable development. Based on annual data from 1980 to 2019, the study revealed a causal relationship in which external loans, workers' remittances, and development aid had a negative impact on sustainable development, while foreign investment had a positive impact.Examining Egyptian immigrant patterns in the Middle East (Mohamed, 2021; Mutwally, 2021) identified occupation and educational status as decisive factors in choosing a destination country, except for Kuwait. In the context of Jordan, (Al-Nosour & Al-Nosour, 2021) found that remittances did not significantly impact economic growth but slightly affected the human development index in the short run. In addition (Nour El Dine & Metwally, 2019) affirmed the importance of institutional framework in strengthing the positive impact of remittances on economic growth.

(Boutalby, 2021)investigated the determinants of remittances for Algerian immigrants and found that remittances were positively affected by Algeria's macroeconomic variables, while the parallel exchange rate premium had a

negative effect. Additionally, (Alsaiedy, 2020) studied the impact of remittances from Saudi Arabian expatriate workers on the Saudi economy and discovered that the large volume of these transfers negatively affected the current account, reducing the percentage of remittances to the private sector's GDP.

(Abdul Salam, 2020) predicted the effects of the COVID-19 crisis on Egyptian workers' remittances abroad, highlighting the channels of transmission for the crisis's impact. Furthermore, (Qabil, 2020)examined the causal relationship between external remittances and economic growth in Egypt and found a unidirectional relationship between net external transfers and real GDP in the long run. (Abdul Salam, 2020) also discussed the efficiency and effectiveness of external financing sources and quantified their impact on economic growth, concluding that external financing is not a substitute for self-financing activities. Similarly, (Özyakışır et al., 2023) emphasized thatremittances have an asymmetrical effect on financial development. Thus, in order to avoid instability, financial institutions must diversify their funding sources.

Several studies have focused on analyzing the impact of external financing components on sustainable development and economic growth, particularly in Egypt and other Arab countries. (Ait Benhamou & Cassin, 2021) found a one-way causal relationship between external financing and sustainable development in Egypt. (Mutwally, 2021) identified two patterns of Egyptian immigrants based on their destination countries. (Al-Nosour & Al-Nosour, 2021) observed that remittances from Jordanian labor abroad and foreign direct investment did not significantly affect economic growth in Jordan. (Boutalby, 2021)found that certain macroeconomic variables positively and significantly influenced remittances from Algerian immigrants in Algeria. (Alsaiedy, 2020)

demonstrated that remittances from expatriate workers in Saudi Arabia had a negative impact on the country's current account. (Abdul Salam, 2020) discussed the predicted effects of the Coronavirus crisis on the remittances of Egyptian workers abroad. Finally, (Qabil, 2020)concluded that there is a unidirectional causal relationship between net external transfers from abroad and economic growth in Egypt. (Abdul Salam, 2020) also highlighted that external financing is not a substitute for domestic savings and should be strategically utilized to maximize its impact on economic growth.

It is important to note that recent research by (Qamruzzaman, 2023)supports the positive impact of financial inclusion on capital formation in 22 selected Arab countries. This finding aligns with the conclusion reached by (Azizi, 2018; Mohamed Aslam & Alibuhtto, 2023; Umair & Scholar, 2023). Moreover, The extension of financial inclusion to rural areas has given stronger results to influence economic growth, possibly due to the concentration of excluded groups in these areas (Ashry, 2018). However, The accounting of remittances is complex and challenging, which suggests that there is no one-size-fits-all approach(Ahmad et al., 2021; Ferreira et al., 2020; Ozili et al., 2022).

While the literature review provides a comprehensive overview of studies on remittances, and economic growth, an in-depth exploration of the relationship between remittances and financial inclusion is advised, emphasizing potential research gaps and the necessity for further investigation in this domain. This clarification will establish a precise focus and augment the coherence of the literature review.

A Global and Regional Overview:

This section provides a more in-depth analysis of workers' remittances abroad through a more detailed examination of various global and regional trends.

Post-COVID-19 Pandemic Global Trends in International Workers' Remittances:

Several significant international trends in worker remittances have existed since the Corona pandemic. Remittance flows decreased in the early stages of the pandemic due to several causes, including job losses, travel restrictions, and economic instability. However, the inflows gradually rebounded as economies started recovering and restrictions eased.

Traditional methods, such as cash-based transfers, faced challenges[5]. As a result, alternative channels such as mobile money, digital wallets, and online transfers gained popularity, allowing for faster and more secure transactions, highlighting the need for financial inclusion.

The volume of inflows remittances to low- and middle-income countries witnessed a significant increase, reaching $589 billion in 2021(IOM, 2022), with a %7.3 increase compared to 2020. The volume of these remittances, excluding China, is three-fold the development aid to developing countries and more than half of the FDI to those countries. Egypt ranked among the top five countries regarding remittance inflows in 2021, where it came in first place in 2022,followed by France, Pakistan, and China, as shown in **Figure 1**. Egypt received approximately $33 billion during the year, marking a notable increase of 12.6% compared to the previous year. This rise can be attributed to multiple factors, including the upswing in oil prices and revenues in the

---

[5]due to lockdowns and limited access to physical locations.

Arabian Gulf region and the recovery of economic activity in Europe and the United States.

Figure 1: World personal remittances Map, 2022
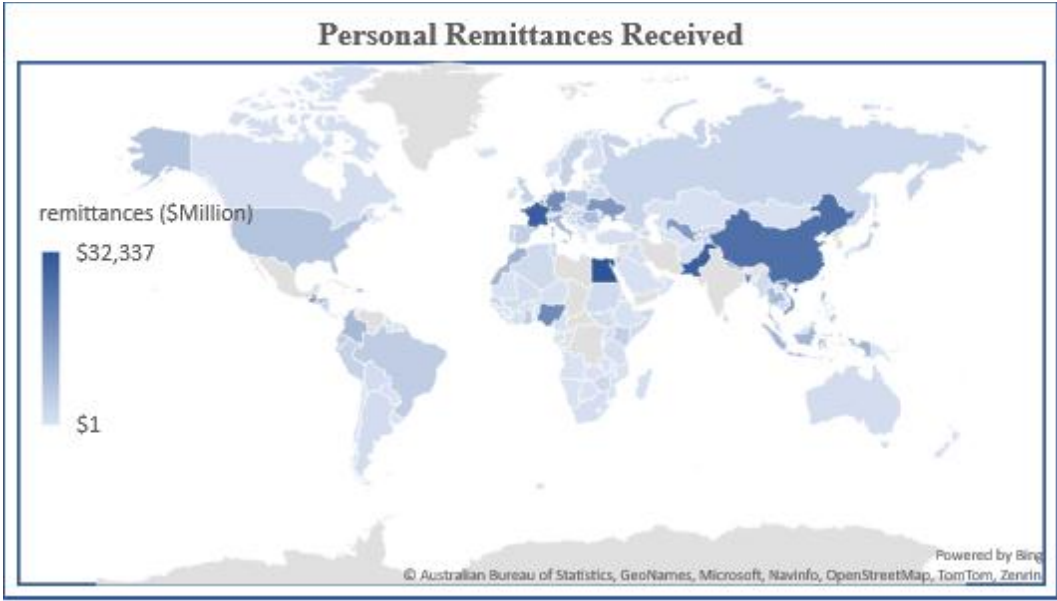
Source:(World Bank, 2023) data, mapped powered by Bing.

*Remittances Trends in the Middle East and North Africa (MENA) countries:*

Remittances to developing countries in the Middle East and North Africa grew by an estimated rate of 9.7% in 2021 to reach $62 billion, supported by the return of growth in the host countries in the European Union - notably France and Spain - and the increase in global oil prices that affected positively in the GCC countries. This increase is due to the strong improvement in inflows to Egypt and Morocco by more than 25%, or about $9.3 billion. The proceeds of remittances to the Maghreb countries (Algeria, Morocco and Tunisia) increased by 15.2%, driven by the growth in the euro area. However, flows decreased to many countries in the region in 2021,

including Jordan (down by 6.9%), Djibouti (down by 14.8%), and Lebanon (down by 0.3%)(World Bank, 2023).

In 2022, remittances grew by 3.6%, one of the slowest growth rates, due to the risks arising from the Corona pandemic. In terms of remittance costs, the average cost of sending $200 to the region decreased to about 6.3% in the first quarter of 2021, down from 7% compared to 2020.

Egypt received about $33 billion,as illustrated in **Figure 1**. Although Egypt went through local economic crises, a state of political and economic instability, the January 25 and the June 30 revolutions, remittances were not affected or decreased (Figure 2).On the contrary, they increased during those crises. Despite exports being the most important and largest source of foreign currency, the global oil crisis in 2015 caused it to recede and was surpassed by workers' remittances, as it was able to cover 40% of imports.

Figure 2: Egyptian workers' remittances
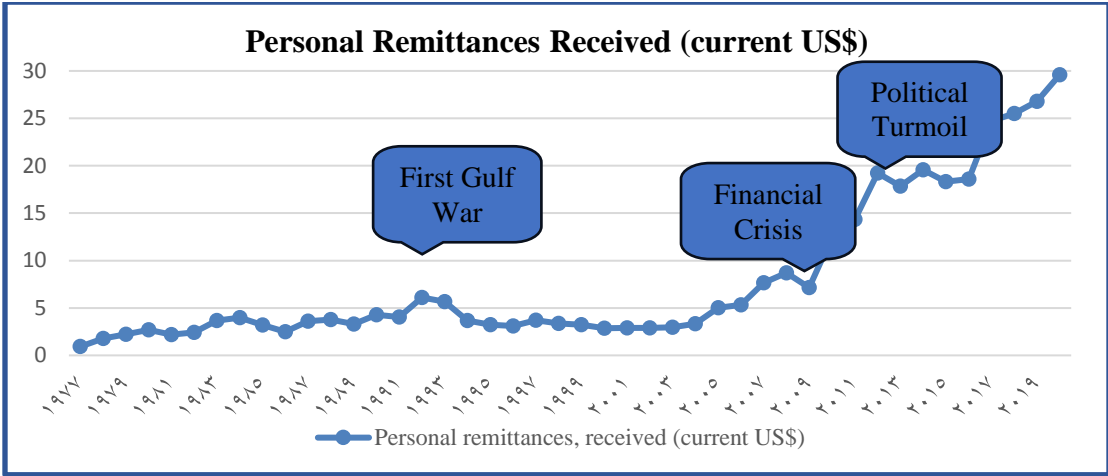
Source: Based on(World Bank, 2023) data.

Remittances have witnessed successive increases in the last two decades, as shown in **Figure 3**, making them one of Egypt's most important foreign

currency sources. The stability and steadiness of remittance flows for workers abroad exceeded all other foreign currency sources, such as tourism revenues, Suez Canal fees, exports, and direct foreign investment. Therefore, Egypt may be able to rely on them as a major source of foreign currency and as an insurance mechanism for itself against any future shocks or changes that may face the Egyptian economy.

Figure 3: Remittances vs. gross capital formation
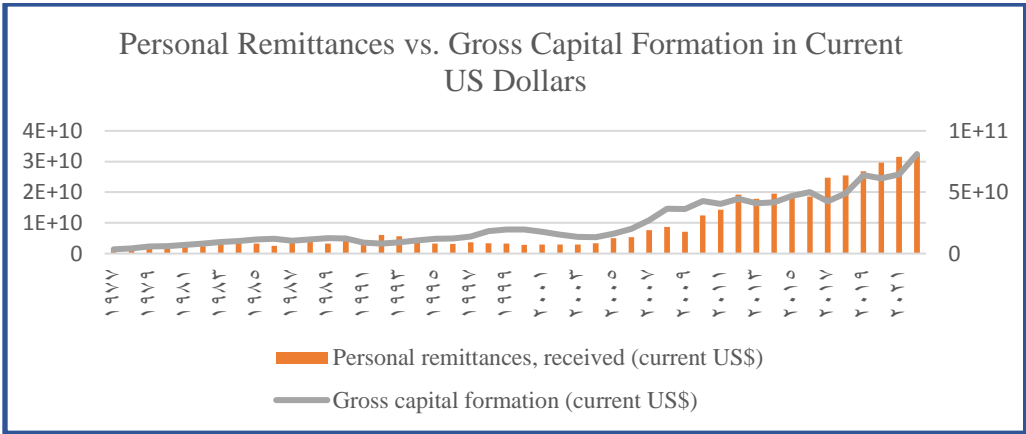
Source: Based on(World Bank, 2023) data.

Figure 4: Egypt's remittances (%GDP)
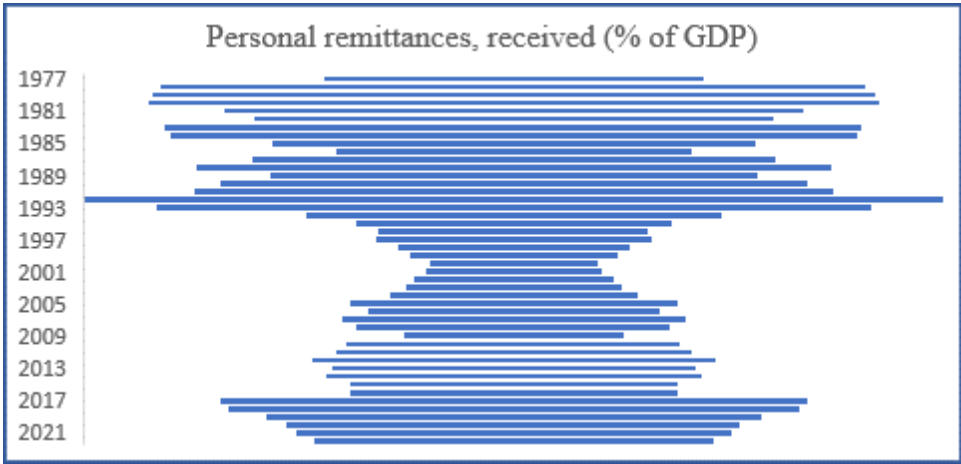
Source: Based on(World Bank, 2023) data.

Remittances have played a crucial role in stimulating capital formation in Egypt, as shown in **Figure 3**, which provides additional funds for investment[6]. It is clear that although exports occupied the main and most important source of foreign income throughout the period from 2004 to 2014, workers' remittances have become close in value to exports during the global oil crisis of 2015 and even surpassed them in the years that followed that crisis and were the most important and largest source of foreign currencyto Egypt from 2016 to 2018, and even after exports returned and topped the rest of the other sources, and exceeded remittances again, there was a very small difference between them.Despite the increasing importance of remittances and their overtaking of exports, they could only cover 42% of the value of imports at their maximum value in the first quarter of the fiscal year 2019.

*Figure 5: Evolution of GDP growth versus remittance growth*
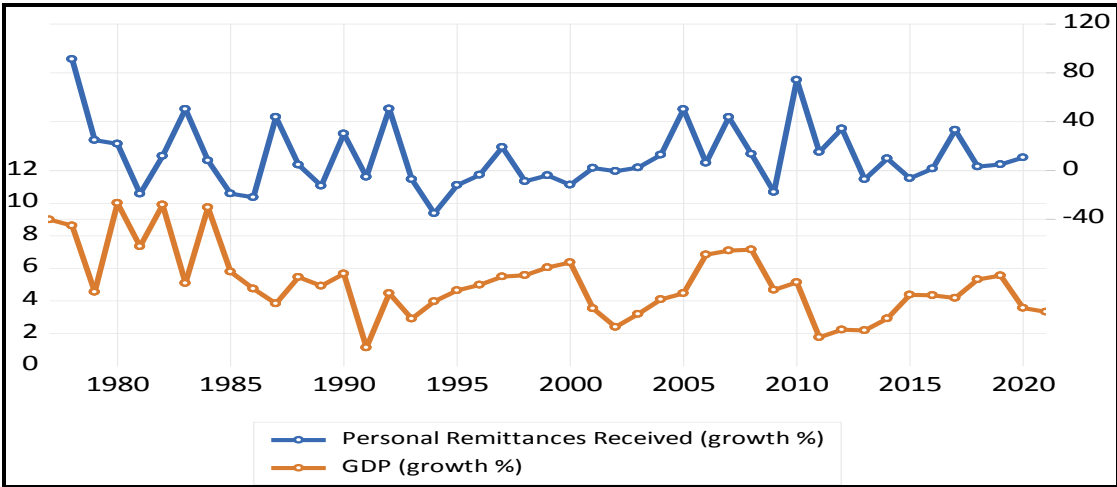
Source: Based on(World Bank, 2023) data.

---

[6] A great portion of remittances directed to investment in real estate.

Figure 5 reveals a strong positive direct relationship between the Egyptian gross domestic product and workers' remittances abroad between 1980 and 2022. Remittances grew by 3.6% in 2022, one of the slowest growth rates due to the risks arising from the Corona pandemic. In terms of remittance costs, the average cost of sending $200 to the region decreased to about 6.3% in the first quarter of 2021, down from 7% compared to 2020 (World Bank, 2023).

Figure 6: Relationship between personal remittances and economic growth in Egypt
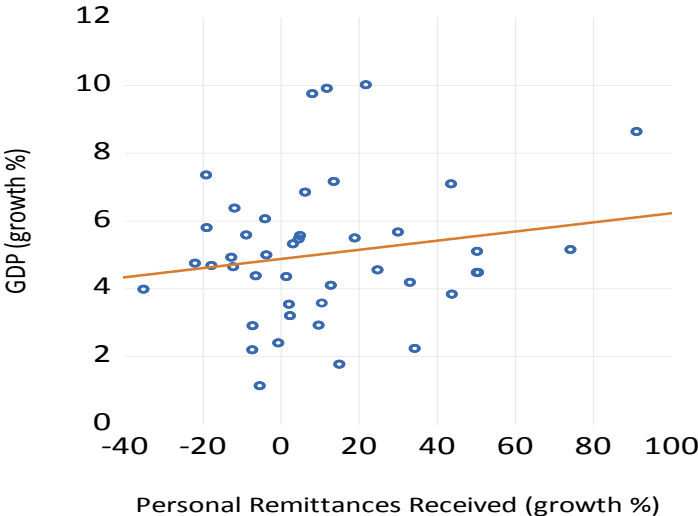
Source: Authors' calculations based on(World Bank, 2023) data.

The analysis of the relationship between the gross domestic product and the volume of workers' remittances abroad in Egypt, according to **Figure 6**, is positive. We also conclude that the relationship is positive with a strong degree, as the correlation coefficient value reaches 0.897. We infer that they are moving in the same direction. When the value of remittances occurred, it was accompanied by an increase in output value. The gross domestic

product and vice versa, as when the value of remittances decreased, the value of the gross domestic product decreased in the same period.

Data and Methods:

This section presents the construction of the research model, including the utilized variables to estimate the target relationship, descriptive statistics for the data, and research hypotheses.

Model Construction:

This research aims to assess the impact of remittances from overseas workers on the level of economic growth in Egypt, considering financial inclusion as a catalyst for this relationship. To achieve this objective, annual time series data from 2004 to 2020, comprising a total of 17 observations, are utilized. The data was obtained from various international organizations, and the sample selection was based on financial inclusion data, which became available in 2004. Hence, the general model of the study can be described in its simplest form as follows:

$$GDPgrowth_t = \alpha_0 + \alpha_1 R_t + \alpha_2 X_t + \varepsilon_t; \quad t = 1, \ldots, T$$

Where:

1) $GDP\ growth_t$:the economic growth rate at time t (the dependent variable).
2) R_t:inflow personal remittances transfers at time t (the independent variable).

3) χ_t:a vector of institutional and economic controlling variables[7] that affect the economic growth rate at time t other than personal remittances.

4) $\alpha_{0,} \varepsilon_t$: equation constant and the error term, respectively.

A marginal effect analysis will be conducted to examine the impact of financial inclusion on the relationship between workers' remittances and economic growth, specifically, whether financial inclusion enhances the effectiveness of transfers in promoting economic growth. This analysis aims to determine the association between personal transfers and the level of financial inclusion.

An interactive variable will be incorporated into the primary research model. This interactive variable is created by multiplying the personal transfers variable by the financial inclusion variable, allowing us to assess the indirect effect of financial inclusion. Simultaneously, the direct effect of financial inclusion will be retained by including the financial inclusion indicator in the research model. By incorporating this interactive variable and retaining the financial inclusion indicator, we can analyze financial inclusion's direct and indirect effects on the relationship between personal transfers and economic growth. As a result, the revised research model takes the following form:

$$\textbf{GDP growth}_t = \boldsymbol{\alpha_0} + \boldsymbol{\alpha_1 R_t} + \boldsymbol{\alpha_2 FI_t} + \boldsymbol{\alpha_3 (R * FI)_t} + \boldsymbol{\alpha_4 \chi_t} + \boldsymbol{\varepsilon_t}$$

Where:

1) FI_t:financial inclusion index in Egypt at time t.

2) $(R * FI)_{it}$:interactive variable (personal remittances ×financial inclusion) at time t.

---

[7]These variables were selected in accordance with models of economic growth, thus economic growth is attained through the accumulation of both physical and human capital as well as technological progress.

Thus, if the effect of the interactive variable is positive, with a significant effect onthe direct impact of personal transfers, this implies that financial inclusion here increases the effectivenessof personal transfers in achieving economic growth. Refers to economic growth models; economic growth is achieved through the growth of labor, capital and technological progress. Thus, the independent and control variables will be expressed as growth rates to match the economic growth rate. Hence, the final forms are as follows:

$$Y_t = \beta_0 + \beta_1 R_t + \beta_2 L_t + \beta_3 K_t + \beta_4 TFP_t + u_t \text{Eq.} \tag{1}$$

$$Y_t = \alpha_0 + \alpha_1 R_t + \alpha_2 FI_t + \alpha_3 L_t + \alpha_4 K_t + \alpha_5 TFP_t + u_t \quad \text{Eq.} \tag{2}$$

$$Y_t = \gamma_0 + \gamma_1 R_t + \gamma_2 FI_t + \gamma_3 (R * FI)_t + \gamma_4 L_t + \gamma_5 K_t + \gamma_6 TFP_t + u_t \text{Eq.} \tag{3}$$

Where:

$Y_t$is the dependent variable, represented by the growth rate of the real GDP, $R_t$is the dependent variable, represented by the growth rate of total workers' remittances, while $FI_t$is the augmenting variable represented by the growth rate of financial inclusion in Egypt. A set of control variables are utilized, including.L_t for labor growth, K_t for capital growth, and $TFP_t$for total factor productivity, t is the time,$\alpha_0$is the constant, and $\varepsilon_t$is the error term.

Data:

The research utilizes a comprehensive set of variables from multiple databases to examine the dynamic relationship between economic growth and the explanatory variables. Table 1provides a concise overview of the variables employed in the analysis, including their respective symbols and data sources. The dependent variable, economic growth, was measured using the annual growth index of GDP at constant prices for the year 2010. This measure allows for the elimination of inflation effects, enabling a focus on real

production levels. The independent variable, remittances from workers abroad, was expressed through the indicator of personal remittances received in current US dollars.

Regarding the enhanced variable, financial inclusion, its complexity stemming from multiple indicators such as the number of bank accounts, branches, ATMs, and credit and debit cards necessitated the creation of a composite index. This index provides a comprehensive overview of the level of financial inclusion in Egypt.

Additionally, control variables were chosen in line with economic growth models, attributing output growth to the growth of direct production factors, namely labor, capital, and technological level. Following neoclassical growth models, the growth indicators of the total labor force, physical capital stock, and total factor productivity (TFP)[8]. These indicators were sourced from the Penn World Table database (Feenstra et al., 2015).Table 1 and **Table 2** presents the descriptive statistics and correlation matrix, respectively.

Table 1: Descriptive statistics

	Unit	*Obs.*	*Mean*	*Median*	*Std. Dev.*	*Min*	*Max*	*Normality test*
Dependent Variable:								
GDP	*(growth %)*	17	4.4651	4.3720	1.642	1.7646	7.1563	[0.4268]
Independent Variable:								
Personal remittances received	*(growth %)*	17	16.554	10.535	23.45	-17.764	74.179	[2.4689]
Moderator Variable:								
Financial Inclusion	*(growth %)*	17	-1.9e-7	0.3506	1.511	-3.1165	1.9996	[1.0833]
Control Variables:								
Labor Force	*(growth %)*	17	2.5107	2.5136	1.571	-0.8692	6.2093	[0.6601]
Capital Stock	*(growth %)*	17	4.8717	4.4174	2.002	2.1127	9.0261	[0.9839]
Welfare-relevant TFP	*const. prices*	17	0.9497	0.9451	0.028	0 .9082	1	[0.9376]

---

[8](TFP) utilized as a proxy for technological progress.

Table 2: Correlation Matrix

		(1)	(2)	(3)	(4)	(5)	(6)
GDP growth	**(1)**	1					
Remittances received growth	**(2)**	0.1332	1				
Financial inclusion growth	**(3)**	0.3162	0.2217	1			
Labor force growth	**(4)**	0.4206 [c]	0.0245	0.1601	1		
Capital stock growth	**(5)**	0.7935 [a]	0.3277	0.3698	0.5924[b]	1	
Welfare-relevant TFP	**(6)**	0.3759	-0.0710	-0.3538	-0.0679	0.0512	1

Note: a, b, and c refer to statistical significance at %1, %5, and %10, respectively.

Based on the background and literature discussed in the previous sections, workers' remittances represent a crucial source of foreign currency and a significant potential contributor to Egypt's economic growth, considering the potential role of the banking sector in strengthening this relationship through increased financial inclusion for the families of overseas employees, the following research hypotheses are formulated:

H1: Workers' remittances positively impact economic growth in Egypt.

H2: Financial inclusion impacts economic growth positively.

H3: Financial inclusion enhances the positive impact of remittances on economic growth.

According to economic growth models supported by the correlation matrix, the sign of all direct factors of production variables is also expected to positively impact Egyptian economic growth.

Econometric analysis and results:

In order to investigate the short and long-run dynamics between variables, taking into consideration the stationarity test of variables that are a mixture between level I(0) and first different I(1), the study will utilize co-integration of time series data based on the bounds testing approach in the autoregressive distributed lag (ARDL) model.

Co-integration using ARDL:

Regarding the co-integration between the study variables and the confirmation of the long-run relationship within the unrestricted error correction (UECM) model framework, Table 3 affirms that the F-stat exceeds the tabular upper limit within the critical bounds. Consequently, the null hypothesis is rejected, and the alternative hypothesis is accepted, indicating the presence of a significant long-run equilibrium relationship among the variables: remittances from workers abroad, financial inclusion, and economic growth. The level of significance is determined at 1%. Therefore, further analysis can be conducted to estimate the long and short-run parameters.

Table 3: Bounds testing results

Regressors: (k = 5)	F-statistic
GDP growth$_t$ = ƒ (Remittances$_t$, Labor$_t$, Capital$_t$,TFP$_t$),ARDL (2, 1, 1, 1, 1, 1)	**120.65***
GDP growth$_t$ = ƒ (Remittances$_t$, FC$_t$, Labor$_t$, Capital$_t$,TFP$_t$),ARDL (2, 0, 0, 0, 0, 0, 0)	**53.990***
GDP growth$_t$ = ƒ (Remittances$_t$, FC$_t$, Remittances t×FC$_t$ Labor$_t$, Capital$_t$,TFP$_t$),ARDL (2, 0, 0, 0, 0, 0, 0)	**21.382***

	Critical values bound	
Significant level	Lower Critical Bounds (I0) *(LCB)*	Upper Critical Bounds (I1) *(UCB)*
10%	2,277	3,498
5%	2,730	4,163
1%	3,864	5,694

Note: *** denotes statistical significance at %1.

Estimating the long and short-run models using ARDL:

Due to the existence of a counteraction relationship between the variables, the estimation of the long-run relationship of the models is conducted in addition to estimating the error correction model. Wherein the error correction model (ECM) is of two importance; The first is that it estimates the short-run coefficients, while the second is the error correction limit (ECT), which is represented by the γ coefficient in the previous equation, and it measures the speed of adjusting the imbalance from the short term towards the long-run equilibrium, which requires it to be significant and negative in order to provide evidence on the stability of the relationship in the long term[9].

---

[9]that is, the error correction mechanism is present in the model.

Table 4: Long-run relationship and error correction model
Dependent Variable: GDP growth (%)
Method: ARDL with HAC standard errors
Model selection method: Schwarz Criterion (SIC)

	Reg (1)	Reg (2)	Reg (3)
	Coefficient [t-stat.]	Coefficient [t-stat.]	Coefficient [t-stat.]
Long-run coefficients			
Personal remittances	**-0.04054**	**-0.02093**	**-0.01505**
	[-15.44] ***	**[-6.057] *****	**[-3.002] ****
Personal remittances_squared	**0.00049**	**0.00034**	**0.00033**
	[9.174] **	**[5.938] *****	**[3.945] ****
Financial Conclusion		0.04506	0.14649
		[1.366]	[2.001]
Remittances x Financial Conclusions			-0.01302
			[-1.429]
Labor force growth	-0.07112	-0.03030	-0.03984
	[-2.586]	[-0.991]	[-0.919]
Capital stock growth	0.71648	0.59886	0.62312
	[38.15] ***	[22.44] ***	[17.32] ***
Welfare-relevant TFP	16.3725	14.8697	17.4382
	[29.98] ***	[9.969] ***	[8.905] ***
Constant	-14.1157	-12.3374	-14.9643
	[-26.76] ***	[-8.696] ***	[-8.099] ***
Error correction coefficient			
φ_i	**-2.62404**	**-2.02810**	**-2.12559**
	[-58.12] ***	**[-32.19] *****	**[-22.37] *****
Short-run coefficients			
GDP growth (-1)	-2.62404	-2.02810	-2.12559
	[-14.86] ***	[-18.26] ***	[-9.474] ***
Personal remittances	**-0.10639**	**-0.04244**	**-0.03199**
	[-16.09] ***	**[-5.464] *****	**[-2.965] ****
Personal remittances_squared	**0.00128**	**0.00069**	**0.00069**
	[10.90] ***	**[5.435] *****	**[3.329] ****
Financial Conclusion		0.09138 [1.409]	0.31139
			[1.855]
Remittances x			-0.02767

Financial			**[-1.296]**
Conclusions			
Labor force growth	-0.18663	-0.06146	-0.08469
	[-2.328]	[-0.992]	[-0.929]
Capital stock growth	1.88007	1.21454	1.32449
	[11.59] ***	[13.64] ***	[8.041] ***
Welfare-relevant TFP	42.9621	30.1572	37.0667
	[12.02] ***	[9.742] ***	[6.594] ***
Constant	-37.0401	-25.0215	-31.8081
	[-11.54] ***	[-8.629] ***	[-6.172] ***

Note: ***, **, * denote statistical significance at %1, %5, and %10, respectively.

Table 5: Sasabuchi-Lind-Mehlum (U-shaped) test

	X_i	X_i^2	Interval		Slope atX_l	Slope atX_h	Sasabuchi test	Extreme point
	$\hat{\beta}$	$\hat{\gamma}$	$X_{l\,(min)}$	$X_{h\,(max)}$	$\hat{\beta} + 2\hat{\gamma}X_l$	$\hat{\beta} + 2\hat{\gamma}X_h$	*(t-value)*	$-\hat{\beta}/(2\hat{\gamma})$
Personal remittances	-0.04054 [-15.44]***	0.00049 [9.174]***	-17,764	74,179	0.03215	-0.0579	[5.396]***	41.3704
							extremum isinside the interval	

Note: * denotes statistical significance at %1.**

Empirical Results:

Results from Table 4 and Table 5 show that remittances' positive effect on economic growth is significant only in years when the growth rate of remittances surpasses the inflection point, such as 2005, 2007, and 2010. The Sasabuchi-Lind-Mehlum test confirms the presence of a U-shaped relationship between remittances and economic growth. The inflection point occurs when the growth rate of remittances exceeds 41.37% annually. The control variables, including the growth of physical capital stock, total factor productivity (TFP), and employment growth, show consistent and stable results across the three regressions. The regression results indicate a positive

effect of physical capital stock and TFP on economic growth, while employment growth does not significantly impact. This reflects the nature of the Egyptian economy, with a scarcity of physical capital but abundant labor. The ECM coefficient (-1) is significant and negative, suggesting an error correction mechanism exists in the weak sustainability model. This indicates stability in the relationship between long and short-run results.

Discussion and Conclusion:

The relationship between remittances from workers abroad and economic growth in Egypt is non-linear in the long-run, following a U-shaped pattern. At low growth rates of remittances, the impact on economic growth is negative, while at high growth rates, the effect becomes positive. The positive effect of remittances (based on the regression coefficient) is smaller than the negative effect, suggesting that remittances alone do not substantially impact economic growth in Egypt. This confirms that the main source of foreign currency in the Egyptian economy is due to external debt.

The growth of financial inclusion does not significantly impactlong-term economic growth, despite having a positive sign. The correlation matrix also shows a weak and insignificant correlation between financial inclusion and economic growth. This lack of impact could be attributed to factors such as the decline in financial development and negative real interest rates. The expansion of financial inclusion does not increase savings or financial depth, which are crucial for augmenting physical capital stock.

Introducing an interactive variable reflecting the multiplication of remittances and financial inclusion did not alter the non-linear relationship between remittances and economic growth. Financial inclusion, both directly and

indirectly through the interactive variable, did not impact economic growth in the long run. This result aligns with the reality of the Egyptian economy, where a significant portion of workers' remittances is transferred informally outside the banking sector or converted into Egyptian pounds on the black market.

In conclusion, the study highlights the practical importance of the relationship between remittances from workers abroad and economic growth in Egypt, whether the growth rate of remittances exceeds or falls below the 41% threshold. Additionally, the study emphasizes that financial inclusion does not directly or indirectly impact economic growth in the Egyptian context, calling for interventions and investments addressing the challenges and limitations associated with financial inclusion in the country. Furthermore, it is worth noting that the findings of this study have important policy implications for the Egyptian government and policymakers. While remittances from workers abroad have the potential to contribute to economic growth, their impact alone is limited. To promote sustainable economic growth, it is crucial to diversify sources of financing and reduce reliance on external debt. This can be achieved by developing policies and strategies that encourage domestic savings, attract foreign direct investment, and promote entrepreneurship and innovation.

The available data might prove inadequate, considering the possibility that achieving conclusions regarding the actual influence of financial inclusion on enhancing the effects of overseas workers' remittances on economic growth may necessitate a long time. Future research can expand the analysis to include additional factors such as governance, political stability, and regional disparities to better understand the dynamics at play.

References:

Abdul Salam, F. M. (2020). *Impacts of the coronavirus on remittances of Egyptian workers abroad* (No. 4; 2 (in Arabic)).

Ahmad, M., Majeed, A., Khan, M. A., Sohaib, M., & Shehzad, K. (2021). Digital financial inclusion and economic growth: provincial data analysis of China. *China Economic Journal*, *14*(3), 291–310. https://doi.org/10.1080/17538963.2021.1882064

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-Bakl, A. S., & Al-Haddad, I. F. (2022). Financial inclusion and its implications for the rate of economic growth in Egypt. *The Journal of Politics and Economics*, *15*(14 (in Arabic), 1–33. https://doi.org/10.21608/jocu.2022.101147.1148

Al-Nosour, I. A. F., & Al-Nosour, I. R. (2021). The impact of migrant workers' remittances on economic growth in Jordan: A panel data study for the period 2000-2018 using the cointegration methodology. *The Arab Journal of Management*, *41*(3 (in Arabic), 205–220. https://doi.org/10.21608/aja.2021.187483

Alsaiedy, W. (2020). The impact of migrant workers' remittances on the Saudi economy: An analytical study 1997-2016. *Al-Bashaer Economic Journal*, *6*(2 (in Arabic), 162–176.

Ashry, M. A. (2018). Remittances from overseas workers and their impact on monetary policy: The case of Egypt. *The Scientific Journal of Economics and Commerce*, *48*(2 (in Arabic), 177–221. https://doi.org/10.21608/jsec.2018.39069

Atiya, J., Hassan, I., & Mohamed, S. (2018). The macroeconomic effects of remittances from Egyptians working abroad. *The Scientific Journal of Research and Business Studies (Helwan Univ.))*, *32*(1 (in Arabic), 1–30.

Azizi, S. S. (2018). The impacts of workers' remittances on human capital and labor supply in developing countries. *Economic Modelling*, *75*, 377–396. https://doi.org/10.1016/J.ECONMOD.2018.07.011

Boutalby, H. (2021). *Determinants and macroeconomic effects of remittances to migrants - a case study of Algeria* [PhD thesis]. Djillali LIABES Sidi-Bel-Abbès university.

CBE. (2022). *Remittances Press Release*.

Dahiya, S., & Kumar, M. (2020). Linkage between financial inclusion and economic growth: An empirical study of the emerging Indian economy. *The Journal of Business Perspective*, *24*(2), 184–193. https://doi.org/10.1177/0972262920923891/ASSET/IMAGES/LARGE/10.1177 _0972262920923891-FIG3.JPEG

Feenstra, R. C., Inklaar, R., & Timmer, M. P. (2015). The next generation of the Penn World Table. *American Economic Review*, *105*(10), 3150–3182. https://doi.org/10.1257/aer.20130954

Ferreira, J. P., Lahr, M. L., Ramos, P. N., & Castro, E. A. (2020). Accounting for global migrant remittances flows. *Economic Systems Research*, *32*(3). https://doi.org/10.7282/t3-6ksz-m505

IOM. (2022). *Interactive - World Migration*.

Liu, D., Zhang, Y., Hafeez, M., & Ullah, S. (2022). Financial inclusion and its influence on economic-environmental performance: demand and supply perspectives. *Environmental Science and Pollution Research*, *29*(38), 58212–58221. https://doi.org/10.1007/s11356-022-18856-1

Mohamed Aslam, A. L., & Alibuhtto, M. C. (2023). Workers' remittances and economic growth: new evidence from an ARDL bounds cointegration approach

for Sri Lanka. *Journal of Economic and Administrative Sciences*, *ahead-of-print*(ahead-of-print). https://doi.org/10.1108/JEAS-05-2022-0132

Mohamed, M. G. (2021). The role of remittances in supporting economic growth in Egypt: A standard study for the period (1990-2019). *The Journal of Financial and Commercial Research (Port Said Univ.)*, *22*(1 (in Arabic), 399–443.

Mutwally, S. (2021). Factors influencing destination country selection among Egyptian migrants for work during the period 2000-2013. *Scientific journal of Faculty of Economics & Political Science*, *22*(2 (in Arabic), 115–147. https://doi.org/10.21608/jpsa.2021.164057

Nour El Dine, G. A., & Metwally, M. F. (2019). The impact of worker's remittances on economic growth in Egypt (1991-2016). *Journal of Contemporary Business Studies*, *5*(7), 1–32. https://doi.org/10.21608/CSJ.2019.91006

Ozili, P. K., Ademiju, A., & Rachid, S. (2022). Impact of financial inclusion on economic growth: review of existing literature and directions for future research. *International Journal of Social Economics*. https://doi.org/10.1108/IJSE-05-2022-0339

Özyakışır, D., Akça, M., & Çamkaya, S. (2023). Do remittances have an asymmetrical effect on financial development? Empirical evidence from Turkey. *The Journal of International Trade & Economic Development*, 1–20. https://doi.org/10.1080/09638199.2023.2203784

Qabil, M. A. A. H. (2020). The impact of remittances from overseas workers on economic growth in Egypt. *The Journal of Commerce and Finance (Tanta Univ.)*, *40*(4 (in Arabic), 149–168.

Qamruzzaman, Md. (2023). Does financial innovation foster financial inclusion in Arab world? examining the nexus between financial innovation, FDI, remittances, trade openness, and gross capital formation. *PLOS ONE*, *18*(6). https://doi.org/10.1371/journal.pone.0287475

Shehada, S. (2023). The impact of remittances from overseas workers on economic growth in Egypt. *The Journal of Economics and Finance*, *9*(1 (in Arabic), 172–187.

Umair, U., & Scholar, B. S. (2023). Does Foreign Remittances Plays a Critical Role in the Determination of Economic Growth. *Social Science Research Network*. https://ssrn.com/abstract=4332855

Van, L. T. H., Vo, A. T., Nguyen, N. T., & Vo, D. H. (2021). Financial inclusion and economic growth: An international evidence. *Emerging Markets Finance and Trade*, *57*(1), 239–263. https://doi.org/10.1080/1540496X.2019.1697672

World Bank. (2023). *World Development Indicators (WDI)*.

أثر تحويلات العاملين المصريين في الخارج على النمو الاقتصادي في مصر في إطار الشمول المالي

الملخص:

إستهدفت الدراسة قياس أثر تحويلات العاملين بالخارج على النمو الاقتصادي المصري في إطار الشمول المالي كمعزز للعلاقة. وفي سبيل تحقيق ذلك إستخدمت الدراسة بيانات سلاسل زمنية سنوية خلال الفترة (2004 – 2020م) بإجمالي 17 مشاهدة. وبالإعتماد علي منهج اختبار الحدود، المبني على استخدام الانحدار الذاتي لفترات الإبطاء الموزعة توصلت الدراسة إلي وجود علاقة غير خطية لتأثير تحويلات العاملين بالخارج على النمو الاقتصادي في الأجلين الطويل والقصير، كما أن هذه العلاقة غير الخطية تأخذ شكل حرف U، فنجد أن تأثير تحويلات العاملين بالخارج إيجابية على مستوي النمو الاقتصادي فقط عندما يكون معدل نمو هذه التحويلات الشخصية أكبر من 41.37%، وهو المتحقق في ثلاثة أعوام فقط وهما عام 2005 والذي إرتفعت فيه تحويلات العاملين بالخارج بنسبة 50.2%، وعام 2007 بمعدل نمو تحويلات 43.6%، وعام 2010 بمعدل نمو تحويلات 74.2%. كذلك لم يكن لنمو مستوي الشمول المالي أي تأثير معنوي على النمو الاقتصادي المصري بالأجلين الطويل والقصير (برغم الإشارة الإيجابية). كما أن مستوي الشمول المالي لم يمارس أي دور معزز في علاقة تحويلات العاملين بالخارج بالنمو الاقتصادي، كما أن هناك أهمية عملية كبيرة لعلاقة تحويلات العاملين بالخارج بالنمو الاقتصادي سواء عندما يكون معدل نمو التحويلات أكبر أو أقل من حاجز 41% في السنة، وذلك بناء على نتائج مؤشري حجم الأثر.

الكلمات الدالة: تحويلات العاملين بالخارج، الشمول المالي، النمو الاقتصادي، التكامل المشترك.