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## The impact of remittances on Iraq's economic growth (2005–2023)

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**Abstract:** Remittances are one of the most important factors influencing both the micro- and macroeconomic levels, internally and externally. They play a significant role in achieving economic growth, particularly in the long term. This study aims to examine the impact on remittances in Iraq's economic growth from 2005 to 2023. To achieve this objective, the study employs the Autoregressive Distributed Lag (ARDL) model with the Bounds test to analyze the short- and long-term co-integration between remittances and economic growth. Additionally, the inflation rate and unemployment rate are included as control variables due to their strong association with the dependent variable (Gross Domestic Product, GDP) as a measure of economic growth and the independent variable (remittances). The findings indicate that remittances have a positive impact on economic growth in both the short and long run. Furthermore, correlation, co-integration, and causality tests confirm a strong relationship among all study variables. It is essential to maximize the benefits of remittances by channeling them into investment opportunities, either directly or indirectly. This would contribute to job creation, increased local production, economic diversification, and ultimately, higher economic growth.

**Keywords:** Remittances, Economic Growth, Inflation Rate, Unemployment Rate, Iraq.

### تأثير التحويلات المالية على النمو الاقتصادي في العراق (٢٠٢٣-٢٠٠٥)

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**المستخلص:** التحويلات المالية تعد من أهم العوامل المؤثرة على المستويين الاقتصادي الكلي والجزئي داخلياً وخارجياً، وتلعب دوراً هاماً في تحقيق النمو الاقتصادي، وخاصة في الأمد البعيد. هذه الدراسة تهدف إلى دراسة تأثير التحويلات المالية على النمو الاقتصادي في العراق من عام ٢٠٠٥ إلى عام ٢٠٢٣. ولانجاز هذا الهدف،

تستخدم الدراسة نموذج الانحدار الذاتي للتأخر الموزع (ARDL) مع اختبار الحدود لتحليل التكامل المشترك على المدى القصير والطويل بين التحويلات المالية والنمو الاقتصادي. بالإضافة إلى ذلك، تم تضمين معدل التضخم ومعدل البطالة كمتغيرات تحكم بسبب ارتباطهما القوي بالمتغير التابع (الناتج المحلي الإجمالي) كمقياس للنمو الاقتصادي والمتغير المستقل (التحويلات المالية). تشير النتائج إلى أن التحويلات المالية لها تأثيراً إيجابياً على النمو الاقتصادي في الأمدين القصير والطويل. النتائج أيضاً تؤكد اختبارات الارتباط والتكامل المشترك والسببية على وجود علاقة قوية بين جميع متغيرات الدراسة. ومن الضروري تعظيم الاستفادة من التحويلات المالية من خلال توجيهها نحو فرص الاستثمار، سواء بشكل مباشر أو غير مباشر. ومن هذا شأن أن يساهم في خلق فرص العمل، وزيادة الإنتاج المحلي، وتنويع الاقتصاد، وفي نهاية المطاف، تحقيق نمو اقتصادي أعلى.

**الكلمات المفتاحية:** التحويلات المالية، النمو الاقتصادي، معدل التضخم، معدل البطالة، العراق.

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## Introduction:

Remittances are financial payments sent by people, often migrant laborers, to their countries of origin. Remittances from families are a key component in the socioeconomic growth of nations. They offer significant financial assistance to millions of homes across the continents, making them an especially important factor. In addition to assisting in the alleviation of poverty, the improvement of living standards, and the development of economic resilience, these remittances, which are given by migrants who have found work overseas, serve as a lifeline for their families returning home. Remittances have an influence that goes much beyond the provision of only cash assistance. Families frequently utilize the cash to invest in education, healthcare, and local companies, which is one of the reasons why they play such an important part in the process of supporting local economies. A higher amount of economic activity is fostered by this injection of cash, which can result in the development of new jobs and improvements to the infrastructure of the towns that receive these moneys (Akeel, 2023).

Remittances have a significant influence on economic growth that extends beyond what is suggested by official balance of payments figures, and this is true for both the nations that send and receive remittances. Migration across international borders is a multifaceted phenomenon that has had and continues to have socio-economic effects on the surrounding areas of both the country of origin and the country of destination. Since remittances account for over 27 percent of the gross domestic product, they have become one of the main sources of foreign capital inflows for underdeveloped nations in recent years (Bellaqa et al., 2020). Improving immigration between developed and developing nations and technological advancements that have made international payment transfers easier and cheaper are two reasons why remittances to developing nations have been steadily rising (Meyer & Shera, 2017). The subject of remittances has garnered significant focus in scholarly study and policy discussions within international economics. These monetary transfers from migrants, amounting to about \$800 billion worldwide in 2022 as reported by the World Bank, have significant potential to influence the socioeconomic growth of their countries of origin. These figures exclusively encompass legally documented remittances, but migrants may also transmit funds through illicit channels that are challenging to quantify (Miteski, 2024).

It is possible for remittances to have a direct or indirect impact on economic growth, and this impact can be either positive overall. According to Dilshad (2013), remittances have a multiplier effect, which means that they enhance the income and spending of households, which in turn has a positive impact on aggregate demand and economic growth. This is a positive aspect of an otherwise negative phenomenon. Additionally, investments made with remittances have an indirect influence on economic growth since they partially eliminate the negative impact that insufficient savings have on the economy. Furthermore, remittances have an indirect impact on economic growth by lowering the level of volatility. This is because, in comparison to foreign direct investment (FDI) inflows and portfolio investments, remittances do not display a high level of volatility in response to changes in the economy. Furthermore, Giuliano and Ruiz-Arranz (2006) state that remittances have an indirect impact on economic growth since they contribute to the

development of the banking sector. On the other side, remittances have been shown to have impacts that are detrimental to the expansion of the economy. The Dutch illness is the most pronounced aspect of the detrimental impact that remittances have on the expansion of the economy. According to Shahedur & Chowdhury, n.d. (2015), the impact of remittances on patients with Dutch illness is caused by expenditures.

The pace at which the prices of goods and services continue to rise over a period of time, thereby lowering the purchasing power of money, is referred to as inflation. Although moderate inflation is good for the economy, rapid price increases can raise the cost of essentials like food, shelter, and gas. There are a number of variables that may contribute to inflation, including increasing demand, growing production costs, and measures implemented by the government that raise the money supply. According to the International Monetary Fund (2023), the worldwide inflation rate was predicted to be 6.8% in 2023, with poorer countries seeing larger price increases than wealthy ones. When it comes to controlling the flow of money in the economy, central banks often modify interest rates or adopt other measures (World Bank, 2022). They do this to control inflation.

The problem of unemployment is a significant economic burden that has an impact not just on people but also on whole economies. When individuals are unable to find work, their income decreases, which in turn leads to decreased expenditure and a slowdown in economic activity. Structural unemployment occurs when workers' abilities do not match available occupations, cyclical unemployment occurs during economic downturns, and frictional unemployment is the short-term gap that occurs when individuals transfer jobs. Some forms of unemployment include cyclical, structural, and frictional. Increased unemployment may be detrimental to economic progress and lead to increased expenditure by the government on social programs. According to the International Labour Organization (ILO), the unemployment rate throughout the globe was around 5.8% in the year 2023. Young people were among those who faced some of the greatest rates of unemployment (ILO, 2023). In order to address this problem, governments and companies need to place a greater emphasis on the creation of jobs, the training of skills, and the implementation of policies that encourage chances for long-term employment (World Bank, 2022).

Since 2003, the Iraqi economy has been detrimentally affected by successive crises due to political instability and ongoing wars (World Bank, 2023). After the war led by the United States in 2003 and the overthrow of Saddam Hussein's dictatorship, a significant number of Iraqis fled the nation in pursuit of a more secure environment and improved prospects. In the present day, Iraqis living abroad are dispersed all over the world, and the money that they bring back to their homeland has become an essential component of the economy. Also, the US invasion of Iraq in 2003 led to a sharp rise in mass displacement, with more than 4 million Iraqis displaced by 2010 (UNHCR, 2010). Remittance sources, estimated at \$2-5 billion annually, have been transferred into the Iraqi economy (Central Bank of Iraq, 2021). In addition to the money that has entered Iraq officially, some money also enters informally through different channels and is not recorded by the central bank and the government, which shows that the amount of remittances is much higher than recorded. After the rise of ISIS (2014-2017) and the COVID-19 pandemic in 2020, which caused oil prices to fall by 60%, remittances became a major source of household support (Iordache et al., 2023; Mushi, 2024). In addition to bolstering local businesses and communities, these remittances have assisted families in meeting fundamental requirements such as the payment of food, medical care, and educational expenses. Although remittances are significant in Iraq, they predominantly function through informal networks, which rely on a trust-based money transfer mechanism (Bellaqa et al., 2020). The objectives of this research are to investigate the extent to which remittances, inflation rates, and unemployment are all impacting economic growth in Iraq, as well as to conduct an empirical investigation into the extended relationship that exists between remittances and economic growth.

### **1<sup>st</sup>: Research hypothesis:**

H0: Remittances have no significant positive impact on Iraq's economic growth.

H1: Remittances have a significant positive impact on Iraq's economic growth.

This paper is analyzing the impact on remittances in Iraq's economic growth (2005–2023). The article is organized as follows: it begins with an introduction, followed by a literature review in the subsequent part, methodology in the third section, empirical data and analysis in the fourth section, and concludes with closing thoughts in the fifth section.

### **1. Literature Review:**

The analysis investigates historical empirical studies about remittance inflow impacts on developing nation economies. A body of extensive literature exists on remittance economics because their growing importance has led researchers to analyze direct effects on macroeconomic variables through empirical and theoretical investigations.

Here is a review of a few of these studies. According to a study by Hamma (2017), the escalation of worldwide migration has resulted in a substantial augmentation of financial transfers to labor-exporting nations, with remittances emerging as a crucial source of external funding for developing countries. The World Bank forecasts that remittances amounted to US\$ 440 billion in 2013 and are projected to increase at a sustainable rate of 7–8 percent annually from 2013 to 2018, reaching US\$ 550 billion by 2016. The documented data on remittances is flawed and under-represents the actual total. Remittances can exert macroeconomic influences, including the enhancement of investments, the accumulation of human capital, and the reduction of poverty.

This research seeks to analyze the indirect relationship between remittances and economic growth in MENA nations. The research examines the interlinked effects of remittances with financial development as well as institutional frameworks and economic growth throughout twelve MENA countries from 1984 to 2012. This study shows that maximizing the impact of remittances requires the strength of financial development and the stability of an institutional framework.

Empirical research by Husein (2019) It shows that the discourse over the efficacy of foreign aid in fostering economic growth persists, with some contending that it replaces domestic resources, while others assert that it enhances them and cultivates management competencies. This study examines the enduring effects of aid and remittances on economic growth in Jordan, a significant source of foreign capital. The research illustrates the strong correlation among aid, labor remittances, and economic growth, highlighting the significance of aid disaggregation in assessing the efficacy of foreign aid. (Dibal, n.d.) This study analyzes the impact of financial growth on the correlation between diaspora remittances and economic development in Nigeria from 2003 to 2021. The results demonstrate that diaspora remittances negatively impact the human development index in Nigeria, but the depth and efficiency of financial institutions have a positive effect. The paper recommends the adoption of macroeconomic and monetary policies to enhance economic and foreign exchange stability, thereby allowing financial institutions to operate and thrive. The high cost of remittances is a major issue.

Furthermore, research by Naeem & Arzu (2017) analyzes human development in developing countries, which experience positive changes from remittances, while migration serves as a critical determinant of currency value and inflation. The research findings show that both gender bias and trade barriers constrain development in developing nations, yet immigrant transfers yield positive outcomes. To improve development, the lowering of expenses and literacy levels combined with export promotion proves beneficial for economic growth.

Moreover, Hamma (2019) highlighted and evaluated how remittances influence 14 Middle Eastern and North African countries economic growth from 1982 to 2016 using unbalanced panel data. The combination of financial development and remittances proves most effective for economic growth in cases where financial institutions, along with their systems, have a strong foundation.

In a study by Bellaqa et al. (2020) entitled Management of Remittances and Their Role in Economic Development in Kosovo, it was found that conveyed money from abroad in Kosovo



works as a source for national improvement together with family wealth that fights against poverty. The data indicates upward trends from 2005 to 2018, culminating in €772 million in remittances in 2015, mostly allocated to household support and investments in the building industry. Young individuals will be drawn to Kosovo's economy, with policy management and export diversification being crucial factors in this allure.

Furthermore, the study by Iordache et al. (2023) examines the relationship between migrants' remittances to their home countries and their influence on EU economic development, utilizing data obtained from the World Bank. The study encompasses the complete membership of 28 EU nations from 2011 to 2022. Laboratory research findings can aid policymakers in formulating migration and development policies to offer critical recommendations for organizational and decision-making entities. The research includes both developed nations and those currently in the developing stage. Remittances have substantial impacts on the economic growth within European nations, mostly among states with sizable migrant populations.

The country experiences considerable migration activity, which requires policymakers to activate the available resources.

Yousef et al. (2024) investigate the role of remittances in promoting socio-economic development. Evidence from Bangladesh influences its socioeconomic growth by assessing its impact on mortality rates, literacy rates, and per capita GDP. Expatriates stimulate economic growth by augmenting human resources and enhancing financial access and living circumstances in their home countries. The research indicates that a one percent increase in remittances results in a 0.05 percent rise in GDP, eradicates death rates, improves secondary school enrollment, and elevates per capita GDP by 4.9 percent.

In addition, Acheampong et al. (2024) believe that rural energy poverty and inequality patterns in 135 developing countries from 2000 to 2020 are studied regarding their relationship with remittance flows. The research indicates that receipts from international remittances effectively decrease this set of challenges. The magnitude of remittance benefits relates to a nation's financial sector development along with its GDP per capita levels so that advanced financial systems and high GDP per capita areas receive greater relief from these problems.

In the study of Mushi (2024), an evaluation of remittance inflows on Tanzanian social and economic progress occurred throughout the period from 1990 to 2022. The World Bank, IMF, and WEO databases served as the data sources to assess how economic growth relates to remittance. Remittance donations show a positive correlation with Tanzania's economic development because they act as vital forces that push the country toward a path of economic growth.

(Kuffour et al., n.d.) The study examines the effects of remittances on Nigeria's economic expansion and unemployment through the use of an (ARDL) model with time series data included from 1980 to 2022, investigating the effects of Holland syndrome. Research data reveals that remittances show a negative impact on GDP expansion but establish a favorable relationship with the unemployed labor force. The use of remittance funds leads to appreciation in the real exchange rate value. The research indicates remittances generate adverse macroeconomic outcomes, which require government strategies to enhance their positive effects and reduce their negative aspects. Also (Khan, 2023) This study examines the impact of remittance influxes on poverty reduction in South Asia. An autoregressive distributed lag model was employed utilizing a time series dataset spanning from 1980 to 2021. The research indicated that remittances substantially alleviate poverty in both the short and long term, although inflation was an obstacle. Trade openness negatively impacted poverty in the long term. Government entities have the capacity to leverage incoming remittance monies to bolster investment initiatives and regulate inflation rates. Abou Ltaif et al. (2024) elucidated the impact of personal remittances on Lebanon's economic development from 2002 to 2022. The data indicates that monetary transfers into Lebanon have a greater impact on its GDP than capital investments from international enterprises. The financial inflows enable households to meet their fundamental needs for living expenses while paying for education alongside healthcare, thus resulting in better family welfare. The data indicates governmental

programs that boost financial education capabilities alongside encouraging investments of value could help Lebanon build better economic strength alongside development capabilities.

Although Miteski (2024), in their study, examines the correlation between economic growth and remittances in twelve Central and Southeastern European nations. The research employs static unobserved effects panel data models alongside the Cobb-Douglas framework. Findings indicate that remittances exert a positive and considerable direct influence on economic growth, in conjunction with other growth determinants such as physical and human capital. So to enhance the impacts, policymakers need to design a technique in an appropriately programmable way.

Navaratnam (2024) investigates the impact of personal remittances on Sri Lanka's economic development from 1980 to 2021 using the Autoregressive Distributed Lag (ARDL) approach. The results show that there is no obvious short-term relationship while there is a long-term positive effect of remittances. Therefore, labour outmigration does not have a significant impact on economic growth. Fixed capital formation promotes aggregate economic growth through FDI but is negatively affected by outward labour migration. The study highlights the importance of remittances for economic advancement.

Lastly, Shair et al. (Shair et al., 2024) research investigates the elements that guide domestic migration patterns and poverty rates in Pakistan, specifically among households that get money transfers. The study relies on Pakistan Social and Living Standards Measurement–Household Integrated Economic Survey data to run its analysis using a logistic regression model. The results indicate that families who receive money from abroad experience decreased chances of being poor since their remittance amount has a reverse correlation with poverty incidence. Households receiving remittances at the level of the minimum wage will decrease the poverty rate to below 40%.

Research reveals extensive development impacts of remittances since they affect economic growth through mechanical functions and financial sector development, which leads to better infrastructure combined with anti-poverty effects. Studies prove remittances create positive effects, but these results depend heavily on both financial institutions quality and governance standards, together with valid macroeconomic policies. The economic advantages from remittances flowing into MENA and emerging regions prove substantial for Iraq because they support reconstruction efforts after conflict while maintaining financial stability. Public authority officials must enhance their financial institutions as well as expand investment choices and implement firm governance methods to ensure remittances lead to positive economic outcomes.

Moreover, previous studies broadly agree that for economic development, remittances play a significant role, as well as impact poverty alleviation and financial sector growth, especially in developing countries. Studies such as those of (Hamma, 2017) and (Yousuf et al., 2024) emphasize that remittances have a positive impact on GDP growth and household welfare, in line with the findings of (Naeem & Arzu, 2017), which focus on improving human development. Yet, some studies report different results, such as Dibal (n.d.) and Kuffour et al. (n.d.). They propose that remittances may adversely affect economic growth and, in particular, labor markets, notably in nations experiencing Dutch disease. A crucial issue to note is the difference between short-term and long-term benefits, with Navaratnam (2024) identifying that remittances considerably and efficiently foster economic growth in the long run (Bellaqa et al., 2020). The cited study contrasts formal and informal remittance channels, with some studies acknowledging the importance of informal networks (Abou Ltaif et al., 2024), while providing limited empirical evidence about their macroeconomic impacts.

Notwithstanding these discoveries, several gaps persist in the research. Initially, there exists a paucity of studies explicitly concerning Iraq in this context, although its distinctive economic framework, significant dependence on oil income, and the obstacles associated with post-conflict rehabilitation. Secondly, although several studies investigate the effects of remittances on economic development and poverty alleviation, fewer assess their interplay with inflation, currency rates, and the efficiency of the banking sector, particularly in nations characterized by fragile institutional

frameworks. Third and finally, although those studies recognize the importance of remittances in financial stability, less attention is paid to their effects on post-war reconstruction and economic diversification, which are crucial for the sustainable development of the country. This article enhances the literature by addressing these shortcomings, providing a country-specific analysis of Iraqi remittance inflows from 2005 to 2023. The ARDL technique examines both short-term and long-term consequences, taking into account essential macroeconomic metrics such as GDP, inflation, and unemployment. Furthermore, it analyzes remittance procedures via official or informal channels, evaluating their respective effects on Iraq's economic stability. This article offers empirical data to guide policymakers in maximizing remittance utilization for sustainable economic growth.

## 2. Methodology and Data Collection:

To examine the impact on remittances in Iraq's economic growth in Iraq, the bounds test, along with the ARDL (Autoregressive Distributed Lag) model, was applied. This analysis utilized annual data for the period 2005–2023,\* focusing on the GDP as a measurement of economic growth, remittances, inflation rate, and unemployment rate from ([World Bank Open Data | Data](#)).

$$\ln GDP_t = B_0 + B_1 \ln REM_t - B_2 \ln INF_t - UM_t B_3 + U_t \dots (1)$$

An ARDL representation of Equation (1) is formulated as follows:

$$\Delta \ln GDP_t = \alpha_0 + \sum_{i=1}^p \alpha_1 \Delta \ln GDP_{t-i} + \sum_{i=1}^p \alpha_2 \Delta \ln REM_{t-i} - \sum_{i=1}^p \alpha_2 \Delta \ln INF_{t-i} - \sum_{i=1}^p \alpha_3 \Delta \ln UM_{t-i} + U_t \dots (2)$$

### Where:

$\ln GDP_t$  = natural logarithm of GDP rate in Iraq in year t;

$\ln REM_t$  = natural logarithm of remittances in Iraq in year t;

$INF_t$  = Inflation rate in Iraq in year t;

$UM_t$  = Unemployment rate in Iraq in year t;

t = time period from 2005 to 2023;

P = optimal lag length;

$\alpha_0$  = the drift component;

$\alpha_1$ - $\alpha_3$  = Coefficients or Parameters/long-run dynamics of the model;

$U_t$  = error term or disturbance.

## 3. Empirical Results and Discussion:

### Description of the study variables:

The following table shows some general statistical tests to describe the data and variables used.

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\* For improving certain results and addressing some econometric problems, it may be beneficial to convert the data into first differences and apply logarithmic techniques.

**Table (1):** Results of Descriptive Statistics for the data and variables:

Statistic indicators	Economic Growth/GDP	Remittances	Inflation Rate	Unemployment Rate
<b>Mean</b>	3.9725	62500000000	7.2	11.2
<b>Median</b>	3.3792	72700000000	2.9	10.6
<b>Minimum</b>	-12.0367	3100000	53.2	16.2
<b>Maximum</b>	13.9364	1161700000	-10.1	7.9
<b>Jarque-Bera (Prob.)</b>	0.2263	0.4565	0.9122	0.3184

**Source:** Prepared by researchers based on annual data for the period (2005-2023) using the program E-views 12.

From table (1), results show that the economic growth during the study period is between the lowest value (-12.03) and the highest value (13.93), with a mean and median (3.97 and 3.37) respectively. Moreover, the remittances during the same period are between the lowest value (3100000) and the highest value (1161700000), with a mean and median (62500000000 and 72700000000), respectively. Thus, with respect to other variables. According to the Jarque-Bera test, all variables follow a normal distribution.

#### Unit root stationarity test:

The stability and consistency of data and variables is an important issue in econometrics, especially for time series data. There are many different tests that can be used for this purpose, but both (Dickey Fuller Augmented and Phillips Perron tests) are among the most used. The results of these two tests are shown as follows:

**Table (2):** Results of Unit Root Test:

Variables	PP: Phillips-Perron				ADF: Augmented Dickey-Fuller			
	(First Difference)		(Level )		(First Difference)		(Level )	
	Intercept	Trend	Intercept	Trend	Intercept	Trend	Intercept	Trend
GDP	-4.1322 (0.0175)	-5.5017 (0.0190)	-0.9072 (0.7284)	-4.0502 (0.0540)	-8.3436 (0.0001)	-6.6135 (0.0024)	-4.7977 (0.0029)	-4.7410 (0.0125)
Remittances	-6.4188 (0.0001)	-5.5314 (0.0020)	-2.2548 (0.1956)	-3.8188 (0.0398)	-5.1347 (0.0009)	-5.0176 (0.0029)	-2.2598 (0.1941)	-3.8188 (0.1941)
Inflation Rate	-10.0965 (0.0000)	-9.1105 (0.0001)	-1.0583 (0.7005)	-0.7266 (0.9483)	-4.9226 (0.0034)	-4.4627 (0.0244)	1.4048 (0.9948)	0.0390 (0.9781)
Unemployment Rate	-3.2541 (0.0339)	-6.8016 (0.0002)	0.0866 (0.9552)	-2.0176 (0.5534)	-3.2809 (0.0326)	-3.1649 (0.1240)	0.0656 (0.9533)	-2.0669 (0.5282)

**Source:** Prepared by researchers based on annual data for the period (2005-2023) using the program E-views 12.

It is clear from Table (2) and through tests (Dickey Fuller Augmented and Phillips Perron tests) that all variables are significant at (5%) in the first difference in (Intercept /Trend), that is, all variables are stationary.

#### Correlation Test:

Correlation is a good basis for supporting a good description of the model. There are several tests to measure the correlations between economic variables, the simplest of which is the correlation matrix, the size and direction of the study variables in Table No. (3):



**Table (3):** Results of Correlation Test:

Variables	GDP	Remittances	Inflation Rate	Unemployment Rate
GDP	1			
Remittances	0.1121	1		
Inflation Rate	- 0.0340	0.1954	1	
Unemployment Rate	- 0.2406	0.4993	- 0.2718	1

**Source:** Prepared by researchers based on annual data for the period (2005-2023) using the program E-views 12.

Table (3) indicates a positive relationship between the remittances and economic growth/GDP rate, while showing a negative relationship between the inflation rate and unemployment rate with GDP.

### Co-integration Test:

Co-integration is one of the important tests to show the level of co-integration between the variables in order to allow an estimate of the model. In time series analysis, it is necessary to have at least one co-integration between one of the independent variables and the dependent variable. The (Johansen Test) one of the common tests used to measure the level of co-integration between the variables; Table (4) shows the results of this test.

**Table (4):** Results of Co-integration Test:

Variables	Maximum Eigenvalue Statistic	Critical Value (0.05)	Prob.	Trace statistic	Critical Value (0.05)	Prob.
GDP	98.92555	30.81507	0.0000	223.4535	55.24578	0.0000
Remittances	49.96531	24.25202	0.0000	124.5279	35.01090	0.0000
Inflation Rate	41.57588	17.14769	0.0000	74.56262	18.39771	0.0000
Unemployment Rate	32.98675	3.841465	0.0000	32.98675	3.841465	0.0000

**Source:** Prepared by researchers based on annual data for the period (2005-2023) using the program E-views 12.

From the above table and based on (Johansen test) in both states (Trace and Eigen) it is clear that all the variables have a co-integration relationship at the significant level (5%), and these results support the procedure for estimation correctly for all variables.

### Granger Causality Test:

Currently, most economic variables have strong relationships and, in many cases, may be both cause and effect at the same time. The concept of causality focuses on the existence of a causal relationship between the variables of the study. There are many tests to determine the direction and the causal relationship between variables (one direction or two direction), but the (Granger Causality) test is one of the most used tests in the field of economic analysis. The results of this test are presented in Table (5).

**Table (5):** Results of Granger Causality Test:

Null Hypothesis	F-Statistic	Prob.
Remittance does not Granger Cause GDP	5.1309	0.0085
GDP does not Granger Cause Remittance	4.3550	0.0167
Inflation Rate does not Granger Cause GDP	1.6536	0.1992
GDP does not Granger Cause Inflation Rate	0.9883	0.3776
Unemployment Rate does not Granger Cause GDP	19.3665	0.0000
GDP does not Granger Cause Unemployment Rate	49.0508	0.0000

**Source:** Prepared by researchers based on annual data for the period (2005-2023) using the program E-views 12.

Table (5) shows that at the (5%) significance level, there is a bidirectional causal relationship between the GDP, Remittance and unemployment rate.

### Short and long run Estimation:

One of the specifications and advantages of using the (ARDL) model is the ability to find short- and long-term effects of the variables under study. In addition, the data in the current study are suitable for using this model due to it giving good economic, statistical, and econometric results. The findings of the short- and long-term impacts are as follows:

**Table (6):** Results of short and long run estimation using ARDL:

	Value	Significant Level	I(0) Lower	I(1) Upper
ARDL-Bounds Test	12.3861	10%	2.72	3.77
		5%	3.23	4.35
		1%	4.29	5.61
Variables	Short run		Long run	
	Coefficient	Prob.	Coefficient	Prob.
Remittance	0.3774	0.0310	0.2731	0.0036
Inflation Rate	-0.0269	0.1881	-0.0194	0.0001
Unemployment Rate	-0.8039	0.0146	-0.5818	0.0002
Coint Eq(-1)	-1.3817	0.0007	B0 /C0	2.8561 (0.0029)

Source: Prepared by researchers based on annual data for the period (2005-2023) using the program E-views 12.

### From the results in the table above, the following can be concluded:

**1:** The Bounds test indicates the presence of long-term co-integration among the variables included in the model. The ARDL-Bounds test values of 12.3861 are greater than the critical values of 4.35 at the (5%) level.

**2:** In the short-term, an increase in the remittance by one unit leads to an increase in the economic growth by 0.3774. Conversely, an increase in the inflation rate and unemployment rate by one unit decreases the economic growth by -0.0269 and -0.8039, respectively.

**3:** In the long term, an increase in the remittance by one unit leads to a rise in the economic growth by 0.2731. On the other hand, a one-unit increase in the inflation rate and unemployment rate leads to a decrease in the economic growth by -0.0194 and -0.5818, respectively.

**4:** The Error Correction coefficient [CointEq(-1)] is expected to be negative and significant. The values of -1.3817 confirm the validity of the error correction model, indicating the speed of adjustment from short-term disequilibrium to long-term equilibrium.

### Diagnostic Checking:

To accuracy the estimation several statistic indicators were used, including ( $R^2$ , Adjusted  $R^2$ , Std. F, Error, SSR, AIC), as well as several econometrics test including (Autocorrelation, Multicollinearity, Heteroskedasticity, Identification, Non-normal distribution of data), thus, the result of these indicators and tests.

**Table (7):** Results of Diagnostic Checking:

Statistic tests	Prob.	Econometrics tests	Prob.
R-Squared	0.8412	LM/Breusch-Godfrey test for Serial correlation	0.5021
Adjusted R <sup>2</sup>	0.6428	Variance Inflation Factors test for Multicollinearity	Remittance = 2.41 Inflation rate = 1.10 Unemployment rate = 3.54
F-statistic Prob.(F-statistic)	4.2393 (0.0932)	ARCH test for Heteroskedasticity	0.7549
S.E. of regression	0.3921	Ramsey Reset Test for Identification	0.6735
Sum squared resid	0.6152	Jarque – Bera test for Normality	0.6326
AIC	1.2494		

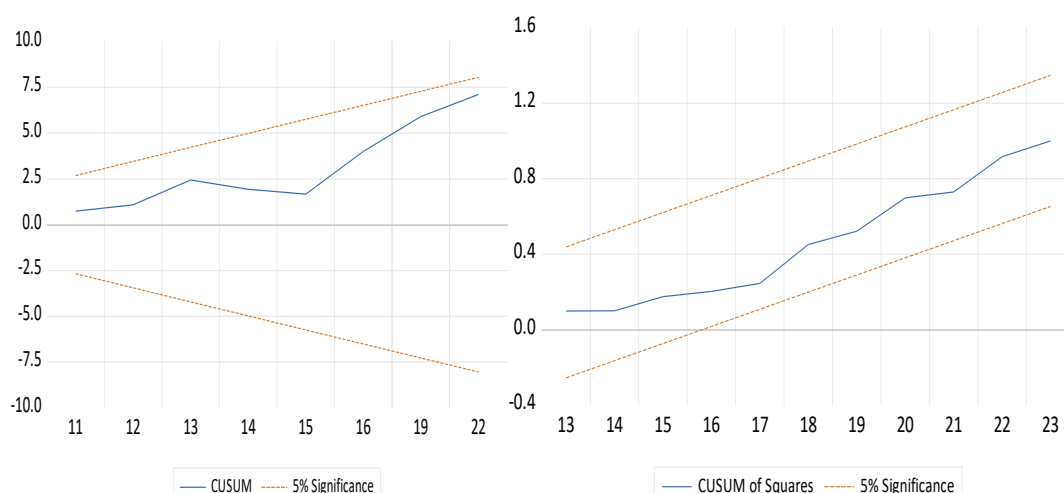
Source: Prepared by researchers based on annual data for the period (2005-2023) using the program E-views 12.

**From table (7) we note the following:**

- 1:** The values of ( $R^2$ ) and (Adjusted  $R^2$ ) are good for the estimator model, with values of (84%, 64%) respectively. This means that all independent variables included in the models have a strong relationship with the dependent variables.
- 2:** The ARDL estimation passed all diagnostic checks because the probability value of the tests is greater than (0.05) and the value of the (VIF) is less than (10).
- 3:** The (F) with statistical significance (0.0932), which is less than the value of (P-value 0.10), so we accept the alternative hypothesis that recognizes the strong relationship between the independent variables and the dependent variable.
- 4:** The value of (S.E/SSR/AIC) is generally suitable and acceptable, which indicates the validity and accuracy of the estimation.

**Stability tests (CUSUM and CUSUM of Squares):**

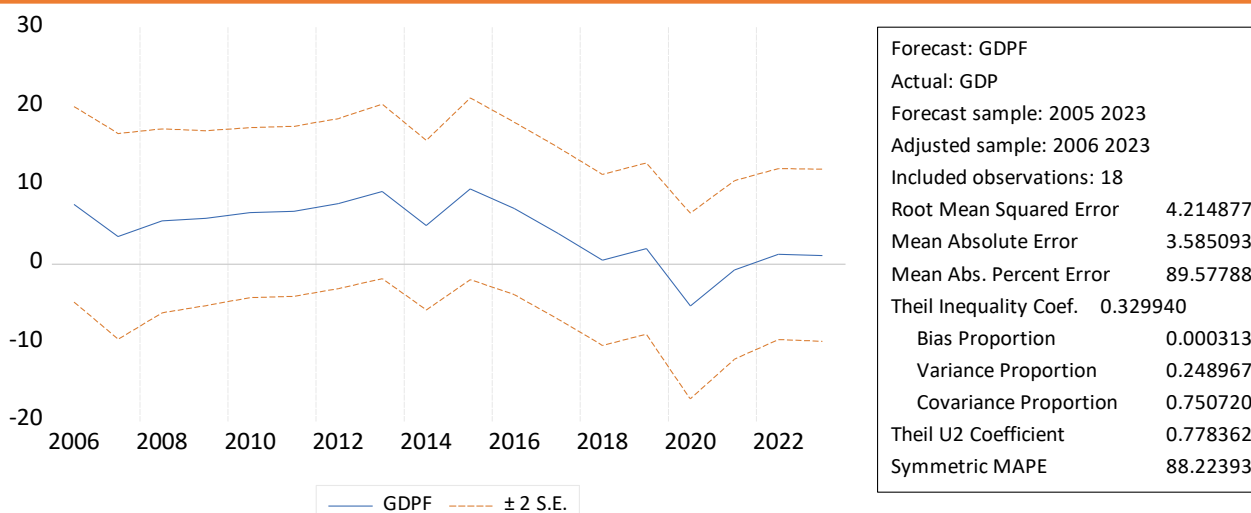
To ensure the stability of coefficients and the model, the study used some important tests like (CUSUM) and (CUSUM of Squares). This can be depicted through the diagrams as follows:



From the above figures, the coefficient and model estimators are stable because the blue curve of the data lies between the two lines, and this indicates the stability of the estimated parameters and ARDL model at the level of significance (5%).

**Testing the predictive performance of the model estimation:**

An important stage in the construction of the econometric model, and at the same time one of the main objectives of the econometric model, is to test the performance of the estimated model to predict. In fact, there are several tests that can be used for checking the ability and performance of model estimation for forecasting purposes, such (RMSE, MAE, MAPE and Theil Inequality coefficient), and the result as following:



The figure above shows that the results of errors for each of (RMSE), (MAE) and (MAPE) are few, and this is an indicators of model performance. Moreover, Theil Inequality coefficient, which is the best predictive performance indicator, its value is only equal (0.3299). This means that the predictive efficiency of the estimated model is strong.

## 2<sup>nd</sup>: Conclusions:

The main goal of all countries, whether developed or developing, is to achieve the required rates of economic growth. The ways of achieving this goal differ from one country to another and within one country from one period of time to another. However, remittances are among the most effective ways and sources, especially in developing countries, if countries benefit from this aspect. They play a significant role in achieving economic growth, particularly in the long term. This study's objective is to investigate the role of remittances on economic growth in Iraq from (2005 to 2023). To achieve this objective, the study employs the Bounds test with Autoregressive Distributed Lag (ARDL) model to the measuring and analyzing the short- and long-term co-integration between remittances and economic growth. The conclusions indicate that remittances have a positive impact on economic growth in both the short and long run, although these effects are greater in the short term compared to the long term. In addition, there are good relationships and integrations between all variables that appear through the use of tests such as: correlation, co-integration, and causality tests.

Finally, to maximize the benefits of remittances at all levels, the government, relevant authorities, and banks should work on developing a long-term strategy for how to employ remittances.

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