

# Empirical Analysis of Remittance to Economic Effects: New Evidence from Jordan's Economic Growth

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**Abstract** - Remittances are a very important source in the economies and livelihoods of the receiving people and countries. Remittances are becoming such an important source in the development of poorer countries that in 2004 the G8 countries decided to take action that would help reduce the cost for foreign workers who send money back to their country of origin. As with many countries, remittance has become a very important source of development in Jordan. According to statistics, remittance inflows into Jordan in 2018 amounted to \$4.4 billion. And while there has been some analysis of remittance and economic growth; the impact of remittances and the relationship between remittances and economic growth have not been adequately studied. The purpose of this paper is to study the effect of remittances on economic growth in Jordan. More precisely this study tries to explore the short-run relationship between remittances and economic growth. I analyze the role of remittance on GDP of Jordan, using a linear regression models and error correction models. The results indicate a highly positive correlation between remittance and GDP growths in Jordan, contributing the overall economic development of the country.

**Keywords:** Empirical Analysis, Error correction model, Economic Growth, Remittance.

## INTRODUCTION

A remittance is money earned abroad by a migrant worker and then sent back to their home country. For this paper, it would be a Jordan worker earning money in the US, or another non-Jordan country, and then sending all or a portion of those earnings back to Jordan.

Jordan officially gained its independence and adopted the name Jordan in 1949. The country's longtime leader from 1953-1999, King Hussein, is credited for successfully creating a healthy economic environment for growth and development. In 1988 King Hussein permanently reinstated elections, and launched a political liberalization through the legalization of political parties in 1992. King Hussein's son, King Abdullah II, continued this path to economic growth and openness when he was granted the throne upon his father's death in 1999.

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Jordan furthered its economic growth when it entered into the World Trade Organization in 2000, and also began to participate in the European Free Trade Association in 2001. Also, in 2001 Jordan eliminated all duties on goods and services between Jordan and the United States with a Free Trade Agreement with the US. King Abdullah II further spurred economic growth by implementing other economic reforms; opening the trade gate, increasing privatization of the state-owned companies, and decreasing fuel subsidies. These reforms made Jordan the 4th freest economy in the Middle East and North Africa, all of which attracted foreign investment and created jobs.

The economic growth and development spurred on by King Abdullah's reforms resulted in an average of 5.5% GDP annual growth since King Abdullah took over in 1990, and 7% growth over the last 10 years. Jordan has also developed and reformed its banking sector; implementing conservative banking policies that have made it the investment destination of choice for surrounding countries in turmoil like Israel and Lebanon. In fact, Jordan's bank policies helped it escape the worst of the serious global financial crisis in 2009. Further Evidence of the success of these new policies and openness is that they have allowed for growth even during this current global slowdown, of 3.1% in 2010 and 2.5% in 2011.

However, with all the economic reform, and growth, Jordan is still heavily dependent on remittances. Remittances to Jordan account for an average of 18% of GDP for the period 1990 – 2014. This heavy reliance on remittance is what makes Jordan an attractive country for this particular analysis.

A lot of studies have analyzed remittances developmental impact on various fields. However, little attention has been paid to answer the question of whether remittances actually boost economic growth. The purpose of this paper is to study the effect of remittances on economic growth in Jordan.

More precisely this study tries to explore the short-run relationship between remittances and economic growth. I analyze the role of remittance on GDP of Jordan, using a linear regression models and error correction models.

**LITERATURE REVIEW**

Singer used a robust analysis to create an instrumental variable analysis with includes multiple economic and political variables to demonstrate that the international financial immigration has a substantial influence on the choice of exchange rate regimes in the undeveloped world. Over the past decades, remittances have become a significant source of external financing for undeveloped countries. This remittance source exceeds traditional sources of capital such as foreign direct investment and bank lending.

Remittances are unlike all other capital inflows because they are stable and move counter cyclically to the recipient country's economy. This means that remittances would be expected to move in the opposite direction with the home countries business cycle, increasing whenever it is a stagnation or economic crisis in the home countries of migrant workers and falling whenever home country economies do well. This is expected, since migrant workers from most countries increase their support to family members during down cycles of economic activity back home to help them compensate for reduced family income due to unemployment or other economic down turn impacts. As a result, these remittances ease the costs of domestic monetary policies and may also serve as an international risk-sharing mechanism for developing countries.

Quisumbing and Mcnoiven using a unique longitudinal dataset from Bukidnon, Philippines, and the authors investigated the impact of remittances on asset holdings, household consumption expenditures, and credit constraints of households in origin communities. The authors demonstrated the negative impact of remittances in the rural Philippines. The authors found that a larger number of migrant children will reduce the values of non-land assets, total expenditures per adult equivalent, and many other components of household expenditures. However, the results are not all negative; the authors also suggested that remittances have a positive impact on housing, consumer durables, non- land assets, and total expenditures.

Maphosa discussed the idea that the development potential of remittances has not developed enough policy attention in the migrants' countries. The author discussed how the Home Link Facility established by the Reserve Bank of Zimbabwe in May 2004 excludes undocumented migrants. These undocumented migrants are not likely to use normal channels to send their remittance money back home, and current studies on international migration from Zimbabwe to South Africa have ignored the role of remittances, especially those from undocumented migrants.

With the flow of remittances' increasing and more informal, untaxed, and unregulated channels being used, some countries have realized the positive effects of the remittances and developed strategies to encourage the transfer and investment of remittances thru normal channels, which can then contribute significantly to the reduction of poverty and development. If no such regulations and policies exist, which require cooperation between government and migrant groups, migrant remittances will continue to be used only for household consumption, and at that point no remittances being invested in sustainable investment.

The authors found that remittances from migrants in South Africa contribute significantly to the welfare of households in southern Zimbabwe. These remittances are used to improve standards of living, better health care and education, and are also invested in productive activities. However, in order for the maximum potential for development from remittances to be fully realized a combined effort is needed between the government, and migrant groups, to find ways to encourage the transfer of remittances and then create an environment for better sustainable investment of remittances.

This study will differ from the previous studies mentioned above, because my study will use the neoclassical Solow Growth model to examine economic growth. More precisely this study tries to explore the short-run relationship between remittances and economic growth. I analyze the role of remittance on GDP of Jordan, using a linear regression models and error correction models.

**DATA DESCRIPTION AND VARIABLE DEFINITIONS**

Our sample consists of annual data for Jordan for the period 1975–2010. The data is from the International Financial Statistics (IFS) of the International Monetary Fund and from the World Development Indicators (WDI) of the World Bank.

**Data sample size**

Column1	R	K	0	Y
Mean	222.9504	1063.17	113.1632	2055.685
Median	234.0291	946.4002	108.9184	1866.678
Minimum	69.08442	550.5678	75.14799	1182.887
Maximum	439.9936	2004.287	146.1082	4559.87
Sum	8026.214	38274.13	4073.875	74004.65
Count	36	36	36	36

Remittances, measured as workers' remittances, comprise of current transfers by migrant workers and wages and salaries earned by nonresident workers. Migrants' transfers are defined as the net worth of migrants who are expected to remain in the host country for more than one year that is then transferred from one country to another at the time of migration. Then remittances per capita are the appropriate variable of interest. Openness to international trade, measured as the ratio of the sum of exports plus imports of goods to total output, is a control variable. This controls the policies, and I want to test what happens when they change policy and allow openness thus increasing imports and exports.

**EMPIRICAL ANALYSIS**

The model is based on neoclassical growth model: Impact of remittances on economics growth

$$Y_{it} = a_0 + a_1 Rem_{it} + a_2 k_{it} + a_3 O_{it} + \epsilon_{it} \quad (1)$$

Y denotes GDP.

R is remittances.

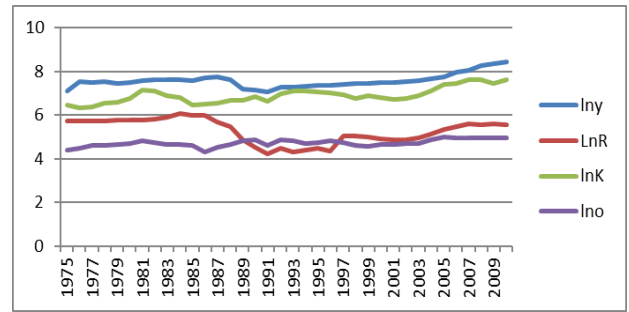
O is a control variable openness, measured as the ratio of the sum of exports plus imports of goods to total output.

K is the capital labor ratio.

Remittances and capital are endogenous variables, the openness is exogenous variable. We are interested in testing whether the marginal impact of remittances on economic growth,  $a_1$  is statistically significant.

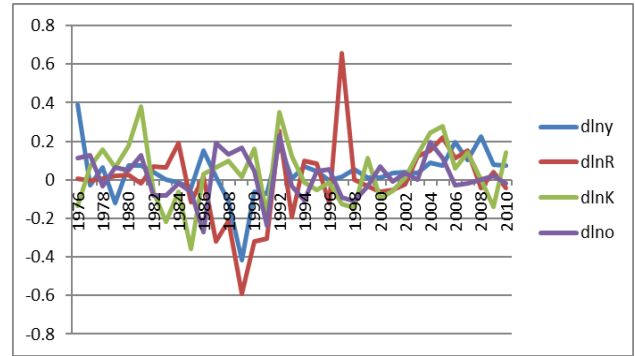
The neo classical model requires the inclusion of capital in our equation. There is sometimes a risk of capital compounding monies sent from other countries back to the home country. Remittance is very different from Foreign Direct Investment, since foreign direct investment is sent for the sole purpose of capital investment. However, remittance is different since it is sent back to struggling family remaining in the country which then typically uses the money for consumption and not investment. This allows for the inclusion of capital in the equation while avoiding any compounding effect on remittance.

The Capital labor ratio variable is endogenous, remittances, and the openness variables are exogenous. We are interested in testing whether the marginal impact of remittances on economic growth,  $a_1$ , is statistically significant.



Time plots on levels variable lnY, lnR, lnK,lnO

**Figure1 Time plots on levels**



Time plots on difference

**Figure 2 Time plots on difference**

**INTERPRETATION OF RESULTS**

An autoregressive AR (1) tests for a level stationary series examines whether it is a function of its own lag and if estimate value less than 1 then is stationary, converging to its dynamic equilibrium (table 1). An ARCH test whether residual hetroskadacity,  $\epsilon_t^2 = \beta_0 + \beta_1 \epsilon_{t-1}^2 + \epsilon_t$ . If  $\beta_1 \neq 0$  there is heteroskedasticity in the autoregressive variance process (table 2).

**Table 1  
AR (1) test**

	Estimate (value<1) Coe+2sse	Residual corr	ARCH(1) (t<2.037)
Y	1.1539	1.5332	t=0.1912
Rem	1.0521	1.4968	t=0.6978
K	1.0877	1.6333	t=-0.4507
O	0.9372	1.8558	t=0.1993 (Level stationary)

An augmented Dickey–Fuller test (ADF) for a difference stationary series by adds a lagged dependent variable. A Durbin h test whether residual correlation. Residual come from origin model  $\ln Y = a_0 + a_1 \ln \text{Rem} + a_2 \ln k + a_3 \ln O + \epsilon$ . From the Engle granger we reject null hypothesis, so the model cointegration (table 3).

**Table 2**  
ADF test

<b>Difference stationary No autocorrelation</b>				
<b>F- value (F&lt;Φ=4.171) t-value Durbin h(-1.96&lt;h&lt;1.96) ARCH(t&lt;2.042)</b>				
ΔY	2.114	-0.4922	0.3271	-0.2100
Difference				
ΔRem	1.295	t= -1.1399	-0.6309	0.2036
Difference				
ΔK	2.1761	t= -2.3735	-0.4325	-0.0546
Difference				
ΔO	3.0575	t= -3.0159	-0.0654	0.0415
Difference				

All the variables are difference stationary

The DW test and ARCH test evidence that the error-correction model demonstrates a reliable result.

**Table 3**  
Engle Granger test

<b>Engle granger</b>			
	Estimate	F-test	t-test (t>-4.10)
Constant	-0.0007	10.6869	-0.038
Lag Residual	-0.2716	10.6869	-3.269

Reject null hypothesis: cointegration. Residual come from origin model  $\ln Y_{it} = a_0 + a_1 \ln \text{Remit}_{it} + a_2 \ln k_{it} + a_3 \ln O_{it} + \epsilon_{it}$ . From the Engle granger we reject null hypothesis, so the model cointegration.

The error-correction model demonstrates a reliable result (table 4). The model demonstrates that a 1% increase in remittances will boost recipient countries economy growth by 0.24%. This suggests that remittances are very important for Jordan's economic growth. When an increase of 1% in capital occurs, it will boost economic growth by approximately 0.29%.

**Table 4**  
Model regressions

	R	k	O	Error-correction	
lnY	0.3165 (t=5.8780)	0.7260 (t=4.4839)	-0.2760 (t=-0.7541)		DW =0.8515 ARCH t = 1.7241
ΔlnY	0.2966** (t=3.127)	0.0839 (t=0.5935)	-0.075 (t=-0.3693)		DW =1.9597 ARCH t =-0.6472
Error Correction	0.2417** (t=3.1157)	0.2936** (t=2.4197)	-0.2839 (t=-2.7724)	-0.1241 (t=1.0511)	DW =1.9734 ARCH t =-0.8079

\*\* mean 5% significant

Openness has a negative effect on economic growth, when an increase of 1% in openness, it will decrease economic growth by approximately 0.28% and significant at 1% level. Openness has negative effect may be evidence that the Jordan industry in infant period, so when increase more trade actual will decrease Jordan economic growth because of the competitive disadvantage.

Completing the neoclassical Solow growth model, and using econometric methods to demonstrate that remittance has a positive effect on economic growth for the home country.

**CONCLUSION**

Remittance is the direct transfer of money by a foreign worker to his or her home country.

For this study, it would be a Jordan worker earning money in the US, or another non-Jordan country, and then sending all or a portion of those earnings back to Jordan. This remittance money sent by migrant workers back to their home countries has become one of the largest financial inflows into many developing countries; surpassing even international aid. The typical migrant worker will send approximately 10% of their household income to their family in their home country, these remittances will then account for 50-80% of the household income of the recipients. Remittances to Jordan play a huge part in the development of the country, and account for an average of 18% of GDP for the period 1995 – 2010. The purpose of this study was to examine the effects of remittance on economic growth for the country of Jordan; specifically, its relationship to household consumption and total investment.

The model results demonstrate that a 1% change increase in remittances to Jordan will boost economic growth in Jordan by 0.24%. This large impact of remittance on Jordan's economic growth demonstrates the importance of remittance on Jordan's economic growth, and that further analysis of the remittance effect on Jordan is worthwhile. The error correction model demonstrates a reliable result for the Solow Growth model. For further study we could use the Equilibrium Displacement model to check whether the effects of remittance on consumption are the same as remittance effects on investment in Jordan.

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