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The Role of Workers' Remittances in Development of Jordanian Banking Sector

Alaaeddin Al-Tarawneh

Department of Business Economics, The University of Jordan, Amman, Jordan

Email address:

a.altarawneh@ju.edu.jo

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Abstract: This paper examines the impact of workers' remittances on a key indicator of banking sector development using Jordanian data over the period 1964 to 2013. The results are obtained using cointegration analysis depending on the E-G procedure test within the ECM framework. The study has found evidence of significant positive effects of remittances on the credit to the private to GDP ratio. Any increase in the workers' remittances, increases the level of banking sector development. In addition, a test for asymmetric relationship between variables is implemented, and results show that this relation does not exist.

1. Introduction

Remittances attracted attention due to the large amount of remittance flows to the developing countries, about 74% of the global remittances flow. The lack of capital inflows in developing countries, particularly Jordan, makes remittances an important source, instead of foreign capital. In addition, remittances also provide a progressively more valuable source of extra saving and capital accumulation. Therefore, the economics of remittances has become an area of interest over the last two decades.

Many of the studies, discussed in section 3, concerning remittances investigate their impact on various economic variables. In some studies, the emphasis is placed on the determinants of the flows of remittances. These studies investigate the main factors that influence workers' remittances. However, there is no study in the literature exclusively devoted to the effect of the remittances of Jordanian working abroad on economic indicators. This study will shed light on the relationship between remittances and banking sector development in Jordan to extend the existing literature.

For most developing countries, remittances flows play a significant role in their economies. Jordan is considered as one of the top ten developing countries with the highest received remittances as a percentage of GDP. This exceeds 17% of GDP on average for the last 15 years. Moreover, it is listed the fourth in the region in terms of the volume of remittances in 2015 [1].

A significant amount of recent research has been devoted to examining the behaviour of financial development, using several determinants that affect banking sector development indicators. Only few papers have examined the relationship between the level of remittances and the banking sector development. This paper attempted to investigate the potential impact of workers' remittances on the key indicator of banking sector development in Jordan. The study employs the standard cointegration test, Engel-Granger test. In order to deepen the analysis, this study divided into three fundamental aspects. First introduces an overview about the Jordanian banking sector. Second constructs a model using cointegration techniques, in which workers' remittances affect banking sector development, particularly, utilising a banking sector development indicator. Finally, presents the empirical estimates of the cointegration analysis.

Several banking development indicators are analysed over the last decades and the main reform policies, taken by the Jordanian government, are presented over the same period.

A recent report published by IMF, about the financial development in the Middle East and North Africa (MENA),

shows that the Jordanian banking sector has obtained a high position in financial development levels, with the most developed financial system group among many countries in the MENA region. The report indicates, using a subset of financial indicators that the banking sector in Jordan is well developed, profitable, and efficient [2].

2. The Trends in Main Indicators of Banking Sector Development in Jordan

Banking sector development is usually defined as a process that leads to improvements in quality, quantity, and efficiency of financial intermediary services provided by commercial banks. However, obtaining a specific definition for financial development is complicated, where the level of evolution depends on the progress in financial system and its structural changes over time. Hence, banking sector development implies a long process of evolution in banking sector structure that caused by significant changes in both services and instruments of the financial institutions operating in the economy [3].

This section produces an overview of the development of the banking sector in Jordan through looking at the trend of main banking sector ratios which reflect the improvement of financial services provided by banking sector. Figure 1 shows four banking sector development indicators used in the literature, which covers several aspects of the financial development concept. The first two indicators represent the simplest measures of financial development, particularly banking sector, since the ratio of broad money (M2) to the

GDP reflects the level of financial depth (M2Y) and the ratio of the credit extended to private sector to the GDP (CPY) reflects the expansion of the commercial banks' ability to facilitate credit for investments purposes.

The third indicator (TDY) represents the total deposits ratio to the GDP, which reflects the ability of banks to create loans through the financial system. The fourth indicator (FA) is the financial assets ratio, and reflects the financial services and the importance of commercial bank's assets in the banking system [4].

As it can be seen from the top panel of Figure 1, CPY and M2Y have experienced a gradual increase over the period 1964-2010. The financial depth indicator (M2Y) expresses the evolution of the financial depth in the Jordanian banking sector, starting from the early 1960s until the 1991, where the ratio of broad money to GDP has increased from 29% in 1964 to about 141% in 1991. After that, the ratio has fallen down to reach about 125%, and it was largely affected by the consequences of Gulf Wars during the period 1992-1998. However, the average ratio of financial depth is 104%, for the period 1964-2010, which is considered the highest ratio among financial development indicators used in this study. Then it stated around 120%.

Similarly, the CPY indicator is relatively large compared to other neighbour developing countries. This reflects the high position of the Jordanian banking sector among other banking sectors in the region, since the CPY indicator provides more accurate information about the role of financial intermediaries in financing private sector and providing funds from savers to borrowers [5]. CPY has increased significantly from 16% in 1964 to about 88% in 2010 with an average of 65% for the whole period.
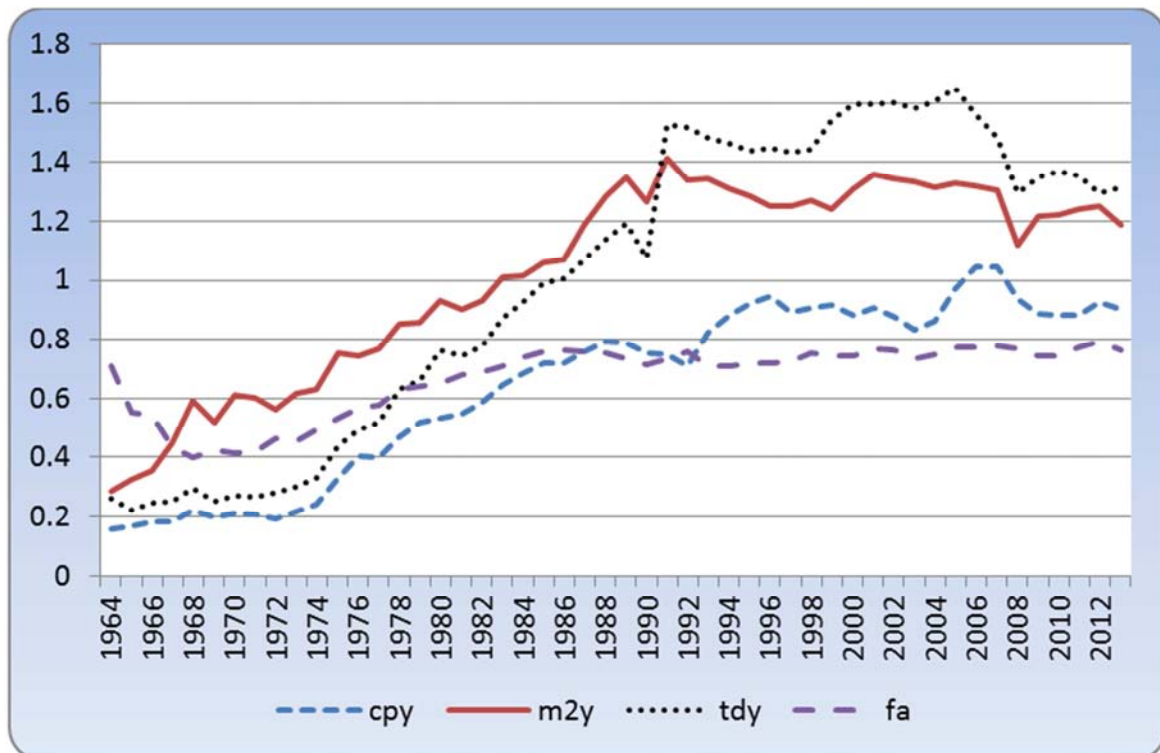

Figure 1. Main Banking Sector Development Indicators.

On the other hand, the TDY ratio rose from 22% in 1964 to 119% at the end of 1980s. A sudden decline has appeared due to the financial crisis happened during 1989, which explains the drop in TDY after this year. However, TDY has experienced a high ratio with about 153%, due to the first Gulf War which forced a large number of Jordanian migrants to return home with huge amounts of money transferred into the local banking system as well as the decline in the GDP level over that period. The ratio ranges between 144%-164% in recent years, which also reflects the role of financial institutions in the development of the banking system through stimulating saving activities within the banks. The calculated average ratio of total deposits to GDP is about 100% over the period 1964-2013.

In contrast, the financial assets ratio indicator (FA) ranges from 40%-78%, with an average of 66% over the period 1964-2013. FA trend shows a slight increase during the last two decades since the total assets of commercial banks and CBJ increased rapidly with more increase in the assets of CBJ.

It clearly appears that the Jordanian banking sector has experienced significant improvement through expanding the role of commercial banks in the economy, and that can be noticed from the constant increase in the latest indicators of banking sector development such as CPY, TDY, and M2Y. The performance of the banking sector in Jordan is relatively better than many other developing countries. According to Creane and Goyal, about financial development in the MENA region, Jordan has strengthen banking supervision and regulations [2], since very modern procedures have been established to collect prudential information on a regular basis as well as audit commercial banks operating in the country. To sum up, Jordanian banks, although relatively small, provide sophisticated financial services and operations in terms of technology, financial tools, and products in both retail and corporate banking.

3. Previous Empirical Work

Remittances start playing a vital role in many developing economies, especially in labour exporting countries, where remittances provide extra income to the families of expatriates. A large number of empirical papers have investigated the development impact of these flows on many variables at the macroeconomic level. Only a few studies have attempted to draw attention to the development impact of remittances on the financial variables.

In terms of the impact of remittances on economic growth, mixed results are reported in different studies. Chami and others find that remittance flows affect economic growth negatively [6]. However, Solimano reports a positive impact of remittances on economic growth [7]. A study by Giuliano and Ruiz-Arranz shows that remittances can affect economic growth, based on the level of financial development in the country under investigation [8]. They argue that remittances help to promote growth in less financially developed

countries. The justification of this result is that agents compensate for the lack of financial development, using remittances to ease liquidity constraints and to channel resources towards productive uses that foster economic growth.

As mentioned before, empirical research on the relationship between remittances and financial development is largely lacking. One of the early works is conducted by Hunte [9], the study finds, using panel regressions for 18 countries, that remittances affect financial deepening positively. Aggarwal and others use remittance flows to 109 developing countries, over the period 1975-2007, to investigate whether remittances contribute to the development of financial sector by affecting both total bank deposits and credit facilitated to private sector [10]. They find that remittances have a significant and positive impact on bank deposits and credit to private sector to GDP ratio. This finding supports the notion that remittances promote financial development in developing countries. Shahbaz and others find, using a cointegration analysis based on the ARDL model and Johansen procedure, significant long-run impact of remittances on financial development, measured by the ratio of credit to private sector to GDP [11].

A research on the effect of remittances on poverty and financial development in Sub-Saharan African countries, using an unbalanced panel of 44 countries and six average time periods over 1975-2004, Gupta and others find a significant effect of remittances on both bank deposits and M2 to GDP, which are used as indicators of financial development, and hence promote financial development [12]. They also find a direct effect of remittances on poverty-mitigating in this region. A recent work by Yadav investigates the relationship between remittances and banking sector development and GDP for four South Asian countries, using multivariate Granger causality tests based on ECM framework covering the period 1990-2010 [13]. He found that GDP per capita influenced by remittances and banking sector development. Also Gani and Sharma examine the effect of remittances on credit provided by banking sector for number of developing countries [14]. Finding emphasis that there is a positive and significant relationship between them.

More recently, a study for Rezwanul and Faria investigates the relationship between financial development indicators and remittances for five South Asian countries. Using an ECM framework covering the time period 1990-2014, they find that remittances affect financial development positively [15]. Another paper for Kayode and Adeleye studied the long-run relationship between remittances and banking sector development in Nigeria, for the 1984-2014 time spans. They find that such a relation does exist, depending on Toda-Yamamoto Causality methodology [16].

Overall, there is no particular study investigating the impact of workers' remittances on financial development in Jordan, especially the banking sector, using a key indicator of financial development that covers the dynamics of financial market in an economy. This paper comes to fill this gap in the

literature by employing a comprehensive investigation that incorporates all possible variables that might be correlated with the level of financial development in a country. The main focus of this research is placed on examining the potential impact of workers' remittances on a key indicator of banking sector development.

4. The Methodology and Empirical Analysis

Remittance flows are found to have a significant impact on different economic variables including financial ones. Focusing on financial variables will allow investigating their role in enhancing financial development in many countries, especially in developing countries that remittance flows are considered as one of the major inflows to their economies. Therefore, remittances are expected to be an important tool supporting the financial development in the banking sector as well as the stock market.

Workers' remittances gain their significance not just from their rabid growing over the last decades but also from the potential effects of these inflows on economic growth and financial development. A large number of studies investigate the development effects of remittances on various variables at macroeconomic levels, including GDP growth, poverty, and income. On the other hand, a few papers have been exclusively devoted to the development impact of remittances on the financial sector. Therefore, this paper comes to fill the gap in the literature that investigates the relationship between financial development variables and remittance flows, by including remittances as an explanatory variable among the determinants of financial development indicators, especially in developing and labour exporting countries such as Jordan. To implement this, the study conducted an empirical analysis based on a cointegration framework using several cointegration techniques to examine this relationship.

4.1. Data and Variables

The sample used in this analysis consists of time series of workers' remittance flows to the Jordanian economy as well as a key indicator of financial development, which reflect the development of the banking sector. This variable was constructed as the ratio of credit facilitated by the commercial banks to the private sector to the GDP (CPY).

In addition to the previous key variable which is the dependent variable in the model, included a series of interest rate (RR), exchange rate (EX), and Trade openness which is calculated by the ratio of export and import to GDP (TO). This set of variables is expected to have a significant effect on financial development as they have been investigated in the literature. The dataset of the variables under consideration is obtained from the Central Bank of Jordan, the IMF's financial statistics and World Bank's development indicators and covers the period 1964-2013 on an annual basis.

In order to evaluate the potential impact of remittances on

the financial sector, especially the banking sector, a variety of empirical models employed that take into account comprehensive measures of the banking sector and provides sufficient empirical work on the relationship between remittances and different financial development indicators.

The measure of financial development (CPY) is one of the oldest and most widely used indicators to proxy of financial development REMY in many empirical studies. This indicator is calculated using the total credits facilitated to the private sector by commercial banks which include agriculture, mining, industry, general commerce, construction, transportation, tourism and hotels, financial institutions, and professional private individuals activities. However, this indicator excludes the credits facilitated to the municipalities and public entities as well as services and infrastructure. The ratio of the total credits to GDP is the preferred indicators of financial development, since this indicator relates to other similar indicators used in the literature [17]. Other researchers used the total claims on private sector to GDP to measure financial development [4] and [18]. However, this measure includes total credit facilitated to private sector by monetary authority and government. Therefore, it might not be an efficient measure of financial development since the credit to private sector increases as a result of an increase in the credit facilitated by monetary authority instead of commercial banks. Hence, using total claims on the private sector might not reflect the development in the banking sector. In the analysis, credit to private sector facilitated by only commercial banks divided by GDP used to observe only the development in the banking sector, rather than including the central bank role.

4.2. Models Specifications

Different equations that encompass financial development indicators were employed. The basic general model of the impact of remittances on financial development indicators that capture potential long-run relationships among these indicators and other explanatory variables (including remittance flows) can be constructed as follows:

$$CPY_t = \beta_0 + \beta_1 REMY_t + \beta_2 X_t + \varepsilon_t \qquad (1)$$

Where *CPY* represents credit to private sector divided by GDP, REMY: workers' remittances divided by GDP, X represents other explanatory variables used in the literature that might affect financial development, and may include trade openness measure, exchange rate, and interest rate expressed by the re-discount rate. ε is the error term.

First, testing for the presence of cointegration among financial development, remittances, and other variables the Engle Granger (E-G) procedure is used [19]. Then estimating several regressions based on the financial development indicator for the long-run relationships among the variables. If the variables are found to be non-stationary and stationary at first differences, this implies that they are integrated, and then they may cointegrate. If this is the case, cointegration can be tested using several cointegration tests. A standard

unit root tests used to test for the presence of a unit root in the variables under consideration.

Then test for the presence of cointegration used, and formulate error correction model. If cointegration exists, then there is a long-run equilibrium relationship among financial development indicator and remittance flows, and hence these variables will be affected by any deviation from the long run path. Additionally, using error correction model will help to capture movements among these variables and to investigate the interrelated relationships between the indicators of financial development, remittances, and other macroeconomic variables in both the short-run and long-run. First testing for cointegration using the E-G procedure within the ECM framework.

Following the E-G cointegration test, and after employing nonstationarity tests to ascertain that all variables are integrated of order one, the first step of the E-G procedure is based on estimation of the cointegration vector parameters by running the static regression, that is applying OLS to Equation 1.

In order to investigate whether the variables are actually cointegrated, the residual from the long-run equilibrium relationship in (1) is obtained and then tested for a unit root. The E-G framework employs several nonstationarity tests that can be applied to test whether the residual from the static regression is I(1) or I(0). The residual $(\hat{\varepsilon}_t)$ is obtained from equation (1) via $\hat{\varepsilon}_t = (CPY_{t-1} - \beta_0 - \beta_1 REMY_{t-1} - \beta_2 X_{t-1})$.

Different critical values are required for residual based unit root testing as the number of regressors including for cointegration. These critical values can be obtained from either Mackinnon [20] or Engle and Yoo [21].

The procedure is then to use $\hat{\varepsilon}_t$ which is I(0) and include it in the following ECM representation,

$$\Delta CPY_t = \alpha_0 + \alpha_1 (CPY_{t-1} - \beta_1 REMY_{t-1} - \beta_2 X_{t-1}) +$$

$$\sum_{j=1}^{p} \alpha_2 \Delta CPY_{t-j} + \sum_{j=1}^{p} \alpha_3 \Delta REMY_{t-j} + \sum_{j=1}^{p} \alpha_4 \Delta X_{t-j} + u_t \qquad (2)$$

The term $(CPY_{t-1} - \beta_0 - \beta_1 REMY_{t-1} - \beta_2 X_{t-1})$ is the error correction term, and α_1 is the coefficient which represents the speed of adjustment to the equilibrium. Equation (2) could be estimated non-linearly. However, in practice, a two-step approach is employed whereby the residual ε_t (obtained from OLS estimation of (1)) is used.

To simplify estimation, the second step of the E-G procedure respecifies Equation (2) and expresses the ECM for the impact of remittances on several financial development indicators as follows:

$$\Delta CPY_t = \alpha_0 + \sum_{j=1}^{p} \alpha_1 \Delta CPY_{t-j} + \sum_{j=1}^{p} \alpha_2 \Delta REMY_{t-j} + \sum_{j=1}^{p} \alpha_3 \Delta X_{t-j} + \alpha_4 \hat{\varepsilon}_{t-1} + u_{it} \qquad (3)$$

Where is $\hat{\varepsilon}_i$ estimated error term obtained using financial development with remittances and other variables.

4.2.1. The Engle-Granger Procedure Empirical Results

In order to establish the order of integration of the series used, the nonstationarity properties of the variables under consideration examined using several unit root tests. Using both the ADF and the PP tests, two cases employed, one with a constant (C) and a second with a constant and linear trend (C+T). The max lag length for each variable is selected based on the SBC.

The results of Table 1 indicate that, at level, the variables are non-stationary by both ADF and PP tests, as the null hypothesis of a unit root cannot be rejected at 5% significance level for any of the variables. Furthermore, the first differences of the series are found stationary by the ADF test. Therefore, a conclusion is that financial development indicators, remittances flows, and other variables under consideration are integrated of order 1, and they are all I(1).

After establishing the order of integration among variables, examining the impact of workers' remittances on financial development is done by looking at the impact of these flows on the main indicators of banking development in the long run. This investigation starts from the basic Engle-Granger framework.

***Table 1.** Results of Unit Root Tests.*

Variables	PP				ADF			
	Level		First Difference		Level		First Difference	
	C	C+T	C	C+T	C	C+T	C	C+T
CPY	-1.600	-0.799	-4.672*	-4.837*	-1.589	-0.708	-4.918*	-4.683*
REMY	-1.742	-1.233	-5.119*	-5.155*	-2.198	-1.919	-5.224*	-5.302*
RR	-2.136	-2.049	-4. 345*	-4. 362*	-2.711	-2.622	-4.696*	-4.691*
TO	-1.828	-2.547	-5.706*	-5.698*	-1.772	-2.994	-5.771*	-5.769*
EX	-0.884	-1.808	-4.184*	-5.356*	-1.138	-1.459	-4.752*	-4.731*

- Critical values are -2.92 and -3.57 at 5% & 1% respectively for test with constant.
- Critical values are -3.51 and -4.16 at 5% & 1% respectively for test with constant and trend.
- * and ** denote reject at 1% and 5%.

The results are reported in several parts, based on the used indicators, to have a comprehensive analysis covering the main banking sector development indicators used in the literature, such as (CPY); the ratio of credit to private sector to GDP.

The empirical results provided below show the results of the E-G procedure, starting from OLS estimation of the long-run Equation (1) and then testing for non-stationarity of the residual obtained from this regression. The ECM model is also estimated using Equation (3).

4.2.2. Credit to the Private Sector (CPY) and Remittances

The first equation shows the impact of remittances on the typical financial development indicator used in the literature (CPY) along with other explanatory variables that might have significant effects, such as trade openness (TO), exchange rate (EX), and interest rate (RR).

The first empirical equation measures the long-run relationship between CPY, REMY, EX, TO, RR. Following Aggarwal and others [10] and Acosta and others [22], a model on the impact of remittances on credit to private sector as an indicator of financial development is specified in the top panel of Table 2 as follows:

Table 2. Cointegration Regression/ CPY.

$CPY_t = \beta_0 + \beta_1 REMY_t + \beta_2 EX + \beta_3 TO + \beta_4 RR_t + \hat{\varepsilon}_1$		
	Coefficient	Std. Error
$REMY_t$	0.745**	0.360
EX_t	-0.197*	0.031
TO_t	0.233***	0.136
RR_t	0.008	0.011
β_0	0.760*	0.179
R-squared: 0.79, Adjusted R-squared: 0.77, F-statistic: 34.33		
Log likelihood: 35.6, D-W stat.: 0.44		

Note: *, ** and *** are significant at 1, 5 and 10 percent level respectively

To precede the analysis, a test to capture whether the ratio of credit to private sector to GDP is actually cointegrated with remittance flows, real GDP, and interest rate using the residual from this regression, which is tested for a unit root. Critical values from Mackinnon [23] are used, with a constant and no trend, see Table 3

Table 3. Stationarity Test of the Residual/CPY.

Null Hypothesis: $\hat{\varepsilon}$ has a unit root		Test-Statistic
Augmented Dickey-Fuller test statistic		***-3.399***
	10% level	-2.607
Test critical values:	5% level	-2.940
	1% level	-3.606

- Critical values are calculated based on Mackinnon (1996).

The reported CADF (Cointegration ADF) values indicate that the null hypothesis of a unit root in $\hat{\varepsilon}_t$ at 5% and 10% is rejected but not at 1%. This result confirms that a cointegration relationship exists between CPY, REMY, EX, TO, and RR. The null of no cointegration at 5% significance level is rejected since the t-value of the CADF is more negative than -2.940.

According to the E-G procedure, an error correction model can be constructed using $\hat{\varepsilon}_t$ to estimate the short-run dynamics along with the long-run ones as in Equation 2. The lag length is determined using the SBC, with one lag selected. Both remittance growth and interest rate lagged one period have been eliminated without losing valuable information to obtain a parsimonious ECM, shown in Table 4.

The results of the ECM reported in Table 4, show that the growth rate of financial development, measured by the credit to private sector, (ΔCPY) is influenced by the change of interest rate (ΔRR), where this factor have a positive impact on the credit to private sector. These findings are consistent

with the findings in Aggarwal and others [10], Shahbaz and others [11], and Acosta and others [22]. Also, growth rate in REMY ($\Delta REMY$) affect the growth rate of credit to private positively but not significant.

Turning to the ECT, it is clearly noticed that this term is significant at 5% level and has the right sign (negative), this also confirms the presence of cointegration between CPY, REMY and the other variables. The error correction coefficient reveals that the growth rate of credit to private sector to GDP does respond to the deviation from the long-run equilibrium in period (*t-1*) and the variables converge to the long-run equilibrium relationship in a relatively slow rate, where the speed of adjustment to restore the equilibrium is about 0.13 and highly significant. This coefficient implies that a deviation from the long-run growth rate of the credit to private sector ratio to GDP in current period is corrected by about 13% in the next period. So it needs for about eight periods to be corrected.

Overall, estimated results using CPY, as our indicator of financial development, imply that there is a short-run effect of remittances growth rate on the growth rate of credit to private sector ratio to GDP. In constrict, it is the case that there is a long-run effect of remittances on credit to private sector since the coefficient of the ECT is significant at 1% significance level.

Table 4. Error Correction Estimates/CPY.

$\Delta CPY_t = \alpha_0 + \alpha_1 \Delta CPY_{t-1} + \alpha_2 \Delta REMY_t + \alpha_3 \Delta TO_t + \alpha_4 \Delta RR_{t-1} + \alpha_5 \hat{\varepsilon}_{t-1} + u_t$		
	Coefficient	Std. Error
ΔCPY_{t-1}	0.170	0.130
$\Delta REMY_t$	0.276	0.199
ΔTO_t	-0.051	0.066
ΔRR_t	0.029*	0.007
$\hat{\varepsilon}_{t-1}$	-0.128**	0.055
α_0	0.015**	0.006
R-squared: 0.476		
Adjusted R-squared: 0.402		
Log. Likelihood: 82.17		
F-statistic: 6.356		
D-W stat.: 2.024		
Diagnostic Tests:		
Autocorrelation, LM test		F(2,33)= 0.13 [0.878]
Normality Test, JB-test		χ^2= 1.11 [0.573]
Heteroskedasticity, Breusch-Pagan test,		F(5,35)= 0.48 [0.791]

- Note: * and ** are significant at 1 and 5 percent level respectively.
- The probability is in squared brackets.

In addition, various diagnostic tests are implemented to check for the absence of autocorrelation and heteroskedasticity and also check whether the error is normally distributed in the estimated ECM. These results are reported at the bottom panel of Table 4, and they show that the model passed all the statistical diagnostic tests.

4.2.3. Testing for Asymmetric Relationship Between Remittances and Financial Development

Following Al-Assaf [24] and Al-Tarawneh [25], the potential asymmetric cointegration relationship between CPY, remittances, and other explanatory variables is examined by extend the analysis taking into account the

possibility of having an asymmetric cointegration relationship among variables, employing Enders and Siklos's TAR model. The threshold value is set to be 0 [26].

If there is an evidence of asymmetric cointegration, the estimating of the ECM should include two adjustment coefficients to allow for asymmetric adjustment [27]. The results of estimation of threshold cointegration relationships between CPY and remittances are illustrated in Table 6. Following Enders and Siklos approach, both F-statistic and t-Max are reported for the error equation. The critical values tabulated by Wane and others used for the test as they have extended the critical values of Φ for the null hypothesis of no cointegration with asymmetric adjustment for up to five variables with different sample sizes [28].

Table 5 reports the results from threshold cointegration analysis for the model. The test is conducted by using F-statistic. It is found that there is asymmetric cointegration between CPY and remittances as shown in model (1) since the Φ statistic for the null hypothesis $\rho_1 = \rho_2 = 0$ is 28 which is greater than the 1% critical value and therefore the null hypothesis of no asymmetric cointegration at 5% level of significance is rejected. F-statistics calculated statistics is substantially greater than their corresponding critical values indicating that the null hypothesis can be rejected at any level of significance which implies that the cointegration with asymmetric adjustment do exist among these series.

Table 5. Asymmetric Cointegration Test (TAR) Model.

Models and Variables	Estimates
Model 1 (CPY, REMY, TO, RR)	$\hat{\varepsilon}_{1,t} = 0.800 I_t \hat{\varepsilon}_{1,t-1} + 0.714(1 - I_t)\hat{\varepsilon}_{1,t-1} + u_{1,t}$
4 Variables	(4.055)* (4.365)*
Φ	28.347

- Φ represent F-statistics for the null hypothesis of no cointegration with threshold $\rho_1 = \rho_2 = 0$ Critical values are obtained from Wane and others for the case of 4 variables (Table 5), and they are as follow: 10.53, 13.91 at 5% and 1% respectively.
- t-statistics are shown in parenthesis, and the critical values are obtained from Enders and Siklos (Table 2) as follows. -2.12 and -2.58 at 5% and 1%, respectively.
- and ** indicate significant at 1% and 5%, respectively.

5. Conclusion

This research has examined the relationship between workers' remittances and an indicator of banking sector development. The study achieved the main objective regarding the impact of remittances on financial development, particularly banking sector development, by employing E-G test of cointegration and using annual Jordanian data covering the period 1964-2013.

The empirical evidence revealed that workers' remittances have positive effects on banking sector development. The E-G test indicated that there is a stable long-run relationship among remittances and financial development indicator. With regards to the speed of adjustment obtained in the ECM estimates, they were found relatively slow which implies that, although the movements in remittance flows has a significant impact on banking sector development, the adjustments of banking sector development indicator take long to restore the equilibrium. In addition, the relationship between variables is found to be symmetric.

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