4. DO REMITTANCES CONTRIBUTE TO THE DEVELOPMENT OF FINANCIAL INSTITUTIONS? NEW EVIDENCE FROM THE DEVELOPING WORLD

Sun QIANG[1]
Adnan KHURSHID[2]
Adrian Cantemir CALIN[3]
Khalid KHAN[4]

Abstract

This study empirically examines the impact of remittances on the development of financial institutions in 50 countries selected from low (LI), lower-middle (LMI) and middle-income (MI) groups. The income group effect is inspected using the system Generalised Method of Moment Regression (SGMM), while for individual economies we employ the dynamic panel bootstrap Granger causality approach. The results reveal that remittances increase financial depth in three groups, stabilise the institutions in low-income and increase profitability in middle-income group. The remittances used for consumption play a negative role in financial expansion. Suitable government policies uplift the position of financial institutions whereas, corruption exerts an adverse effect on it. The causality evidence shows that remittances have a more robust effect on financial institutional development especially in lower-middle and middle-income countries. Moreover, remittances and institutions cause each other in three-fifths of lower-middle and three-fourths of middle-income countries. The developed financial institutions have the additive capability to attract more remittances and employ them in a productive way. We notice the fact that, the economic relationship between remittances and financial institutions is more country-specific. Sound economic policies, tax exemptions and a competitive environment in the financial sector can have dual effects on both the remitters and the intermediary financial institutions.

Keywords: worker's remittances; financial institutions; financial development; governance; bootstrap panel Granger causality test

JEL Classification: F24, G20, C32, O16

---

[1] North China University of Technology, Beijing, China. E-mail: sunqiang206@126.com.

[2] Corresponding Author. North China University of Technology, Beijing, China, E-mail: adnankhurshid83@gmail.com.

[3] Institute of Economic Forecasting, Romanian Academy, E-mail: cantemircalin@gmail.com.

[4] School of Finnace, Qilu University of Technology, Jinan, E-mail: Shah_khan884@yahoo.com.
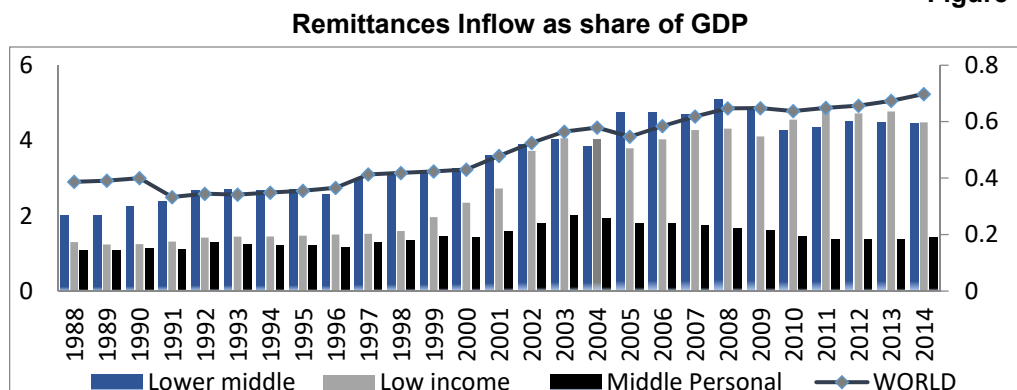
1. Introduction

Financial institutions and remittances exert a significant influence on poverty alleviation, stability and sustainable economic growth, specifically for developing economies, where the size of remittances is greater than foreign direct investments (Levine, 2005). Financial intermediaries are generally used to deliver the official flow of remittances. They also benefit from offering remittances related services that encourage receiving households to save or invest, fact that positively affects their development, efficiency and profitability. The growing literature suggests that remittances have a more robust effect on growth in less financially developed economies. They are an alternative source of funding for investments that help in solving liquidity problems. The monetary transactions due to remittances have a significant impact on the financial institutions, particularly the banking sector in the host economy. Remittances have a positive effect on the development of credit markets along with financial widening and deepening (Amuedo-Dorantes and Bansak, 2006). The transfer services through a bank or another financial institution bring to light the unbanked remittances receivers who use limited financial services (Orozco, 2006). Therefore, this results in an increase in the demand for financial products and services which in turn leads to institutional development. In addition to this, the banks and other financial institutions are more willing to lend credit to remittance-receiving families because they are seen as stable source of income (Demirgüç-Kunt *et al*., 2008). Moreover, the funds that accumulate in banks due to remittances raise the credit capacity for other members of the community (Aggarwal *et al.,* 2011). Thus, remittances directly affect the recipient family, but also serve the financial institution and community indirectly.

Remittances are considered to have a counter-cyclical nature. The flow of remittances during the economic recession and financial crisis makes it a more consistent and dependent source of foreign currency for developing the world (Yang, 2004). From a macroeconomic standpoint, remittances can stimulate aggregate demand, thus boosting the economic activity along with adding to macroeconomic stability and reducing output volatility (Barajas, Adolfo *et al*., 2009). Moreover, remittances increase the money supply and put upward pressure on the exchange rate that affects international competitiveness due to reductions in the labour supply (Bussolo and Medvedev, 2008). This could lessen the credit demand and negatively affect the financial institutions. Lastly, immediate consumption and distrust of financial institutions cannot help to increase bank deposits. The remittances inflow as share of economy is shown in low, lower-middle and middle income groups is shown in Figure 1.

Most of the previous studies check the impact of remittances on consumption (Airola, 2007; Nishat, Bilgrami and Kazi, 1993), poverty and inequality (Barham and Boucher, 1998), trade competitiveness (Makhlouf and Mughal, 2013, Khurshid et al., 2017, Khurshid et al., 2018) and inflation (Khurshid et al., 2016). According to Rao and Hassan (2012) and Senbeta (2013), remittances do not have a direct impact on economic growth, but these transfers can affect GDP through various channels: total factor productivity (TFP), output volatility, financial development and investments. Nevertheless, on the whole, the effects seem to be neutralised. The fact that remittances have an imperceptible impact on TFP defends the argument that these transfers do not have a significant impact on long-term growth (Senbeta, 2013). Clemens and McKenzie (2014) notice that increase in remittances are attributed to changes in its definition, instead of actual value of its growth. On this ground, the authors do not consider that remittances can exhibit a substantial growth-boosting effect.

Figure 1

Remittances Inflow as share of GDP

Source: World Development Indicators (WDI).

There is mixed evidence on the topic of relationship between remittances, financial development and growth. According to Mundaca (2005), Giuliano and Ruiz-Arranz (2009), Khurshid *et al*., (2017) and Ziesemer (2012) remittances positively affect the financial system and promote growth. On the other hand, Chami *et al.* (2003), Barajas, Adolfo *et al.* (2009) and Md Shoaib Ahmed (2010) find a negative relationship between the above-mentioned variables. Giuliano and Ruiz-Arranz (2009) find that the relationship between remittances and growth depends on the level of financial development in receiving economies. The authors find that in the less financially developed markets, remittances solve liquidity problems and provide an alternative way of investment that boosts economic growth. The remittances inflow is a substitute for financial development, and plays a notable role in the economies of the receiving country (Mundaca, 2009).

Despite this block of literature, a limited attention has been given to the direct relationship between remittances and financial development. Gupta *et al.* (2009) studied the effect of remittances on financial development and poverty in 44 countries of Sub-Saharan Africa. The results reveal that remittances foster financial development and reduce poverty in the panel countries. Acosta *et al.* (2009) examine the empirical linkages between remittances, exchange rate and financial development for 109 developing countries using the GMM approach. The results reveal that remittances appreciate the exchange rate more in the less financially developed economies as compared to the developed ones. In a more relevant contribution, Aggarwal *et al.* (2011) analyze the impact of remittances on financial development for 109 developing countries using the fixed and GMM technique and find a strong link between them. Similar results are reported by: Esteves and Khoudour Castéras (2011) in eight-panel countries, Chowdhury (2011) for the case of Bangladesh and Kar, Nazlıoğlu and Ağır, (2011) for the MENA Region. Nyamongo, Esman Morekwa *et al.* (2012) studied the role of remittances and financial development on economic growth on a data set containing 36 African countries. The authors find that remittances are a major source of growth and, despite the fact that their instable character may generate adverse effects, they bring a positive influence on financial development, which in turn boosts the economic growth of the countries under study.

A different conclusion is reported by Brown *et al. (*2013). Using micro and macro data for 138 developing countries, the authors show that remittances have an adverse impact on

financial development. More recently, Rana and Tasneem (2016) examine the above-mentioned relationship in 5 South Asian countries using ECM and panel OLS approach. The empirical findings suggested that remittances foster the financial sector development in this region. Karikari (2016) checks the impact of remittances on financial development in 50 African countries for a period ranging from 1990 to 2011. To do so, the author uses the Vector Error Correction Model (VECM) and panel OLS approach and reports that remittances have a positive impact on the financial development of the African countries.

There are numerous problems associated with measuring the effect of remittances on financial institutions and on the system as a whole. For many developing countries, the data regarding financial indicators (*Financial Structure Dataset*) are usually available for short periods with gaps. Besides this fact, most of the previous studies used different proxies to gauge this relationship, which leads to a profound lack of consensus on the results. For instance, Wagh and Pattillo (2009) used M2 and bank deposits to GDP, whereas Motelle (2011) adopted Credit/Deposit Ratio, Liquidity Ratio and Business Credit/Credit ratio. Similarly, Giuliano and Ruiz-Arranz (2009) and Karikari (2016) used four proxies: loan to GDP ratio, M2 to GDP ratio, credit to GDP ratio and deposit to GDP to show the inner picture of the financial sector development. Based on the functioning and classification made by Čihák, Martin *et al.*, (2013), all said variables are representing the depth of the financial institution. Now, the question that arises is how does the remittances inflow affect the financial access, efficiency, stability and profitability in the recipient economy? To answer this question, we selected 58 countries from low (hereafter LI), lower-middle (hereafter LMI) and middle (hereafter MI) income groups for a period from 1988 to 2014.

This article is an addition to the existing literature in the following ways.

To find the remittances and financial development nexus, previous researchers put all member countries in a single group, where institutional corruption, economic policy, geographical location, population, income level are not similar. In general, aspects like: trade regulations, labor force, unemployment, ethnic tensions and economic growth and are also dissimilar. Hence, the empirical outcomes of these sorts of panel studies cannot be generalized for each individual economy. To overcome this problem, we divide the countries according to income groups, as each group has comparable features. After considering the size of economy and remittances inflow, we ignore the high-income group.

The data constraints are solved by using new remittances series proposed by Khurshid *et al.* (2016). These series have never been used to find an empirical nexus between remittance and financial development, especially in the panel setting. The informal inflow of remittances is around 40% of the total aggregate, without adding migrant transfers and compensation of employees, this figure going further higher. So, the outcomes, in that case, do not project the real happening in the economy (Khurshid *et al.*, 2016).

This study will check the in-depth relation between remittances and financial institutional development by using four broader functional characteristics, namely: stability, efficiency, depth and profitability. These relations have never been discussed in the existing literature. Because of potential endogeneity, limited observations and a significant number of parameters, it is not appropriate to use the ordinary least squares (OLS) method. We address the possible endogeneity problem by using the system of generalised moment method regression (SGMM).

Due to the social problems and economic constraints prevailing in the different countries, it is likely that the remittances and financial development relation will be country-specific. To keep this in mind, this study uses slope homogeneity, cross-sectional dependency test

together with the bootstrap panel Granger causality approach. This technique examines the causal link in each country individually not assuming that panel has homogeneous characteristics. Before testing the bootstrap causality approach, it is not essential to check the unit root or cointegration because it generates country-specific critical values. In addition, in the existing literature, none of the previous studies used this method to find remittances-financial development relationship. After addressing the endogeneity, technical and data-related issues, it is expected that the relationship between the remittances and financial institutions will be country-specific.

The remainder of this study is structured in the following way. Section II describes the data and defines the variables. Section III introduces and elaborates the methodology. The empirical results are discussed in Section IV. Section V concludes and provides policy implications.

2. Data and Methodology

2.1. Data

This study examines the remittances and financial development nexus for 50 countries selected from the LI, LMI and MI groups. The relationship is tested both individually and groupwise using the System GMM and bootstrap panel Granger causality approach for a period from 1988 to 2014.

This study used the remittances series that is composed of migrant's transfers, workers' remittances and compensation of employees (*see* Khurshid *et al.*, 2016). Before examining the remittances-financial sector relationship, we should stress the purpose of the financial system. According to World Bank (2005, pp.22) "*The role of the financial system is to transform liquid, short-term savings into relatively illiquid, long-term investments, thus promoting capital accumulation.*"

Huang (2011) builds on this definition by adding the fact that: "Financial markets have an important role in channelling investment capital to its highest value use."

Given the above-presented points of view, it is clear that a single measure does not have the ability to represent the financial sector development. However, this can be achieved by combining the information from several existing measures. In this study, we employ a series of financial development indicators originating from the World Bank database. The World Bank (2005) developed several methods to measure the functioning of four broad characteristics of financial institutions. We use the following measures to quantify the remittances and financial development relationship[5].

- Depth of Financial Institutions
    - Domestic credit to private sector (% of GDP)
    - Financial sector deposits to GDP
- Efficiency of Financial Institutions
    - Boone indicator
- Profitability of Financial Institutions

---

[5] *For detail definitions of all financial variables see (Demirgüc-Kunt,* et. al*., 2013, p.18946) and World Bank* http://www.worldbank.org/.

- – Bank cost to income ratio (%)
- Stability of Financial Institutions
  - – Z-Score

These measures are able to give a clear picture regarding depth (DPTH), stability (STBTY), profitability (PRFT) and efficiency (EFCY); hence, they enable us to overcome the potential issues raised by Gapen *et al.*, (2009) and Bettin and Zazzaro (2012). The other explanatory variables are: Capital market development (*FDI + ODA*), Gross Domestic product (*GDP*), Consumer Price Index (CPI, 2010=100). To examine the governance impact, we choose two proxies, namely Economic Policy (*EP*) and Control of Corruption (*CC*). The financial variables used in different approaches are: domestic credit to the private sector (DCPS), Z-Score (ZSCR), Boone indicator (BI) and Bank cost to income ratio (BCIR). We also introduce one interaction term to see how remittances affect the financial sector if used for consumption (*REM*HHCE*). The other exogenous instruments employed are: Age dependency ratio (*ADR*), population (*POP*), government expenditures (GE), gross savings (GS) and money supply (M2). The data set is collected from World Bank development indicators (WDI) and International monetary fund (IFS), whereas, for governance variables, we use Political Risk Services (PRS)[6] database. The strict international regulations regarding money laundering reduce the informal flow of remittances but still this constitutes a problem and a limitation for the previous empirical work. Due to unavailability, we ignore the informal flow and assume that it will have added effect on the financial sector development.

2.2. *Methodology*

2.2.1. *System of Generalised Method of Moments (SGMM)*

To examine the empirical relationship between remittances and financial institutional development we run three regression for depth, profitability and stability. The potential endogeneity problem is addressed by using the System GMM approach suggested by Arellano and Bover (1995).

The correlation between remittances and financial institutions is tested using the following three regressions.

$$DPTH_{it} = \alpha_0 + \alpha_1 DPTH_{i,t-1} + \alpha_2 REM_{it} + \alpha_3 (REM_{it} * HHCE_{it}) + \alpha_4 X_{it} + \gamma_t + \varepsilon_{it} \qquad (1)$$

$$PROF_{it} = \alpha_0 + \alpha_1 PROF_{i,t-1} + \alpha_2 REM_{it} + \alpha_3 GOV_{it} + \alpha_4 MNV_{it} + \alpha_5 X_{it} + \gamma_t + \varepsilon_{it} \qquad (2)$$

$$STBTY_{it} = \alpha_0 + \alpha_1 STBTY_{i,t-1} + \alpha_2 REM_{it} + \alpha_3 GOV_{it} + \alpha_4 MNV_{it} + \alpha_5 X_{it} + \gamma_t + \varepsilon_{it} \qquad (3)$$

where: $DPTH_{it}, PROF_{it}$ and $STBL_{it}$ represents broad functions of financial institutions. In the above regressions, GOV_{it} signifies goverance, MNV_{it} denotes the monetary and X_{it} repesents that other variables that can effect the financial institutions. Moreover, γ_t symbolize the exogenous instruments while α_1 to α_5 are coefficients of monetary, financial, goverance and other explanatory variables presented in the data section. In eqation (1), α_3 is the cofficient of the interaction term ($REM_{it} * HHCE_{it}$) which explains the impact of remittances on financial depth if they are used only for consumption. These relationships are tested for all income groups separately and the results are summarised in Table 1.

---

[6] *The data and detail explanations are accessible at www.prsgroup.com.*

2.2.2. Cross-sectional Dependence and Slope Homogeneity

Studying Granger causality inside panel setting requires a careful treatment. The first issue in that regard is not to oversight the potential cross-sectional dependency through countries as it is possible that a shock affecting one economy can affect others due to globalisation, financial integration and international trade. Pesaran (2006) emphasizes the significance of the cross-sectional dependence test after performing the Monte Carlo experiment. Size distortions and substantial bias will occur if the cross-sectional dependence is ignored (Pesaran, 2006). The second matter is about the manner in which to treat the slope coefficients (homogeneous or heterogeneous) before imposing the causality restrictions on the parameters. The causality running from one variable to another by imposing the joint limit for the panel is the strong null hypothesis (Granger, 2003) and the homogeneity assumption is not capable of capturing heterogeneity because of country-specific attributes (Breitung, 2005). In the remittances and financial development relationship, there might be a significant association in some countries that could also run the other way around. Following the above-presented arguments, we start testing for the cross-sectional dependence followed by slope homogeneity. On the basis of these outcomes, we take a decision regarding the selection of the suitable causality approach for finding a causal nexus between remittances and financial development. The econometric technique regarding causality relationship is hereafter presented.

2.2.3. Cross-sectional Dependency Tests

The cross-sectional dependence among countries indicates that the impact of a shock in one country can spread to other countries.

While considering the LI, LMI and MI groups, the cross-sectional relationship can play a major role in identifying causal relationships between economic series, as countries are highly integrated due to cross-border movement and international trade. Breusch and Pagan (1980) introduced the Lagrange test to investigate for cross-sectional dependence. The test statistic of the Lagrange approach depends on the estimation of the following model:

$$y_{it} = \alpha_i + \hat{\beta}_i x_{it} + \varepsilon_{it} \ for \ i = 1, 2, 3, \dots \dots, N; t = 1,2,3, \dots \dots., T \quad (4)$$

where: t is the time, i is the cross-section dimension, x_{it} represents the k ×1vector of explanatory variables and the intercepts (α_i) and slope coefficients(β_i) are allowed to vary across the countries. The null and alternative hypotheses of cross-sectional dependence are stated as:

$$H_0: \ Cov\left(u_{it}, u_{jt}\right) = \ 0 \ , for \ all \ t \ and \ i \ \neq j$$
$$H_1: \ Cov\left(u_{it}, u_{jt}\right) = \ 0 \ , for \ at \ least \ one \ pair \ of \ i \ \neq j$$

Breusch and Pagan (1980) developed the Lagrange multiplier (*LM*) statistic, which has the following expression:

$$LM = T \ \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij}^2 \quad (5)$$

In equation (5), for each i, $\hat{\rho}_{ij}^2$ represents the sample estimate of pair-wise correlation attained from OLS estimation of equation (4). Under the null hypothesis, the LM statistic is asymptotically distributed as chi-square with N (N - 1)/2 degree of freedom. The LM test gives better results when N is small and T is relatively large. The inadequacies of LM test are fixed by Pesaran (2004) by proposing the scaled variant that is:

$$CD_{lm} = \left(\frac{1}{N(N-1)}\right)^{1/2} T \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} (T\hat{\rho}_{ij}^2 - 1) \tag{6}$$

The *CD$_{lm}$* statistic has a standard normal distribution with T → ∞ first then N → ∞, but shows size distortion in the case when N is relatively large, and T is small. CDLM test applies to large N and T but has the size of the distortion when N is large, and T is small. Pesaran (2004) proposed *CD* test to overcome the flaws of LM and *CD$_{lm}$* statistics, that is:

$$CD = \sqrt{\left(\frac{2T}{N(N-1)}\right) \left(\sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{ij}^2\right)} \tag{7}$$

The *CD* test has asymptotic standard normal distribution for any value of *N* and *T,* under the null hypothesis.

2.2.4. Slope Homogeneity Tests

In the panel causality analysis, before imposing the causality restriction, it is important to check if the slope coefficients are homogenous (Granger, 2003). The null and alternative hypotheses of slope homogeneity/ heterogeneity are stated as:

H_0: $\beta = \beta_i$ $(for\ all\ i)$

H_1: $\beta_i = \beta_j$ $(for\ a\ non-zero\ friction\ of\ pair-wise\ slopes\ for\ i \neq j, (Apply\ F-test)$

The F test will be valid in the presence of small cross-sectional dimension (N) and large time dimension (T). Moreover, the homoscedastic error variance and exogenous explanatory variables enhance the validity of this test as well. Swamy (1970) developed the homogeneity test by unwinding the homoscedasticity supposition in the F test. This methodology is dependent upon the individual slope estimates from an appropriate pooled estimator. However, both of these techniques need a smaller *N* as compared to *T* in the panel settings. Pesaran and Yamagata (2008) followed Swamy's approach and developed the Δ̃ test for analysing the slope homogeneity especially in the large panel where (N, T) → ∞. The revised Swamy's test is symbolised as:

$$\tilde{S} = \sum_{i=1}^{N} (\hat{\beta}_i - \tilde{\beta}_{WFE})' \frac{x_i' M_\tau x_i}{\widetilde{\sigma_i^2}} (\hat{\beta}_i - \tilde{\beta}_{WFE}) \tag{8}$$

In equation (8), $\tilde{\beta}_{WFE}$ is the expression for weighted fixed pooled estimator and $\hat{\beta}$ represents pooled OLS. Furthermore, σ_i^2 is the estimate of $\tilde{\sigma}_i^2$ and M_τ denotes the identity matrix (see Pesaran and Yamagata, 2008). The standard Δ̃ test is stated as:

$$\tilde{\Delta} = \sqrt{N} \left(\frac{N^{-1}\tilde{S} - k}{\sqrt{2k}}\right) \tag{9}$$

The $\tilde{\Delta}_{adj}$(*bias-adjusted*) test improves the properties of the Δ̃ approach specially, when error term is normally distributed. The bias-adjusted version is expressed as:

$$\tilde{\Delta}_{adj} = \sqrt{N} \left(\frac{N^{-1}\tilde{S} - E(\tilde{z}_{it})}{\sqrt{var(\tilde{z}_{it})}}\right) \tag{10}$$

In the equation (10) $var(\tilde{z}_{it}) = \frac{2k(T-k-1)}{T+1}$ is variance while $E(\tilde{z}_{it}) = k$ is representing the mean.

2.2.5. The Bootstrap Panel Granger Causality Test

Granger (1996) defines the causality relationship as the situation in which the past information on one variable helps in improving the forecast of a second variable. Kar *et al.* (2011) present different causality methods. However, we selected the approch put forward by Kónya (2006), since it accounts for country-specific heterogeneity and cross-sectional dependence as well. The bootstrap Granger method finds the causal nexus on each member distinctly without assuming that the panel possesses homogenous properties. For that reason, it is not essential to test unit root or co-integration before applying this approach as it generates country-specific critical values.

The panel bootstrap causal methodology relies on the two-dimensional vector autoregressive model. In this study, we connected it in the context of remittances (*REM*) and financial development (*FID*). The Granger causality test for our panel arrangement is expressed in a following manner:

$$Y_{1,t} = \alpha_{1,1} + \sum_{j=1}^{p_{y1}} \beta_{1,1,j} Y_{1,t-j} + \sum_{j=1}^{p_{x1}} \gamma_{1,1,j} X_{1,t-j} + \varepsilon_{1,1,t}$$

$$Y_{2,t} = \alpha_{1,2} + \sum_{j=1}^{p_{yi}} \beta_{1,2,j} Y_{2,t-j} + \sum_{j=1}^{p_{xi}} \gamma_{1,2,j} X_{2,t-j} + \varepsilon_{1,2,t}$$

...

$$Y_{N,t} = \alpha_{1,N} + \sum_{j=1}^{p_{y1}} \beta_{1,N,j} y_{N,t-j} + \sum_{j=1}^{p_{x1}} \gamma_{1,N,j} X_{N\ t-j} + \varepsilon_{1,N,t}$$

And .... (11)

$$X_{1,t} = \alpha_{2,1} + \sum_{j=1}^{p_{y2}} \beta_{1,1,j} Y_{1,t-j} + \sum_{j=1}^{p_{x2}} \gamma_{2,1,j} X_{1,t-j} + \varepsilon_{2,1,t}$$

$$X_{2,t} = \alpha_{2,2} + \sum_{j=1}^{p_{yi}} \beta_{2,2,j} Y_{2,t-j} + \sum_{j=1}^{p_{xi}} \gamma_{2,2,j} X_{2,t-j} + \varepsilon_{2,2,t}$$

...

$$X_{N,t} = \alpha_{2,N} + \sum_{j=1}^{p_{y2}} \beta_{2,N,j} y_{N,t-j} + \sum_{j=1}^{p_{x2}} \gamma_{2,N,j} X_{N\ t-j} + \varepsilon_{2,N,t}$$

In (11), *i* represent countries while *t* symbolizes the periods under study. Considering *j* lags, in (11) p_{1i} and p_{2i} signify the longest lags in the system which remain persistent throughout countries, but vary across the variables. This empirical study estimates the framework for each pair on the presumption 1-4 lags and chooses one that minimises the Schwarz information criterion.[7] $\varepsilon_{1,i,t}$ and $\varepsilon_{2,i,t}$ are white noises, correlated for each individual economy but act else in the panel.

To find the remittances and financial development relationship we use the Seemingly Unrelated Regressions (SUR) method for the equations (11). Subsequently, there may have

---

[7] The causality results in the panel setting depend on the lag structure (Kónya, 2006).

a conceivable association between the individual regressions through simultaneous connection within the two equations. The Wald tests are performed with every single country specific bootstrap value achieved by simulations. In the system (11), the one-way causal relation runs from X to Y only if all $γ_{1,i}$ are not zero, however, $β_{2,i}$ must be zero and the other way around.

The two-way causality connection exists just if neither all $γ_{1,i}$ nor $β_{2,i}$ are zero, and if not there is not the case of causality.[8]

3. Empirical Results

3.1. The SGMM Results

The empirical results of remittances and key indicators of financial institutional development are summarised in Table 1. The results reveal that remittances positively affect the financial depth of the three income groups while we find a more robust effect on profitability in the MI group. Remittances stabilize the financial institutional more in the LI group, by fulfilling the credit needs of the financial institutions and increase the financial depth in all groups. The remittances used for consumption put a negative effect on deepening, while the CPI have a nominal effect on the stability in all groups. Moreover, the capital market development and GDP reveal a positive impact on the financial institutional development.

The governance variables such as corruption have a negative impact, whereas regularity quality positively influences the financial sector of the receiving economies. In addition, monetary expansion by providing loans to the private sector increases the financial depth in all groups. On the other hand, profitability is linked to financial stability only in the LMI and MI countries. The financial sector stability positively influences the depth and profitability furthermore; their efficiency helps in stabilizing the institutions. The Hansen and autocorrelation AR (2) test confirm the validity along with the presence of no second-order serial in the model.

3.2. Homogeneity and Cross-sectional Dependence Results

In the panel settings, it is necessary to examine the slope homogeneity and cross-sectional dependence across countries in order to find a suitable estimator. In order to scrutinize the cross-sectional dependence, we adopt three tests, namely *LM, CD$_{lm}$*, and *CD,* and their results are shown in Table 2. The results indicate that the null-hypothesis of no cross-sectional dependence is rejected at all quasi-levels signifying that the *SUR* methodology is more adequate and suitable than the country-specific OLS estimation.[9] More precisely, the outcomes accommodate transmission shocks from one economy to another in the same income group. The slope homogeneity across the countries was verified using $\tilde{S}$, $\tilde{\Delta}$, and $\tilde{\Delta}_{adj}$ tests and results are reported in Table 2 as well. The findings support the country-specific heterogeneity by rejecting the null-hypothesis of slope homogeneity in all the three tests. Therefore, a substantial financial relationship in one economy is not transferred to another.

---

[8] *Kónya (2006) defines the causality of one period ahead.*

[9] *According to Zellner (1962), in the presence of cross-sectional dependence the SUR approach is more effective than the country-specific OLS method. The causality outcomes obtained from SUR procedure proposed by Zellner (1962) are more reliable than those based on OLS estimation.*

Remittances, Governance and Institutions Development

Variable	Low Income			Lower-Middle Income			Middle Income		
	DPTH	PRFT	STBTY	DPTH	PRFT	STBTY	DPTH	PRFT	STBTY
DPTH(-1)	0.981***			0.890***			0.959***		
PRFT (-1)		0.604***			0.632***			0.629***	
STBTY (-1)			0.619***			0.919***			0.632***
REM	0.115*	0.137	0.272***	0.091***	0.015	-0.009	0.055	0.364***	0.090
CMD	0.094***	-0.026	0.062	0.041	0.027*	0.0026*	0.083	0.426**	0.022
CPI	0.099**		0.002	-0.006		0.0101**	0.004		-0.004
GDP	0.142***	-0.336	0.106***	0.126**	0.024*	0.087	0.134**	0.156	0.081
RHHCE	-1.51***			-1.66***			-0.265		
Governance									
CCLI	-0.708	-2.043*	-2.360	-4.01**	-3.796	0.499	-4.06***	1.871	-0.553
RQLI	1.151	5.582	2.523	-0.123	0.502	0.178	0.069	-0.029	0.119
Financial Indicator									
DCPS	0.027***			0.180***			0.039***		
ZSCR	0.062**	0.361**		0.018	0.059		-0.053	0.20***	
BI	0.590	1.564	0.569	-0.864	7.33*	0.763	2.224	8.627*	4.264
BCIR			-0.06***			0.024			0.11***
C	1.507	25.4***	4.919**	4.569***	17.97***	-0.851	-0.941	26.42***	10.28***
Countries	9			22			19		
Obs.	162			396			342		
AR(2)	0.721	0.861	0.583	0.743	0.341	0.119	0.336	0.388	0.976
Sargan	0.162	0.775	0.125	0.112	0.533	0.265	0.138	0.442	0.133

*Note: *, **, *** are representing significance at 1, 5 and 10 %.*

Homogeneity and Cross-sectional Dependency Tests

	Middle Income				Lower-Middle Income				Low Income			
	DPTH	EFFE	PRFT	STBTY	DPTH	EFFE	PRFT	STBTY	DPTH	EFFE	PRFT	STBTY
LM	287.3*	375.7*	342.9*	393.1*	298.0*	366.8*	257.6***	269.3**	52.40**	56.36***	48.45***	47.99***
CD_{lm}	6.29*	11.06*	9.29*	12.01*	3.11*	6.322*	3.24***	1.78**	1.93**	1.62***	1.67***	1.51***
CD	3.628*	5.07*	5.27*	5.19*	1.84***	2.44*	2.68***	1.37***	3.97*	1.22***	1.23***	1.88***
$\tilde{S}$	3155.5*	472.8*	1301.4*	1080.8*	4198.0*	333.1*	8049.1*	1125.9*	3593.7*	523.9*	2026.0*	2026.0*
$\tilde{\Delta}$	508.8*	238.5*	208.1*	172.2*	629.5*	46.90*	1662.4*	166.4*	844.9*	121.3*	475.4*	475.4*
$\tilde{\Delta}_{adj}$	31.10*	145.9*	12.70*	10.51*	38.48*	2.842*	101.67*	10.15*	51.67*	7.408*	29.06*	29.06*

*Note: (1): *, ** and *** represents the significance at 1, 5 and 10% levels. (2) (LM, CD_{lm} and CD) and ($\tilde{S}$, $\tilde{\Delta}$ and $\tilde{\Delta}_{adj}$) are the cross-sectional dependence and slop homogeneity tests proposed by (Breusch and Pagan, 1980; and Pesaran, 2004) and (Swamy, 1970; and Pesaran et al., 2008) respectively. To slope homogeneity tests have been performed using GAUSS 10 while for cross-sectional dependence we use EVIEWS 8.*

The results of both slope heterogeneity and cross-sectional dependence support the suitability of the dynamic bootstrap panel Granger causality technique. The outcomes from this approach are reported in Tables 4, 5 and 6 and (See appendix A); however, the causality evidence from three groups are compiled below (Table 3).

Table 3

Causality Evidence from Bootstrap Panel Granger Causality Approach

	Low Income	Lower-Middle	Middle Income
Rem-Depth	Guinea	Guatemala, Guyana, Honduras, Lesotho, Sudan	Belize, Botswana, Colombia, Fiji, Thailand
Rem-Efficiency	Togo	Guatemala, El Salvador, India, Indonesia	China, Colombia, Jamaica
Rem- Profit	Togo	Congo, Rep., Guatemala, Guyana, India	Brazil, Mexico
Rem-Stability	Mali, Mozambique	Bangladesh, Cote d'Ivoire, Ghana, Guyana	Algeria, Botswana, Brazil, China, Jamaica, South Africa, Turkey
Depth- Rem	Ethiopia	India, Bolivia, Swaziland	Jamaica, Mexico, South Africa
Efficiency - Rem	Mozambique		Ecuador, Suriname
Profit - Rem	Benin, Togo	Lesotho	Colombia, Malaysia, Suriname
Stability - Rem	Togo	Congo, Rep., Guatemala	Colombia, Dominican Republic,

The results presented in Table 3 show that in the LI group countries remittances increase financial depth in Guinea, efficiency and profitability in Togo, whereas stabilising the financial institutions only in Mali and Mozambique. We only find bi-directional causality evidence in Togo, where remittances increase the profitably of the financial institution. As one may see above, the dynamic bootstrap causality results show that remittances have a smaller impact on the financial institutional development. The inward flowing remittances have a greater influence in stabilising financial institutions by providing them with excessive monetary resources that help in fulfilling credit needs. In the LMI countries, remittances affect the different functions and financial indicators in sixty percent of the countries included in the sample. The evidence shows that they increase the financial depth in recipient economies of the LMI group. Furthermore, we find one-sided causality evidence running from remittances to profit, stability and efficiency in a few countries. On the other hand, the quality of financial institutions is not the reason for the increasing trend of the remittances' inflow. Remittances are the biggest source of capital flow in the LMI countries that helps in strengthening the financial sector, boosting efficiency and increasing profitability. Remittances represent the second largest source of foreign currency in the MI countries, and in this context the results indicate that they affect financial indicators in three-fourths of the member countries. By lowering transaction costs and time span, the MI countries attracted more remittances over the last decade. The results for the MI countries reveal that

these inflows have a stronger impact on stability and financial depth. We also find a one-sided causality between remittances and financial institutional development in several MI countries. The results also reveal that mature and developed financial institutions have the capability to attract more remittances, as we find a higher degree of causality in the LMI and the MI groups as compared to the LI group.

The graphs in Figure 2 (see Appendix) are made by using 19 years average data from 1996 to 2014, compiled from the World Bank development indicators. These graphs show the relationship and trends between remittances, governance and institutional development indicators. The visual inspection of graphs indicates the positive correlation among remittances, financial depth and stability. Similarly, good economic policies increase the financial depth, but weak governance quality contributes less to profitability in many low, lower-middle, and middle-income countries.

Summing up, the remittances surging in via official channels have a positive impact on financial institutional development. The developed financial institutions have a higher ability to attract remittances, relative to less developed ones. The monetary and fiscal measures along with governance quality, trade and the business environment can also affect the remittances - financial development relationship in recipient economy. Therefore, we observe that the relationship between the two variables is in general country-specific. The results are consistent with the existing literature, despite the fact that it does not cover all the countries included in this study.

Conclusions

The results obtained using the System GMM reveal that the remittances inflow positively affects the depth, efficiency, stability and profitability of financial institutions. The outcomes explore the more profound impact that remittances have on the development and stability in the LI group, while showing the significant effects on depth and profitability in the LMI and MI groups, respectively. Moreover, remittances used for consumption do not have a positive effect on the financial depth of the receiving economy. Similarly, corruption represents a big dilemma of group's understudy that negatively affects the financial system of the respective economy. Sound economic policies combined with progress in the financial sector can influence the financial and institutional growth as well as development.

The major results from the bootstrap panel Granger test are presented hereafter. Remittances Granger-cause depth, efficiency, profitability and stability in all income groups, but also trigger substantial evidence in the LMI and the MI countries. Despite this fact, given the sign of this causality nexus, we find mixed resuts in the three income groups. Remittances and financial variables cause each other in three-fifths of the LMI and three-fourths of the MI countries. The two-sided causality relationship is observed only in Togo from the LI group. In other cases, there is no additional causality evidence in the three income groups. This leads us to conclude that the nexus between remittances and financial institutional development is in general country-specific.

From the results, it is suggested that the governments should collaborate with banks and other financial institutions in order to launch programs that address all the problems related to remitters and households. The government should exempt or reduce the taxes on remittances inflow and create the competitive environment in the financial

sector that will help in reducing the cost and time span which encourages remitters to transfer their savings back to their homeland. This will increase the financial access and stabilize the financial institutions by fulfilling the credit needs of the economy. The financial institution can offer incentives for the savers and also can provide consultancy along with credit facility to remittance receiving households for starting a business. It will increase the institutional efficiency and positively affect the profitability, especially in the LI and the LMI countries.

References

Acosta, P.A., Baerg, N.R. and Mandelman, F.S., 2009. Financial development, remittances, and real exchange rate appreciation. *Economic Review, Federal Reserve Bank of Atlanta*, 94.

Adenutsi, D.E., 2011. Financial development, international migrant remittances and endogenous growth in Ghana. *Studies in Economics and Finance*, *28*(1), pp.68-89.

Aggarwal, R., Demirgüç-Kunt, A. and Peria, M.S.M., 2011. Do remittances promote financial development?. *Journal of Development Economics*, *96*(2), pp.255-264.

Agir, H., Kar, M. and Nazlioglu, Ş., 2011. Do remittances matter for financial development in the MENA region? Panel cointegration and causality analysis. *Empirical Economics Letters*, *10*(5), pp.449-456.

Airola, J., 2007. The use of remittance income in Mexico. *International Migration Review*, *41*(4), pp.850-859.

Arellano, M. and Bover, O., 1995. Another look at the instrumental variable estimation of error-components models. *Journal of econometrics*, *68*(1), pp.29-51.

Gapen, M.T., Chami, M.R., Montiel, M.P., Barajas, M.A. and Fullenkamp, C., 2009. *Do workers' remittances promote economic growth?* (No. 9-153). International Monetary Fund.

Barham, B. and Boucher, S., 1998. Migration, remittances, and inequality: estimating the net effects of migration on income distribution. *Journal of development economics*, *55*(2), pp.307-331.

Bettin, G. and Zazzaro, A., 2012. Remittances and financial development: substitutes or complements in economic growth?. *Bulletin of Economic Research*, *64*(4), pp.509-536.

Breusch, T.S. and Pagan, A.R., 1980. The Lagrange multiplier test and its applications to model specification in econometrics. *The Review of Economic Studies*, *47*(1), pp.239-253.

Brown, R.P. Carmignani, F. and Fayad, G., 2013. Migrants' remittances and financial development: Macro-and micro-level evidence of a perverse relationship. *The World Economy*, *36*(5), pp.636-660.

David, A.M. and Marouani, M.A., 2015. Migration and employment interactions in a crisis context: The case of Tunisia. *Economics of Transition*, *23*(3), pp.597-624.

Chowdhury, M.B., 2011. Remittances flow and financial development in Bangladesh. *Economic Modelling*, *28*(6), pp.2600-2608.

Čihák, M., Demirgüč-Kunt, A., Feyen, E. and Levine, R., 2013. *Financial development in 205 economies, 1960 to 2010* (No. w18946). National Bureau of Economic Research.

Clemens, M. and McKenzie, D., 2014. *Why Don't Remittances Appear to Affect Growth? Working Paper 366*

Čihák, M., Demirgüč-Kunt, A., Feyen, E. and Levine, R., 2013. *Financial development in 205 economies, 1960 to 2010* (No. w18946). National Bureau of Economic Research.
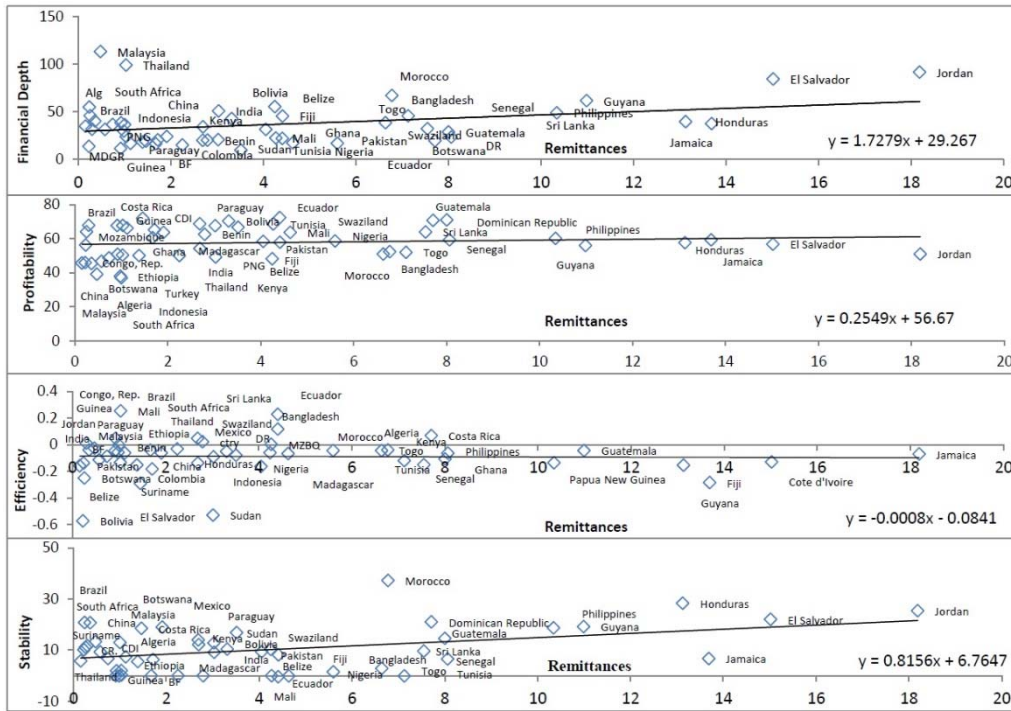
Esteves, R. and Khoudour-Castéras, D., 2011. Remittances, capital flows and financial development during the mass migration period, 1870–1913. *European Review of Economic History*, *15*(3), pp.443-474.

Gapen, M.T. *et al*., 2009. *Do workers' remittances promote economic growth?* (No. 9-153). International Monetary Fund.

Giuliano, P. and Ruiz-Arranz, M., 2009. Remittances, financial development, and growth. *Journal of Development Economics*, *90*(1), pp.144-152.

Granger, C.W., 2003. Some aspects of causal relationships. *Journal of Econometrics*, *112*(1), pp.69-69.

Gupta, S. Pattillo, C.A. and Wagh, S., 2009. Effect of remittances on poverty and financial development in Sub-Saharan Africa. *World development*, *37*(1), pp.104-115.

Huang, Y., 2011. Private investment and financial development in a globalized world. *Empirical Economics*, *41*(1), pp.43-56.

Kar, M. Nazlıoğlu, Ş. and Ağır, H., 2011. Financial development and economic growth nexus in the MENA countries: Bootstrap panel granger causality analysis. *Economic modelling*, *28*(1-2), pp.685-693.

Karikari, N.K. Mensah, S. and Harvey, S.K., 2016. Do remittances promote financial development in Africa?. *SpringerPlus*, *5*(1), p.1011.

Khurshid, A., *et al*., 2018. Remittances Inflows, Gain of Foreign Exchange or Trade Loss? New Evidence from Low, Lower-Middle and Middle-Income Groups. *Journal for Economic Forecasting*, 21(1), pp.20-41.

Khurshid, A. Kedong, Y. Calin, A.C. and Khan, K., 2017. The Effects of Workers' Remittances on Exchange Rate Volatility and Exports Dynamics-New Evidence from Pakistan. *Romanian Economic Journal*, *20*(63), pp.29-52.

Khurshid, A. Kedong, Y. Călin, A.C. and Popovici, O.C., 2017. A Note on the Relationship Linking Remittances and Financial Development in Pakistan. *Financial Studies*, *21*(4), pp.6-26.

Khurshid, A. Kedong, Y. Calin, A.C. and Popovici, O.C., 2016. Do Remittances Hurt Domestic Prices? New Evidence from Low, Lower-Middle and Middle–Income Groups. *Romanian Journal of Economic Forecasting*, *19*(4), pp.95-114.

Kónya, L., 2006. Exports and growth: Granger causality analysis on OECD countries with a panel data approach. *Economic Modelling*, *23*(6), pp.978-992.

Levine, R., 2005. Finance and growth: theory and evidence. *Handbook of economic growth*, *1*, pp.865-934.

Makhlouf, F. and Mughal, M.Y., 2012. Remittances, Dutch disease, and competitiveness: a Bayesian analysis. *Journal of Economic Development*, *38*(2), pp.67-97.

Motelle, S.I. 2011. The role of remittances in financial development in Lesotho: Evidence from alternative measures of financial development. *Journal of development and agricultural economics*, *3*(6), pp.241-251.

Mundaca, G., 2005. Can remittances enhance economic growth? The role of financial markets development. *Unpublished, Department of Economics, University of Oslo, Oslo, Norway*.

Nishat, M.,Bilgrami, N. and Kazi, S., 1993. The Determinants of Worker's Remittances in Pakistan [with Comments]. *The Pakistan Development Review*, *32*(4), pp.1235-1245.

Nyamongo, E.M. Misati, R.N. Kipyegon, L. and Ndirangu, L., 2012. Remittances, financial development and economic growth in Africa. *Journal of economics and business*, *64*(3), pp.240-260.

Orozco, M., 2006. *International Flows of Remittances: Cost, Competition and Financial Access in Latin America and the Caribbean toward an Industry Scorecard*. Inter-American Development Bank.

Pesaran, M.H. and Breitung, J., 2005. Unit roots and cointegration in panels. *Cambridge Work*.

Pesaran, M.H. and Yamagata, T., 2008. Testing slope homogeneity in large panels. *Journal of Econometrics*, *142*(1), pp.50-93.

Pesaran, M.H., 2006. Estimation and inference in large heterogeneous panels with a multifactor error structure. *Econometrica*, *74*(4), pp.967-1012.

Pesaran, M.H. Ullah, A. and Yamagata, T., 2008. A bias-adjusted LM test of error cross-section independence. *The Econometrics Journal*, *11*(1), pp.105-127.

Rao, B.B. and Hassan, G.M., 2012. Are the direct and indirect growth effects of remittances significant?. *The World Economy*, *35*(3), pp.351-372.

Rana, R.H. and Tasneem, F., 2016. Does Remittance Inflow Promote Financial Development in South Asia?. *Asian journal of social sciences & humanities*, *5*(2), pp.86-100.

Senbeta, A., 2013. Remittances and the sources of growth. *Applied Economics Letters*, *20*(6), pp.572-580.

Sobiech, I., 2015. *Remittances, finance and growth: does financial development foster remittances and their impact on economic growth* (No. 158). FIW Working Paper.

Swamy, P.A., 1970. Efficient inference in a random coefficient regression model. *Econometrica: Journal of the Econometric Society,* 38(2), pp.311-323.

Gupta, S. Pattillo, C.A. and Wagh, S., 2009. Effect of remittances on poverty and financial development in Sub-Saharan Africa. *World development*, *37*(1), pp.104-115.

Yang, D., 2004. How remittances help migrant families. *University of Michigan*.

Ziesemer, T.H., 2012. Worker remittances, migration, accumulation and growth in poor developing countries: Survey and analysis of direct and indirect effects. *Economic Modelling*, *29*(2), pp.103-118

Figure 2

Remittances, Governance and Institutional Variables

Appendix A

Table 4

Causality Results; Remittances and Institutions (Low-Income Countries)

	REM→Depth		Depth→REM		REM→EFCY		EFCY→REM		REM→PRFT		PRFT→REM		REM→STBTY		STBTY→REM	
LI Countries	C	Wald test	C	Wald test	C	Wald test	C	Wald test	C	Wald test	C	Wald test	C	Wald test	C	Wald test
Benin	0.069	4.298	-0.131	0.333	0.032	0.268	3.615	5.472	-0.037	2.331	2.561	60.01***	-0.049	1.594	0.297	0.465
Burkina Faso	0.043	5.715	0.020	0.279	-0.076	0.328	0.091	0.234	-0.014	0.106	0.349	4.021	0.117	1.134	0.175	2.747
Ethiopia	-0.027	3.000	2.842	12.63*	0.028	0.589	4.566	0.715	-0.109	2.981	-0.129	0.271	0.119	3.969	0.716	3.096
Guinea	0.074	10.98*	0.905	6.466	0.032	0.915	0.421	0.518	-0.043	4.884	-0.164	0.590	0.097	3.298	0.300	1.640
Madagascar	0.013	2.837	-0.041	0.794	0.005	0.876	-3.320	0.308	0.006	0.152	0.194	0.105	-0.046	8.714	-0.144	0.560
Mali	0.088	5.640	0.426	1.262	0.090	2.081	-0.945	0.285	0.006	1.014	-0.320	0.510	0.478	16.10**	0.134	1.111
Mozambique	-0.095	1.784	0.147	1.859	0.056	0.746	-0.207	9.188*	0.131	0.697	-0.042	0.948	0.626	27.20**	-0.193	7.502
Tunisia	0.143	1.210	0.057	2.543	-0.308	0.476	-0.273	2.081	-0.156	0.725	-0.133	9.801	-0.483	0.331	-0.032	5.896
Togo	-0.014	2.911	0.450	1.073	0.160	11.69*	0.312	3.192	-0.065	13.40*	1.109	53.5***	-0.034	0.956	-0.561	22.19**

Note: *, **, *** specifies the significance level at 1%, 5% and 10% respectively. The TSP codes are used to obtain the results by running it in GiveWin software. The critical values bootstraps are obtained from the 10,000 replications.

Table 5

Causality Results; Remittances and Institutions (Low-Income Countries)

Income	REM → Depth C	Wald test	Depth → REM C	Wald test	REM → EFCY C	Wald test	EFCY → REM C	Wald test	REM → PRFT C	Wald test	PRFT → REM C	Wald test	REM → STBTY C	Wald test	STBTY → REM C	Wald test
Bangladesh	-0.053	1.87	0.231	4.07	-0.15	0.51	-1.35	0.99	-0.27	2.14	-0.14	10.82	0.93	25.38*	-0.05	1.24
Bolivia	0.019	0.75	-1.751	37.04**	-0.07	6.62	-0.14	0.28	-0.03	3.10	1.01	5.87	-0.04	2.36	0.67	13.70
Congo, Rep.	-0.003	0.61	-0.960	3.54	-0.03	0.31	-0.45	0.12	0.15	34.33**	-0.57	2.51	-0.05	0.71	1.15	18.761*
Cote d'Ivoire	0.010	0.27	0.295	3.46	-0.26	7.64	-1.59	2.48	0.01	0.36	0.25	0.98	0.52	17.81*	0.31	2.37
El Salvador	0.112	8.00	-0.049	0.33	-1.09	40.06***	0.12	1.27	-0.46	8.94	0.19	3.44	0.21	7.14	-0.01	0.43
Ghana	0.034	5.57	1.979	3.54	-0.05	4.14	8.01	2.92	-0.01	0.20	-0.11	0.27	0.12	24.85*	1.07	2.31
Guatemala	0.237	35.47**	-0.092	0.20	0.17	32.27**	0.25	0.20	0.09	25.66*	0.42	1.87	0.10	3.15	-0.38	37.00*
Guyana	-0.071	19.547*	0.462	2.42	-0.02	0.49	8.07	5.92	-0.04	14.68*	0.65	2.62	0.08	22.77*	-0.94	7.10
Honduras	0.136	27.80**	0.034	0.19	0.12	2.89	-0.15	8.07	0.22	5.74	0.15	2.33	0.03	1.09	0.02	0.45
India	-0.009	0.43	0.920	29.04**	0.99	46.29**	0.18	0.10	0.34	21.15*	0.11	0.47	0.34	17.94	-0.12	1.23
Indonesia	-0.049	15.31	-0.353	0.84	0.30	41.39**	0.87	0.21	0.23	9.95	0.23	2.27	-0.13	0.98	-0.12	1.44
Kenya	-0.085	4.27	-0.169	0.47	0.38	14.56	-0.26	10.96	0.12	10.23	-0.70	6.90	-0.18	1.10	-0.01	0.29
Lesotho	0.256	35.49**	-0.812	6.80	-0.20	1.08	-0.31	0.99	0.08	1.13	-0.80	20.21**	-0.19	8.52	0.56	4.61
Morocco	0.147	11.04	0.033	0.73	-0.41	3.92	-0.75	0.72	-0.04	0.42	0.00	0.12	-0.10	1.42	-0.01	0.12
Nigeria	0.052	0.95	-0.382	3.25	0.03	0.75	0.06	0.30	-0.18	3.17	0.35	9.58	0.28	7.01	-0.20	4.52
Pakistan	0.027	0.73	-1.421	12.62	0.12	2.26	0.38	4.08	0.02	0.31	0.04	0.32	0.10	1.23	-0.17	0.97
Papua New Guinea	-0.067	3.01	-1.279	10.20	0.19	2.41	-0.97	5.27	0.06	1.36	0.33	1.49	-0.05	0.31	-0.20	1.43
Philippines	0.064	1.49	-0.054	0.33	1.12	9.59	0.14	1.54	0.13	1.51	0.12	1.87	-0.28	2.05	0.09	2.53
Senegal	0.122	9.86	0.095	0.26	0.09	3.19	-2.85	2.00	0.11	16.45	-0.47	7.00	0.07	7.87	0.02	0.85
Sri Lanka	0.165	6.48	-0.071	0.35	-0.53	1.42	-0.02	0.51	-0.38	4.81	-0.28	10.73	2.08	9.57	0.01	0.12
Sudan	0.118	21.60*	-0.991	15.57	0.58	6.25	-0.73	0.82	0.09	9.95	0.81	16.21	-0.27	9.73	-0.40	14.36
Swaziland	0.006	0.36	-1.458	69.16**	0.13	9.27	-0.03	2.30	0.01	1.51	1.15	20.35	-0.05	0.30	-0.14	3.85

Note: *, **, *** specifies the significance level at 1%, 5% and 10% respectively. The TSP codes are used to obtain the results by running it in GiveWin software. The critical values bootstraps are obtained from the 10,000 replications.

Table 6

Causality Results; Remittances and Institutions (Low-Income Countries)

	REM → Depth		Depth → REM		REM → EFCY		EFCY → REM		REM → PRFT		PRFT → REM		REM → STBTY		STBTY → REM	
Income	C	Wald test	C	Wald test	C	Wald test	C	Wald test	C	Wald test	C	Wald test	C	Wald test	C	Wald test
Algeria	-0.02	2.13	-0.80	4.17	0.00	0.85	3.59	2.29	0.03	0.35	-0.09	0.13	-0.12	25.26**	0.34	0.57
Belize	0.21	21.72**	-0.09	0.18	0.01	0.15	0.36	0.13	0.44	8.466*	0.05	0.47	-0.07	0.24	0.04	0.12
Botswana	0.13	30.72**	-0.87	8.60	0.00	0.77	-8.32	3.65	-0.02	4.78	0.91	0.47	-0.11	31.59***	1.05	9.82
Brazil	0.02	3.33	-0.51	5.42	0.03	0.28	0.45	4.22	-0.08	0.70	0.91	8.51	0.09	9.708*	-0.72	3.79
China	-0.02	1.65	-0.21	0.60	0.02	41.23***	0.93	1.44	0.11	6.94	0.67	10.04	-0.26	58.27***	0.31	1.88
Colombia	-0.33	31.45***	0.26	3.28	-0.07	27.29**	-0.04	0.87	-0.08	4.51	0.68	37.87**	0.27	3.15	-0.27	27.15**
Costa Rica	0.30	3.96	-0.25	3.20	-0.14	1.68	-0.26	2.53	-0.10	8.72	-0.39	0.49	0.03	0.39	-0.27	0.28
Dominican Republic	-0.20	8.67	-0.28	6.94	-0.24	3.76	0.02	0.47	0.08	0.59	-0.35	5.74	-0.07	0.95	0.71	21.78*
Ecuador	-0.14	3.27	-0.55	3.41	-0.05	1.54	1.07	31.87**	0.10	1.90	-0.29	1.23	0.04	0.92	0.00	0.29
Fiji	0.09	12.41*	-0.52	5.47	-0.08	3.78	-0.94	6.44	-0.01	0.13	0.18	0.43	0.19	1.54	0.23	5.66
Jamaica	0.18	4.50	1.18	32.67**	3.01	45.50***	-0.01	2.47	0.01	0.12	0.22	11.38	-1.96	23.58*	0.01	0.65
Jordan	0.03	1.01	-0.22	2.13	-0.01	0.39	-1.68	9.36	0.00	0.25	-0.01	0.63	-0.12	0.75	0.00	0.44
Malaysia	-0.07	8.86	-0.71	3.51	0.01	7.86	-1.46	0.32	-0.10	0.19	-0.21	15.16**	0.22	7.00	-0.26	4.32
Mexico	0.11	5.84	-0.87	17.75*	0.06	1.63	0.07	0.14	-0.16	9.551*	0.31	4.50	0.02	0.34	0.17	4.14
Paraguay	-0.19	7.12	-0.11	0.21	0.30	8.60	0.24	1.60	0.23	6.43	0.15	0.26	-0.01	0.38	0.08	0.84
South Africa	-0.04	0.62	0.46	29.95**	0.04	1.36	-0.06	0.15	0.25	9.78	-0.21	9.43	-2.69	115.9**	-0.03	5.74
Suriname	-0.03	1.07	-1.32	4.00	0.00	0.63	21.87	27.29**	0.00	0.35	3.72	18.14**	0.06	4.16	-1.43	4.30
Thailand	0.14	20.86**	-1.14	5.72	0.38	3.09	0.00	0.41	0.03	0.60	-0.10	0.32	0.12	0.52	0.10	1.32
Turkey	-0.05	2.94	-0.71	7.29	-0.04	5.09	-0.79	11.84	0.12	2.01	-0.11	2.72	-0.88	33.62**	0.05	1.83

*Note: *, **, *** specifies the significance level at 1%, 5% and 10% respectively. The TSP codes are used to obtain the results by running it in GiveWin software. The critical values bootstraps are obtained from the 10,000 replications.*