

Do Remittances Matter for Financial Development in the MENA Region? Panel Cointegration and Causality Analysis

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Abstract: This paper investigates the impacts of remittances on financial development in the MENA region by utilizing the panel cointegration and causality methods and finds out that while the remittances and economic growth cause financial development in both the short- and long-run, financial development and economic growth induce the worker's remittances to the home country in the long-run.

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1. Introduction

Volume of remittance flows by migrant workers from the host countries into the home countries has rapidly risen over the years (Brown, 2006; World Bank 2006) and this sort of private transfers has become one of the important resources for economic development (Chami et al., 2008). Recently, both theoretical and empirical literatures on this subject have mainly concentrated on whether macroeconomic variables and conditions in both the home and the host country determine magnitude of remittances (El-Sakka and McNabb, 1999; Sayan, 2004; Vargas-Silva and Huang, 2006). In addition, the impacts of remittances on the receiving economies are investigated through three channels. Remittances might alleviate poverty by increasing the recipient family's income and living standards (Adams and Page, 2005; Gupta et.al., 2009, Rao and Hassan, 2010), increase the growth rate by

reducing the volatility (Hnatkovska and Loayza, 2003; Chami et al., 2008), and negatively affect the growth rate by appreciating the exchange rate (Amuedo-Dorantes and Pozo, 2004; Lopez et.al., 2007; Lartey et. al., 2008).

The literature also argues that remittances may induce financial development through a few channels (Aggarwal et al., 2006; Giuliano and Ruiz-Arranz, 2009; Gupta et.al., 2009; Acosta et.al., 2009). First of all, aggregate level of deposits may increase if remittances are held in the banks. Second, this rise in the deposits may enhance an increase in the total amount of the credit channeled into the private sector in the receiving country. This implies that a well-functioning financial market may play an important role to direct the remittances to the projects that yield the highest return and therefore enhance growth rates. Third, remittances may introduce new households with the banking system and, in turn, this familiarity may result in both more deposit and new credit opportunities in the sector.

The aim of this paper is to examine to what extend the remittances contribute to the financial development in the MENA (Middle East and North Africa) region which receives a lion share from the regional distribution of the world-wide remittances, mainly from the European Union. To the best of our knowledge, this is the first empirical study which investigates whether the remittances contribute to financial development in the MENA region and how the direction of causality, if any, between the remittances and financial development is.

2. Model and Data

In order to empirically investigate impact of the remittances on financial development, this paper augments the traditional finance-growth model (Patrick, 1966; Trew, 2006) by adding the remittances. Thereby, following model can be written to examine the sensitivity of financial development to the remittances:

$$\ln FD_{it} = \alpha_{0i} + \alpha_{1i} \ln Y_{it} + \alpha_{2i} \ln REM_{it} + \varepsilon_{it} \quad (1)$$

$$(i = 1, 2, 3, \dots, N); (t = 1, 2, 3, \dots, T)$$

where *FD*, *Y*, and *REM* stand for financial development, income level and remittances, respectively.

The annual data covering the period 1980-2007 for nine MENA countries (Algeria, Egypt, Israel, Jordan, Morocco, Sudan, Syria, Tunisia, and Turkey), restricted by the availability of the number of countries and the time period, is compiled from the World Development Indicators. Real per capita income and remittances are used as proxies for the economic growth and the remittances.

Before going into the empirical analysis, one should highlight that financial development is a multifaceted issue and has not a direct measurement at hand. Instead, a number of proxies to catch up various dimensions of financial development have been widely used. This paper develops a Financial Development Index (FD) by utilizing the principle component analysis. The index is constructed from the widely employed six indicators of financial development: 1) The ratio of narrow money to income, 2) the ratio of quasi money to income, 3) the ratio of broad money (M2) to income, 4) the ratio of deposit money bank liabilities to income, 5) the ratio of private sector credit to income, and 6) the ratio of domestic credit to income.

The financial sector is mainly dominated by the banking sector in the MENA countries and therefore these indicators may well capture the developments in the financial sector of these countries. The data on the financial variables are compiled from the IMF's International Financial Statistics online database.

3. Methods and Findings

This study utilizes panel unit root, cointegration, and causality tests since panel data sets increase the statistical power of tests by combining information from both cross-section and time dimensions. The empirical analysis is carried out in three steps: Unit root analysis, cointegration analysis, and causality analysis.

3.1. Panel Unit Root Analysis

The stationarity properties of the variables are examined by the panel unit root tests of Levin et al. (2002) (LLC) and Im et al. (2003) (IPS). Results in table 1 show that the series are $I(1)$ which signals a possible cointegration relation among the variables.

Table 1: Panel Unit Root Tests

	LLC	IPS
$\ln FD$	-2.96 [0.0015]	-0.15 [0.4368]
$\ln Y$	2.60 [0.9954]	5.30 [1.0000]
$\ln REM$	-2.28 [0.0111]	0.70 [0.7588]
$\Delta \ln FD$	-12.41 [0.0000]	-14.46 [0.0000]
$\Delta \ln Y$	-11.12 [0.0000]	-11.28 [0.0000]
$\Delta \ln REM$	-10.65 [0.0000]	-9.87 [0.0000]

Note: Numbers in brackets are p-values. Schwarz Bayesian Criterion was used to determine the optimal lag lengths.

3.2. Panel Cointegration Analysis

To test for the null of no-cointegration in the panel, the cointegration tests of Pedroni (1999) are employed. The cointegration statistics except group p -test in table 2 provide evidence on the steady-state equilibrium in the long-run among financial development, the economic growth, and the remittances.

Table 2: Panel Cointegration Tests

Within-dimension tests	Constant	Constant and Trend
Panel- ν	1.14	3.18 ***
Panel- ρ	-1.41 *	-1.04
Panel- PP	-2.79 ***	-3.27 ***
Panel- ADF	-2.13 **	-3.01 ***
Between-dimension tests		
Group- ρ	-1.05	-0.01
Group- PP	-3.22 ***	-3.02 **
Group- ADF	-2.31 **	-3.40 ***

Note: ***, ** and * indicates the statistical significance at 1, 5, and 10% levels respectively.

The cointegration parameters are estimated by the group-mean panel FMOLS and DOLS methods developed by Pedroni (2000 and 2001). The panel FMOLS estimator can be constructed as $\hat{\beta}_{GFM}^* = N^{-1} \sum_{i=1}^N \beta_{FMI}^*$ where β_{FMI}^* is obtained from the time series FMOLS estimation of the equation (1) for each country. The panel DOLS estimator requires estimating the following model by the OLS for each country.

$$\ln FD_{it} = \beta_{0i} + \beta_{1i} \ln Y_{it} + \beta_{2i} \ln REM_{it} + \sum_{k=-K_{ii}}^{K_{ii}} \alpha_{ik} \Delta \ln Y_{it} + \sum_{k=-K_{ii}}^{K_{ii}} \lambda_{ik} \Delta \ln REM_{it} + \varepsilon_{it}^* \quad (2)$$

where $-K_i$ and K_i are leads and lags. The panel DOLS estimator can be constructed as $\hat{\beta}_{GD}^* = N^{-1} \sum_{i=1}^N \beta_{Di}^*$ where β_{Di}^* is obtained from the estimation of equation (2).

The cointegration parameters in table 3 indicate that financial development is positively associated with the economic growth and the remittances. More specifically, the panel DOLS (FMOLS) estimator shows that 1 percent increase in the income and the remittances respectively stimulates financial development by 3.15 (3.24) and 0.78 (0.40) percent. The

findings also show that the impact of income growth on financial development is greater than that of the remittances in the MENA countries.

Table 3: Panel Cointegration Estimation

	lnY	lnREM
Panel DOLS	3.15 ***	0.78 ***
Panel FMOLS	3.24 ***	0.40 ***

Note: Leads and lags were set to 1 for the panel DOLS estimator. *** denotes statistical significance at 1 percent level.

3.3. Panel Causality Analysis

The cointegration relationship implies that there are causal interactions among the variables. If the variables are cointegrated, one needs to estimate a vector error correction model (VECM) by augmenting the VAR model with one-lagged error correction term. The panel VECM can be written as follows:

$$\Delta \ln FD_{it} = \delta_{1i} + \sum_{p=1}^k \delta_{1ip} \Delta \ln FD_{it-p} + \sum_{p=1}^k \delta_{12p} \Delta \ln Y_{it-p} + \sum_{p=1}^k \delta_{13p} \Delta \ln REM_{it-p} + \phi_{1i} \hat{\varepsilon}_{it-1} + \nu_{1it} \quad (3)$$

$$\Delta \ln Y_{it} = \delta_{2i} + \sum_{p=1}^k \delta_{21p} \Delta \ln Y_{it-p} + \sum_{p=1}^k \delta_{22p} \Delta \ln FD_{it-p} + \sum_{p=1}^k \delta_{23p} \Delta \ln REM_{it-p} + \phi_{2i} \hat{\varepsilon}_{it-1} + \nu_{2it} \quad (4)$$

$$\Delta \ln REM_{it} = \delta_{3i} + \sum_{p=1}^k \delta_{31p} \Delta \ln REM_{it-p} + \sum_{p=1}^k \delta_{32p} \Delta \ln FD_{it-p} + \sum_{p=1}^k \delta_{33p} \Delta \ln Y_{it-p} + \phi_{3i} \hat{\varepsilon}_{it-1} + \nu_{3it} \quad (5)$$

where k is the optimal lag length(s) and $\hat{\varepsilon}_{it}$ is the residuals from the panel FMOLS estimation of the equation (1). This specification allows identifying for both the short- and long-run causalities. The short-run causality from one variable to other variable is tested with a Wald test by imposing zero restriction on the parameters of the first-differenced variables. The long-run causality is examined by statistical significance of the t-statistic of the error correction coefficients (ϕ) (ECT).

The results for causality analysis in Table 4 indicate the short-run uni-directional causality from the economic growth and from the remittances to financial development that lasts into the long-run. The findings fail to show any causal feedback from the financial development to neither the economic growth nor the remittances in the short-run. Even though remittances are not sensitive to financial development and the economic growth in the short-run, financial development and the economic growth are cause of remittances in the long-run.

Table 4: Panel Granger Causality

	Short-run causality			Long-run causality
	$\Delta \ln FD$	$\Delta \ln Y$	$\Delta \ln REM$	ECT
$\Delta \ln FD$		20.99 [0.0000]	6.06 [0.0138]	0.08 **
$\Delta \ln Y$	2.36 [0.1242]		0.01 [0.9186]	-0.0003
$\Delta \ln REM$	0.16 [0.6822]	0.52 [0.4670]		0.14 ***

Note: The p -values are in brackets and parentheses. *** and ** indicate the statistical significance at 1 and 5 percent levels respectively.

4. Conclusion

This paper empirically investigates the relationships among the remittances, financial development and the economic growth for nine MENA countries to see whether and how the remittances might affect the financial development. The empirical results obtained from panel cointegration and panel causality tests for the period 1980-2007 show that (i) the demand following hypothesis of Patrick (1966:174), stated that “ as economy grows it generates additional and dew demand for financial services, which bring about a supply response in the growth of the financial system”, is supported in the MENA region and (ii) the worker’s remittances provide an additional channel to induce financial development. This finding implies that policy makers should carry out economic policies to faster economic growth which, on the hand, leads to attract new remittances and, on the other hand, induces financial development. In addition, policy prescriptions in these countries should include new instruments to attract more remittances to the home countries and, in turn, this deepens financial sector.

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