A NOTE ON THE RELATIONSHIP LINKING REMITTANCES AND FINANCIAL DEVELOPMENT IN PAKISTAN

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Abstract

We study the relationship among remittances, financial development and growth using the system GMM, full sample Granger causality test and the sub-sample rolling window estimation approach for the case of Pakistan. This paper uses annual and monthly series that cover the 1992 to 2015 interval. The results of the System GMM reveal that remittances negatively affect financial development and growth in the cases in which they are not directed towards investments. In theory, remittances stabilize financial institutions and accelerate the growth process. The full-sample causality results find a unidirectional causal relationship running from financial development to remittances. The parameter stability test hints at evidence of the presence of structural changes. Therefore, this investigation relied on a bootstrap subsample rolling window causality approach that has the unique characteristic of identifying time variation in the sub-sample data. Moreover, the rolling sum of coefficients exhibits the magnitude and direction of the causal relationship. The results of the dynamic sub-sample causality approach show that there is a bidirectional causal relation between remittances and financial development. This sub-sample is correlated with relevant economic occurrences, fact that demonstrates that the results are not a simple statistical artefact.

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1. Introduction

Remittances represent the largest source of external capital, both in absolute terms and as a share of GDP in Pakistan. The flow of remittances can affect financial institutions, especially the banking sector, within the recipient economy. The formal flow through financial institutions increases the demand for financial products and enhances access to other financial services that might not exist otherwise (Orozco and Fedewa, (2007)).

It has been shown that remittances have a positive impact on the development of the credit market and on financial deepening and widening (Amuedo-Dorantes and Pozo, (2006)). Demirgüç-Kunt et al. (2011) state that financial institutions are more willing to give credit to remittances-receiving households, due to the fact that these cash flows represent a stable income source. Moreover, remittances represent cash flows that can be used by financial institutions in other credit-granting operations. In this light, it can be stated that remittances do not only affect receiving households, but also have an impact on the community or region.

Figure 1

Capital inflow to Pakistan (Percentage of GDP)
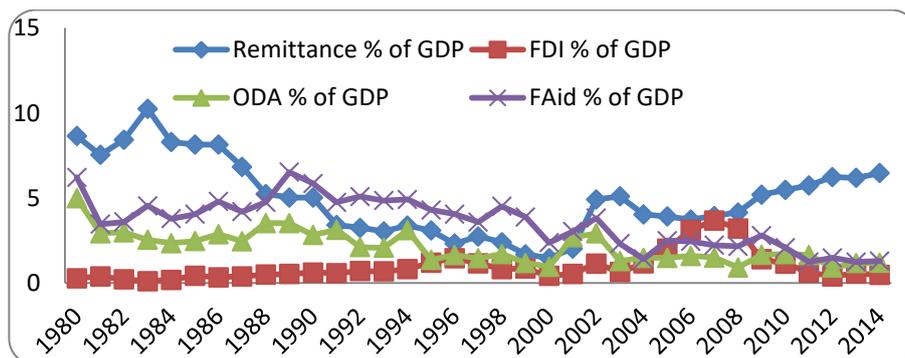
Source: Authors' computation on World Bank data

The flow of remittances is also associated with several macroeconomic challenges, despite the above mentioned benefits. At least technically, the remittances recipients go smoother over financial constraints, fact which in the long run reduces credit demand. In addition to this, the increase of remittances can appreciate the exchange rate, and this in turn will affect competitiveness in international markets (Khurshid et al. (2017)).

During the 90s Pakistan experienced a series of reforms oriented especially to the privatization of industrial units and liberalization of the exchange rate which allowed residents to hold foreign currency accounts. Given tax and *Zakat*[1] exemptions, the deposits in foreign currency quickly picked up, exceeding $1 billion in March 1992. The flow of credit to the domestic sectors expanded to 17.8 percent, which boosted the private fix investment up to 24.8 percent. Despite this fact, the period was market by a marginal expansion of remittances. In the 1997 - 1998 period, the financial sector witnessed a negative dynamics, influenced mainly by the East Asia economic crisis, political and constitutional turmoil and a series of economic sanctions imposed by the international financial institutions.

After 2000, the Pakistan economy recovered and foreign exchange reserves amounted to $10 billion. In the 2003 to 2007 interval, it experienced a tremendous growth and was included in the Goldman Sachs Global Economics Group as one of the next N-11. This growth encouraged remitters, and their flows reached $6 billion in 2008 fact that promted the formation of a national agency called the Pakistan Remittance Initiative.

Due to the stability of the foreign exchange reserves and an exceptional increase in remittances, the economic performance was satisfactory in 2013 – 2014. The money supply decreased, but CPI increased by 1% compared to the same period of the previous year. With 13 percent growth, Pakistan was ranked the 7th in terms of the highest remittance recipient by the World Bank. A moderate appreciation of the national currency translated in a shallow increase in exports.

In the 2014 – 2015 year, the economy of Pakistan was confronted with many challenges. These culminated with a series of floods that affected infrastructure and damaged the major crops that

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[1] *A specific form of religious tax obligation.*

shattered the investor's confidence. During the first six months of 2015, the average M2/GDP ratio was slightly less than the value for the precedent year. The appreciation of the domestic currency along with the energy crisis decreased Pakistan's ranking in the Global Competitiveness Index from 128th to 129th in 2014-15. Despite this fact, remittances kept growing at a steady pace reaching $17.26 billion in 2015. Figure 1 and Figure 2 depict the dynamics for the main variables mentioned above.

Figure 2
Monthly trends of financial development, exports and remittances
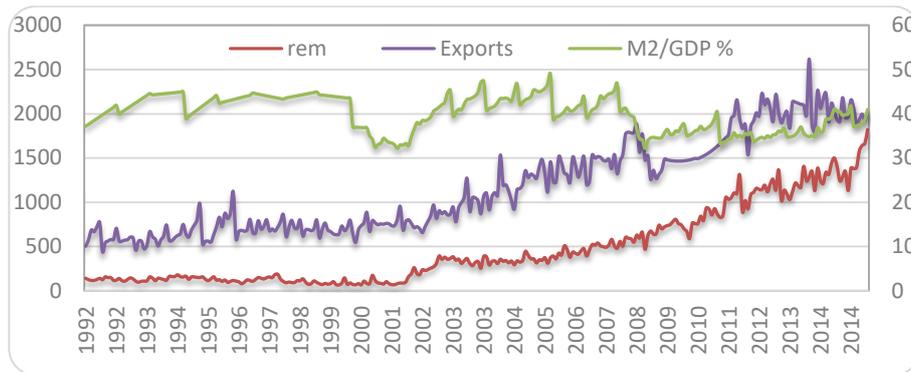
Source: Authors' computation

By considering the existing literature, we notice that little interest has been oriented to the relation between worker remittances and financial development, especially in the case of Pakistan. This study aims to fill this gap in two major ways. Firstly, in order to overcome the data limitation specific to remittances series, we use a new measure to calculate the variable by adding "worker remittances", "migrant transfers" and "compensation of employees".

Secondly, this study offers a procedure aiming to overcome inadvertences deriving from the effects of structural changes. This procedure allows for the analysis of the causal link between the international inflow of remittances and financial development and subsequently growth for the Pakistan economy.

We notice that remittances negatively affect financial development and growth when used for other purposes than investments and document some more on the causality.

The remainder of this paper is organized in the following way. Section two deals with a brief literature review. Section three covers data and methodology, and Section four presents the empirical results. Section five concludes.

2. Literature Review

There is an abundant literature that covers the various effects induced by remittances on growth, relevant results being presented for example in: Giuliano and Ruiz – Arranz (2009), Fayissa and Nsiah (2008), Ratha (2013) or Meyer and Shera (2016). Despite this fact, the literature linking remittances and financial development is limited, especially for the case of Pakistan.

Mundaca (2009) reports that remittances and financial development can represent different solutions for the same scenario. The author notices that remittances have a fundamental role in financial development and growth. Aggarwal et al. (2011) conduct a study on 109 countries focusing on the 1975 – 2007 period. The authors find that there is a positive and strong link between remittances and financial development.

Nyamongo et al. (2012) focus also on the problem of remittances, financial development and growth for the case of 36 African countries. The study shows that remittances represent a relevant source of growth for the states included in the analysis. In addition to this, the volatility of remittances is considered to have a negative influence on growth as these cash flows are a solid complement to financial development.

On the opposite spectrum, Acosta et al. (2010) employ a GMM technique in order to measure the impact of remittances and financial development on the exchange rate. The results suggest that remittances appreciate the exchange rate and induce negative effects on the financial system. On the same line, in a panel study of 138 countries, Brown et al. (2011) find out that worker remittances have a negative impact on financial development.

Amjad (1986) conducted a study on the uses of remittance by using survey data for the case of Pakistan. The study shows that a significant portion of remittances is oriented towards aggregate consumption and another segment towards small-scale investments. Burney (1987) finds that remittances from the Middle East help in reducing the current account deficit, lowering debt and the additional

loans problem. One conclusion is that they have a positive impact on the growth of Pakistan. Khurshid et al. (2017) find that remittances depreciate the exchange rate in Pakistan and boost exports. In another investigation, Khurshid et al. (2016) explain that the remittances inflow is not responsible for inflation in Pakistan.

Rana and Faria (2016) conduct a panel study of five south Asian countries (including Pakistan) by using ECM and OLS approach. The results reveal that remittances have a positive and significant impact on the financial development for the case of Pakistan.

Ghumro and Karim (2017) test for short-run and long-run impact of remittances on monetary aggregates in an ARDL approach. The authors conclude that remittances are in general used for the purpose of consumption.

3. Data and Methodology

This study uses both monthly and annual data series ranging from January 1992 to June 2015. This time frame is relevant as it witness different political and economic events as those mentioned in the introductory section. To overcome data limitation problems, the methodology uses a remittance series constructed in the fashion of Khurshid et al. (2016).

The data have been collected from the Bureau of Immigration and Overseas employment[2], and from the State Bank of Pakistan[3].

In previous literature (Chowdhury (2011), Aggarwal et al. (2006), or Gupta et al. (2009)) private domestic deposits, bank credit and the M2 ratio of GDP are considered as proxies for financial development (hereafter FD). This study focuses on last variable as it captures the entire range of the financial sector. The other explanatory variables include: Capital Market Development *(CMD)*, Trade Openness *(TOPN)*, Real Interest Rate *(RIR)*, Gross domestic product *(GDP)*, Financial depth *(DEPTH)*, Economic policies *(RQ)*, Economic Crises 2008 *(EC08)* and Economic and trade restrictions *(ETR98)* of 1998.

Our approach uses two proxy variables, $(REM * GS)_{it-1}$ and *(Rem* $STBTY)_{it}$*, that show the way in which remittances affect

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[2] *For further details visit Bureau of immigration and overseas employment website URL: www.beoe.gov.pk/*
[3] *For further reading visit URL: www.sbp.org.pk*

financial development and growth if they are used for saving and financial institution development. All original data are transformed into natural logarithms to overcome potential heteroscedasticity and dimensional difference problems.

The System Generalized Method of Moment approach proposed by the Arellano and Bover (1995) is used to examine the empirical relationship among our variables. This relation is governed by the following equation:

$$FD_{it} = \alpha_0 + \alpha_1 FD_{i,t-1} + \alpha_2 REM_{it} + \alpha_3 (REM * GS)_{it-1} \qquad (1)$$
$$+ \alpha_4 (Rem * STBTY)_{it-1} + \alpha_5 X_{it} + \varepsilon_{it}$$

where:

$FD_{i,t-1}$ is the lag value of FD;

REM_{it} represents remittances;

$(REM * GS)_{it-1}$ stands for saving due to remittances in the previous period;

(Rem* $STBTY)_{it}$ determines the stability of institutions due to remittances inflow

In equation (1), X_{it} is the illustration of the explanatory variables described above: Capital Market Development (CMD), Trade Openness (TOPN), Real Interest Rate (RIR), Gross domestic product (GDP), Financial Depth (DEPTH), Economic Policies (RQ), Economic Crises 2008 *(EC08)* and Economic and Trade Restrictions *(ETR98)* of 1998.

The relationship between remittances and growth is tested using the following equation:

$$GDP_{it} = \alpha_0 + \alpha_1 GDP_{i,t-1} + \alpha_2 REM_{it} + \alpha_3 FD_{it} + \alpha_4 RQ_{it} + \alpha_5 X_{it} + \varepsilon_{it} \qquad (2)$$

Where:

α_1 is the coefficient of last period's growth;

α_2 stands for remittances and;

α_4 characterizes the impact of economic policies on economic growth.

The others variables from the regression are the same as above. The results of these equations are presented in Table 1.

This study treats Granger non-causality on the basis of its predictive capability. Therefore Granger non-causality is regarded as the manner in which the available information on a variable can

improve the prediction of another. This test is performed in the VAR frameworks by using Wald test, likelihood Ratio (LR) and Lagrange Multiplier (LM) statistics, which work under the assumption that the data set is stationary and has no asymptotic distribution.

This study uses the residual based modified *LR* statistics in order to find the causal relationship between remittances and financial development for the case of Pakistan. Our approach follows the next bivariate *VAR (p)* process to show the bootstrap modified *LR* Granger causality:

$$y_t = \phi_0 + \phi_1 y_{t-1} + \ldots\ldots\ldots + \phi_p y_{t-p} + \varepsilon_t \tag{3}$$

In our approach y_t is divided into sub-vectors, one standing for remittances and the other for financial development. Rearranging the above equation, we obtain:

$$\begin{bmatrix} REM_{1t} \\ FD_{2t} \end{bmatrix} = \begin{bmatrix} \phi_{10} \\ \phi_{20} \end{bmatrix} + \begin{bmatrix} \phi_{11}(L) & \phi_{12}(L) \\ \phi_{21}(L) & \phi_{22}(L) \end{bmatrix} \begin{bmatrix} REM_{1t} \\ FD_{2t} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{bmatrix} \tag{4}$$

Where

$$\phi_{ij}(L) = \sum_{k=1}^{p+1} \phi_{ij,k} L^k$$

And the lag operator L is given by:
$$L^k x_t = x_{t-k}$$

In the light of equation (4) the null hypothesis that remittances do not Granger cause financial development is tested under these restrictions: $\phi_{12,k} = 0$, for $k = 1,2,\ldots,p$. Similarly, while testing for the financial development, the following restrictions apply: $\phi_{21,k} = 0$, for $k = 1,2,\ldots,p$.

The full-sample causality test is thus based on *p*-values and modified-LR statistics. If the first hypothesis is rejected we can detect a significant causality running from remittances to financial development. In the same way, if the second null hypothesis is rejected we can assert that financial development is caused by the dynamics of remittances.

Standard Granger non-causality test assumes that the parameter of the VAR model remains constant over the time. The presence of a structural change in full-sample series violates this

assumption. To address the parameter non-constancy and the structural change problem, this empirical study is using rolling window Granger causality and the rolling bootstrap estimation test.

In order to examine the short run parameter stability, Andrews (1993) and Andrews and Ploberger (1994) used the *Sup-F, Mean-F and Exp-F* tests. In this study, the above-mentioned tests are empirically examined from the sequence of LR statistics. The parameter constancy is checked in full-sample against one-time structural change at each possible point of time.

Furthermore, Andrews (1993) proposed that a 15% trimming is required for the sample while performing *Sup-F, Mean-F, and Exp-F.* So, under these guidelines, these tests are performed on the friction of the sample (0.15, 0.85). With respect to the L_c tests, by applying FM-OLS estimator, they are separately calculated in this study for VAR system and equations.

Structural changes bring instability to the modeling framework. In order to evade parameter non-constancy and pre-test bias problem, this study is using a rolling window subsample Granger causality test which is based on the modified bootstrap estimation. This technique is built on fixed size sub-samples rolling one after the other from the beginning to the end of the sample (Balcilar et al., (2010)). In other words, the rolling window having *n* observation and the full-sample is transformed into an order of *T-n* sub-samples that is *τ-n*+1, *τ-n*... T for *τ= n, n*+1... T.

All sub-samples in this study are tested using the RB based modified LR causality test. The variations in the causal relationship between the two series (remittances and financial development) are estimated by calculating bootstrap *p*-values of the observed LR - statistic rolling through T-*n* sub-samples.

The effect of remittances on financial development is defined as the average of the total bootstrap estimates. The values are calculated from $N_b^{-1} \sum_{k-1}^{p} \hat{\phi}_{21,k}^*$, where N_b is a representation of bootstrap repetitions. Similarly, the impact of financial development on remittances is computed from $N_b^{-1} \sum_{k-1}^{p} \hat{\phi}_{12,k}^*$.

$\hat{\phi}_{21,k}^*$ and $\hat{\phi}_{12,k}^*$ represent bootstrap estimates from the VAR models in Equation (2).

In the rolling window estimation approach the size of the window represents a prerequisite. In this study, we tried window sizes

between 20 and 50 *(results available on request)* and observed that the outcomes are not very sensitive in this range. So, due to this reason, the outcomes with the 24-window size have been reported.

4. Results

The results for remittances, financial development and growth are reported in Table 1. Remittances are not contributing both in the financial development and growth. If they are used for saving purposes they can positively affect the financial sector and potential changes in the institutional development can ultimately lead to growth.

Table 1
Remittances, financial development and growth results

Variables	Financial Development			Growth		
	Coeff.	[95% Conf. Interval]		Coeff.	[95% Conf. Interval]	
FD(-1)	0.745**	0.0091	1.4804			
GDP(-1)				0.966***	0.4139	1.5179
Remittances (REM)	-2.597**	-6.4023	0.2090	-0.268	-2.0934	1.5570
Financial Development (FD)				0.062*	-0.0521	0.1761
Capital Market Development (CMD)	0.437	-2.1477	3.0222	1.137**	-2.3290	0.0544
Trade Openness (TOPN)				0.484***	-0.8521	-0.1163
Real Interest Rate (RIR)	0.324	-0.2937	0.9409	-0.154**	-0.3094	0.0011
Gross domestic product (GDP)	0.610	-1.8755	0.6556			
REM*GS	0.276***	0.0642	0.4885			
REM*STBTY				3.509	-7.5563	14.5738
DEPTH	1.149**	0.1674	2.1297			
Institutions Stability (STBTY)	0.243	1.1899	1.6758			
Economic Policies (RQ)	0.151*	-0.2040	0.5062	-0.090*	-0.2010	0.0220

Variables	Financial Development			Growth		
	Coeff.	[95% Conf. Interval]		Coeff.	[95% Conf. Interval]	
Economic Crises (EC08)	0.786	-7.1145	8.6867	-1.478	-4.5542	1.5989
Economic and Trade restrictions (ETR98)				-1.716	-1.7540	5.1856
C	-27.789**	-76.7467	21.1689	18.369**	3.5020	33.2354
AR(2)	0.268			0.451		
Hansan	0.141			0.182		

Source: Authors' computation

The analysis starts with checking for stationarity. Using the ADF, Pillips Perron, and KPSS tests we conclude that both series are first order integrated (I(1)). To find the causal relationship between the said series, firstly, we need to find the lag structure of the bivariate VAR model. This study uses Akaike Information criteria (AIC) for optimal selection of lag length. The lag length selection criteria selected three lags for our bivariate model.

The bootstrap full sample Granger causality test results are presented in Table 2. The values of the test accepted the null hypothesis at 10 percent, asserting that the remittance variable (REM) does not Granger cause financial development. On the other hand, the results fail to accept the null hypothesis that financial development variable (FD) does not Granger cause worker remittances. The results point out to a unidirectional causality between the two series. Furthermore, the outcomes suggest that only financial development has the predicting power to explain worker remittances.

Table 2

Granger causality tests (Full Sample)

Tests	H₀: REM does not Granger Cause FD		H₀: FD does not Granger Cause REM	
	Statistics	*p*-values	Statistics	*p*-values
Bootstrap *LR* Test	1.95698	0.1207	4.28423	0.0056

Source: Authors' computation

The results of full sample Granger's causality test will be stable and reliable only if the parameter estimate remains stable over the full sample period. In other words, an unstable parameter estimate will lead to unreliable results. In the absence of the structural change problem, there exists a single causal relationship across the whole sample period (Balcilar et al., (2013)).

The parameter constancy tests are used to examine the stability of the coefficients of the VAR model formed by remittances and financial development. The parameter constancy test results of both series and VAR system along with its *p*-values are presented in Table 3. The *p*-values are obtained from a bootstrap approximation to the null distribution of the test statistics, by Monte Carlo simulation using 1,000 samples generated from a *VAR* model with constant parameters. The *Sup-F* is tested under the null hypothesis of parameter consistency against a one-time sharp shift and the results are presented in Table 3. The outcomes reject the null hypothesis of parameter consistency and accepted otherwise that one-time sharp shift exists in remittances, financial development and in the *VAR* system at 10 percent. The results of the *Mean-F* test suggested that a *VAR* system accepted the null hypothesis of parameter consistency, while a one-time sharp shift exists. According to *Exp-F* results, none of the series follows a martingale process and show presences of the one-time sharp shift which mean they evolved gradually with time. The Lc test gives an indication that the overall VAR model is not stable in the short run.

Table 3

Parameter Stability Tests

	REM Equation		FD Equation		*VAR*(1) System	
	Statistics	Bootstrap *p*-value	Statistics	Bootstrap *p*-value	Statistics	Bootstrap *p*-value
Sup-F	12.3761835	0.09014572	17.5577885	0.010784339	18.4069798	0.08549586
Mean-F	5.4732111	0.07866795	10.3338158	0.002097883	8.4672007	0.13419011
Exp-F	3.9774256	0.06543715	6.6224891	0.006921066	6.4998461	0.07064835
L_c^b					1.9148560	0.02176883

Source: Authors' computation

We estimate the cointegration equation linking remittances and financial development by the following expression:

$$REM_t = \beta + \beta_1 FD_t + \varepsilon_t \tag{5}$$

The parameters of equation (5) are observed with the help of the FM-OLS estimator. The results of this test are provided in Table 4. We clearly notice that the Lc test fails to reject the null hypothesis of parameter stability.

In addition to this, the Sup-F test accepted the null hypothesis of parameter stability. Moreover, the Mean-F, Exp-F tests accepted the null hypothesis of the unchanging parameters in the cointegration equation. This conclusion points to the fact that both series are following a martingale process. Still we notice the fact that the long-run relationship between financial development and remittance holds.

Table 4

Parameter Stability Tests (FM-OLS)

	Sup-F	*Mean-F*	*Exp-F*	*L_c*
REM = α + β*FD	2.86713802	1.24621947	0.69073879	0.30339499
Bootstrap *p*-value	0.9078100	0.6673138	0.7213874	0.4767720

Source: Authors' computation using 1000 bootstrap repetitions.

The results shown in tables 3 and 4 indicate the presence of structural changes that add instability to various sub-sample periods. This problem is dealt with by using a rolling window regression methodology that aims to capture sub-sample causality between remittance and financial development. For this purpose this study uses the *RB* bootstrap-based modified-*LR* causality test adapted for a rolling window of 30 observations that considers as null hypothesis the fact that remittances do not Granger cause financial development.

The bootstrap *p*-values of LR-statistics are estimated from the *VAR* model (equation 4) with rolling window sub-sample data of size 24. The rolling window procedure starts with a fixed window size and updates it by deleting the first observation. The selection of the window size is very important because it gives the rolling estimate. This study selected the rolling window size in such a way to keep both precession and representativeness of the parameters.

Figure 3 (A) depicts the bootstrap *p*-values of a rolling test under the null hypothesis that remittances do not cause financial development. Considering a 10 percent significance level, the result presented in the above mentioned figure show the magnitude and period during which the causality occurs. Figure 3 (B) exhibits the sign of causality along with the estimated sum of rolling window coefficient. In other words, it shows if the causal relation between remittance and financial development is positive or negative. According to empirical evidence, the null hypothesis is rejected at 10 percent during 3 sub-sample periods 2004/6-2006/11, 2013/9-2014/8 and 2014/12-2015/06.

The results reported in Figure 3 (B) demonstrate that during all the three sub-sample periods remittances had a negative impact on financial development. This is synonymous with the economic situation observed in Pakistan.

In the 2004/6-2006/11 interval, the net exports contributed negatively due to the appreciation of the exchange rate in conjuction with an oil price shock. This translated into an adverse effect on domestic prices which prompted an intervention from the State Bank consisting in a tighter monetary policy. Though remittances exceeded 5 billons and were succesful in reducing the external debt from 29 to 27.1%, social inequalities were more than visible in this period.

The second interval singled-out above corresponds to the post-crisis period. During the years of financial turmoil, in terms of the global financial development index, Pakistan lost 3 points moving from 58 to 62. In the 2013 – 2014 period the monetary authority shifted the policy stance from accommodating to a tighter approach that decreased the money supply from 10 to 7%.

Figure 3

Rolling Window estimation results from remittance to financial development
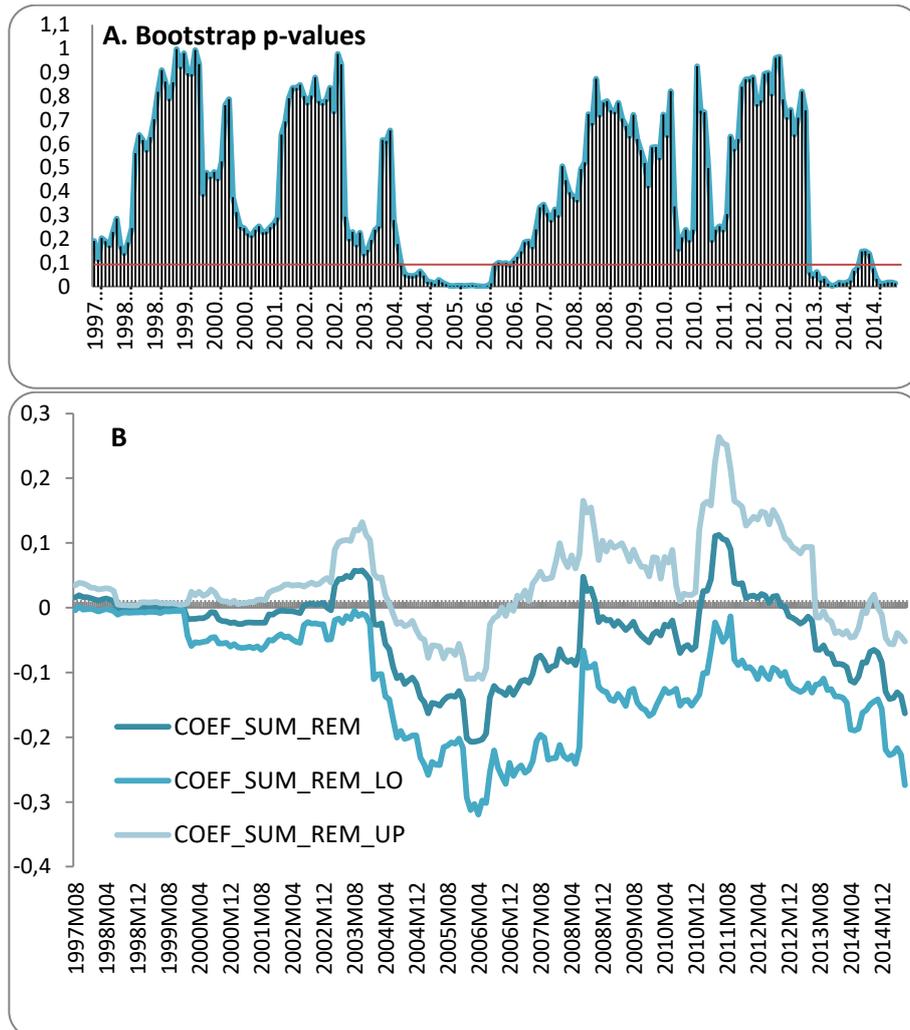
Source: Authors' computation.

*Note: These graphs are obtained by using EVIEWS software (**A**) The Bootstrap p-values for testing the null hypothesis that remittance doesn't Granger cause financial development. (**B**) The Bootstrap estimate of the sum of coefficients.*

During the causality period, 2013/9-2014/8 and 2014/12-2015/06 the remittances inflow was at its top. In the fiscal year 2013-14 the remittances inflow was recorded at $15.8 billion and with the 16.5% growth, it reached to $18.4 billion (State bank of Pakistan, July 2015).

In 2013/14, the economy witnessed a 5.7% decline in the collective profit of the five leading banks in the country. This was due mainly to a slowdown in credit growth and rising inflation. Several other studies report similar results for this specific period, good examples being Makhlouf and Mughal (2013) and Hassan and Holmes (2013).

The trade sector suffered from the appreciation of the national currency and from a series of energy shortages. In 2014, Pakistan's delicate financial situation was reflected in areas such as Financial Institutions Index, Financial Development Index and Financial Markets Index, which ranked the country at 128, 108 and respectively 72. The political and economic instability shattered investor confidence and this led to a fraction of foreign investment of 0.5% of GDP. In the same line, in the Global Competitiveness Index, Pakistan was downgraded from 128th to 129th. The results exhibit the presence of the phenomenon called "the Dutch Disease" during the causality intervals.

In order to cast a clear verdict on the sub-sample causality between financial development and remittances, this study employed the RB bootstrap-based modified-LR causality test estimated from *VAR* (1) fitted to a rolling window of 30 observations. This test is performed under the null hypothesis that financial development does not Granger cause remittances. The bootstrap *p*-values are shown in Figure 4 (A). At 10 percent significance, financial development has the predicting power to explain remittances during one sub-sample period ranging from 2003/04 to 2006/07. The results from figure 4 (B) reveal that financial development is positively causing remittances.

After the recession of early 2000, Pakistan economy regained a favorable pace and reached a GDP growth of 6.4% in 2004. The growth in the agricultural sector, accompanied by an industrial boom and a sharp increase in the construction sector, uplifted the per capita income from $657 to $756 dollars.

The foreign exchange reserves amounted to $10 billion. This growth was fostered by a monetary approach that maintained the real interest rate at a negative value.

*Figure 4. Rolling Window estimation results from financial
development to remittances*
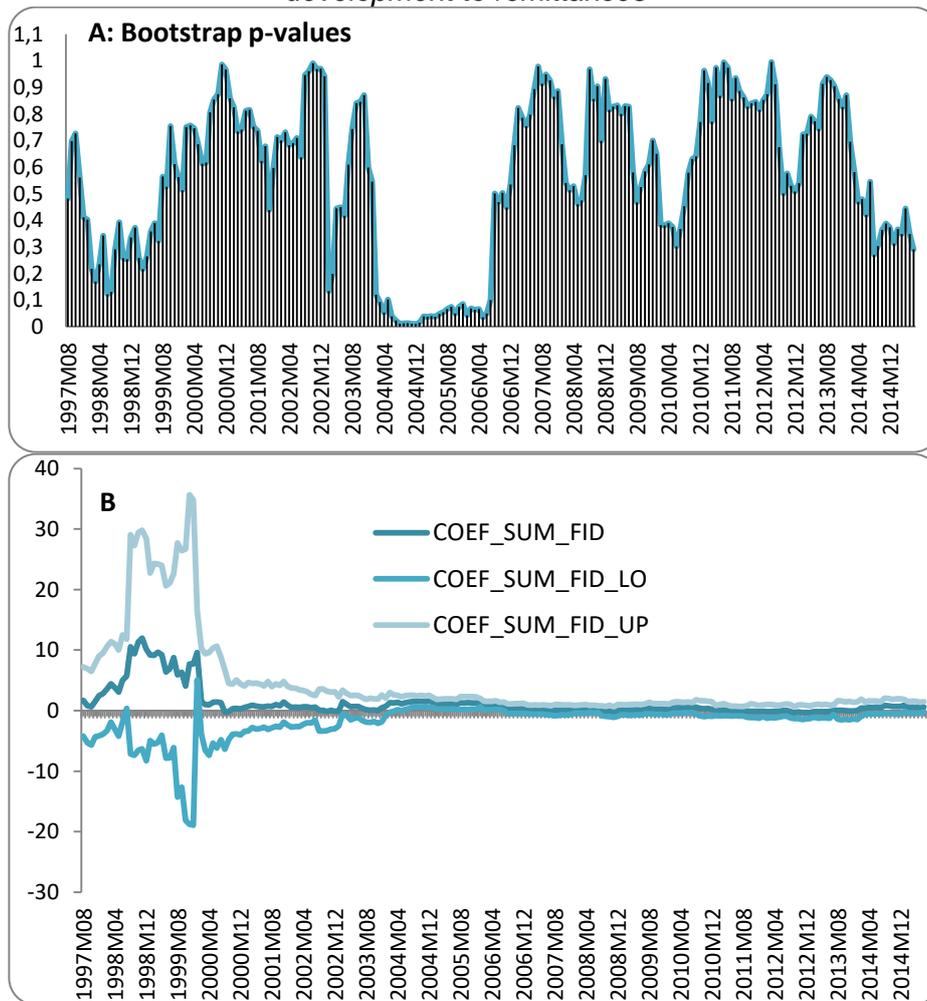
Source: Authors' computation

In this period, the international debt was settled and the government announced that IMF assistance was no longer required. The broad money growth was estimated as 14.5 percent due to the higher rate of credit disbursement to the private sector. In the same period, the banking sector witnessed a growth from 21% to 36% in deposits. The financial system suffered serious upgrades do to the

privatization of state owned banks and other institutions, new regulations regarding transaction and transfer costs and amendments in commercial banking. In the period between 2004 and 2007, Pakistan's economy experienced a fulminant growth and was included in 2005 in the Goldman Sachs Global Economics Group as one of the next N-11.

To sum up, our investigation provides evidence that there is a bi-directional causality between remittances and financial development Moreover, we notice that the sub-period causality was linked with domestic or international economic events.

5. Conclusions

This study examines the relationship among remittances, financial development and growth using the system GMM, full sample Granger causality test and sub-sample rolling window estimation approach for the case of Pakistan.

Our approach used annual and monthly series covering the period ranging from 1992 to 2015. We notice that remittances negatively affect financial development and growth if not used for saving or investments with a productive character. In addition to this, remittances stabilize financial institutions and through this channel can accelerate the growth process. The full-sample Granger causality test results reveal that there is a unidirectional causal relationship running from financial development to remittances. The outcomes of the parameter stability test results show that neither variables nor the VAR system are stable over the short term.

The *FM-OLS* test revealed that there is a long-run association between remittances and financial development. The bootstrap subsample causality approach finds a bidirectional causal nexus between the two series. We conclude that negative causality is running from remittances to financial development, while financial development is causing remittance positively. This means that a developed financial system can boost the inflow of worker remittances in Pakistan.

The impact of remittances on financial development can be enhanced by upgrades in the banking sector in the direction of reducing costs, birocracy, time span of transfers and by raising financial awareness. Moreover, financial intermediaries should act as

facilitators in producing ex-ante investing opportunities and the right remittance capital allocation.

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