

DOES REMITTANCE INFLOW PROMOTE FINANCIAL DEVELOPMENT IN SOUTH ASIA?

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ABSTRACT

Even though remittance income has become one of the major sources of external finance for South Asian countries, its influence on financial development of the region has not been sufficiently examined. This paper studies the relationship concerning three established indicators of financial development (Deposit/ GDP, Private credit/GDP and M2 money/GDP) with remittance inflow for five South Asian countries (Bangladesh, India, Nepal, Pakistan, Sri Lanka). Assuming panel heterogeneity for our model we have conducted panel unit root test, ECM based panel co-integration test and Dynamic OLS method to estimate the long run relationship. Using newly constructed data from 1990 to 2014, we find that remittance inflow has positively impacted the factors of financial development. The results indicate that remittance inflow plays an essential role in improving total deposit, private credit and M2 money of South Asian countries.

Keywords: Financial development, Economic growth, Remittance inflow, South Asia, Panel co-integration, Dynamic OLS.

INTRODUCTION

In recent years, the relationship between remittances and financial development has become an issue of extensive analysis. The interrelationship between these two variables can be analyzed from several perspectives. Financial development in any country has deep connection with economic growth. Remittances also play a crucial role in promoting economic growth of a country. Therefore, the relationship between remittances and financial development cannot be simply overlooked.

Financial development stimulates economic growth in several ways. For example, financial development reduces transaction, information and monitoring costs of business and enhances higher savings and investment. So, well performing financial sector often helps to allocate the resources efficiently and increase gross domestic production which eventually ensures higher economic growth. (Rana and Barua, 2015). According to Levine (1999), the lower transaction and information cost have a great deal of impact on savings rate, investment decision, technological innovation which induces long run economic growth. Moreover, developed financial sector assures higher capital rate return (Greenwood and Jovanovic, 1989) and encourages entrepreneurs to invest properly (Bittencourt, 2012) which obviously supports greater growth. Again, remittances play a major role in enhancing economic growth by working as a capital fund to finance households' investment and savings which drives economic growth. Remittances also enhance economic growth through reducing current account deficit, external borrowing and external debt burden (Catrinescu et al., 2009).

Remittances have been playing crucial role for social development in the development countries for the last few decades. In 2015, remittance inflow was recorded around \$588 billion in the whole world (World Bank, 2015).

Table 1. Net FDI inflow (as % of GDP) and remittances (% of GDP) in South Asia (1996-2014)

year	Bangladesh		India		Nepal		Pakistan		SriLanka	
	net FDI inflow (% of GDP)	remittances (% of GDP)	net FDI inflow(% of GDP)	Remittances (% of GDP)	net FDI inflow (% of GDP)	remittances (% of GDP)	net FDI inflow (% of GDP)	remittances (% of GDP)	net FDI inflow (% of GDP)	remittances (% of GDP)
1996	0.03	2.90	0.61	2.19	0.42	0.98	1.46	2.03	0.86	6.13
1997	0.29	3.16	0.85	2.44	0.47	1.01	1.15	2.73	2.85	6.24
1998	0.38	3.21	0.61	2.21	0.25	1.39	0.81	1.88	1.22	6.48
1999	0.35	3.52	0.46	2.38	0.09	1.66	0.84	1.58	1.13	6.85
2000	0.53	3.69	0.75	2.70	-0.01	2.03	0.42	1.45	1.06	7.14
2001	0.15	3.90	1.11	2.89	0.35	2.45	0.53	2.02	1.09	7.53
2002	0.10	5.22	1.07	3.00	-0.10	11.21	1.14	4.92	1.15	7.65
2003	0.45	5.31	0.70	3.40	0.23	12.18	0.64	4.76	1.21	7.61
2004	0.69	5.50	0.80	2.60	-0.01	11.31	1.14	4.03	1.13	7.69
2005	1.10	6.69	0.87	2.65	0.03	14.91	2.01	3.91	1.12	8.09
2006	0.64	7.56	2.11	2.99	-0.07	16.07	3.11	3.73	1.70	7.66
2007	0.82	8.24	2.04	3.00	0.06	16.79	3.67	3.94	1.86	7.75
2008	1.45	9.76	3.55	4.08	0.01	21.74	3.20	4.14	1.85	7.18
2009	0.88	10.27	2.61	3.60	0.30	23.21	1.39	5.18	0.96	7.93
2010	1.07	9.41	1.60	3.13	0.55	21.65	1.14	5.46	0.84	7.27
2011	0.98	9.38	1.99	3.40	0.50	22.30	0.62	5.74	1.46	7.89
2012	1.19	10.59	1.31	3.76	0.49	25.43	0.38	6.24	1.38	8.77
2013	1.27	9.25	1.51	3.76	0.39	29.00	0.58	6.33	1.25	8.64
2014	1.44	8.67	1.65	3.44	0.03	29.18	0.73	7.00	1.20	8.93

Source: World Development Indicator

Among all the regions, South Asia stood first following East Asia & Pacific and Latin America and Caribbeanⁱ (World Development Indicator, 2014). The formal remittance inflow reached to almost 115 billion in 2014 which increased from \$16.13 billion in 2000. Most of the South Asian countries heavily rely on remittances in financing the external funding source, financial crisis and natural disaster. Among South Asian countries, Nepal receives 29.18% of formal remittances as a share of GDP in 2014 which is the highest within the region. For Sri Lanka, Bangladesh, Pakistan and India, the figures are 8.93%, 8.67%, 7% and 3.44% respectively in the same year which cannot be ignored (Table-1). It is also noticeable that for all South Asian countries, remittance inflow surpassed the net foreign direct investment inflow during 1996-2014 (Table-1). Another significant role of remittances is that it helps to finance trade deficit in South Asia especially in Bangladesh. In 2014, remittances accounted for 207.4% merchandise trade deficit in Bangladesh whereas it accounted for 95.7%, 84.7% and 91.3% for Pakistan, Sri Lanka and Nepal respectively (CEIC, 2015). Therefore, the role of remittances cannot be ignored in South Asia.

As financial development and remittances both promote economic growth, it is obvious that remittances and financial development are interrelated. According to Martinez (2005) remittance inflow is helpful in productive investment which in turn promotes economic growth. Remittances improve banking sector by providing excess cash which generates transaction demand for financial services. Moreover, it helps to generate more fees for bank. In addition, improved banking sector reduces transaction cost and hence attracts more remittance inflow from informal to formal channels. Besides these, remittances increase country's creditworthiness and facilitate its access to international capital market. However, although remittances might improve the financial condition of a family, it will create less demand for credit from a bank. Furthermore, if the remittance recipient families have distrust in financial institutions, they might prefer other ways to save money rather than depositing money in bank accounts (Aggarwal et al., 2006). So, the question arises whether remittances promotes financial development or not. Again, well-developed financial sector can encourage remittance recipient families to deposit their money in banks. Thus, this deposited money is added to formal remittance flow which was not counted before. So, in either way, there is some interlink between remittances and financial development.

Previous studies on the relationship between remittances and financial development mainly focus on MENA (Middle East and North Africa), African, American and some developing countriesⁱⁱ. Unfortunately, for South Asia, these kinds of studies are very limited in case of panel cointegration and recent data. Only Noman and Uddin (2012) have examined the relationship between remittances, banking sector development and per capita income during 1976-2005 on four South Asian countries; India, Pakistan, Bangladesh and Sri Lanka.

Thus, in short, we can conclude that previous studies provided contradictory results and focused on different regions of the world. In addition, the previous literatures highlight the different types of relationship like financial development and economic growthⁱⁱⁱ and remittances and economic growth^{iv}. Although some studies focus on series co-integration and

ⁱ In 2014, official remittance inflow in South Asia, East Asia & Pacific and Latin American & Caribbean region were almost \$115 billion, \$91 billion and \$78 billion respectively.

ⁱⁱ Kunt et al. (2010), Agir et al. (2011) and Fayissa and Nsiah (2012) scrutinize the relationship between financial development and remittances on developing, MENA and African & American countries.

ⁱⁱⁱ Studies which focus on the financial development-economic growth issue are Dimitris and Tsionas (2003), Apergis et al. (2007), Adamphulous (2010), and Caporale et al. (2009)

^{iv} Studies which focus on remittances-economic growth issue are Iqbal and Sattar (2005), P. Ang (2007), Karagoz (2009), Nsiah and Fayissa (2013) and Tahir et al. (2015)

fixed effect estimation^v very few panel co-integration or dynamic OLS estimation were conducted.

In our study, we basically try to analyze the long run and short run causality between remittances and financial development for five South Asian countries; India, Pakistan, Sri Lanka, Bangladesh and Nepal with newest data from 1990-2014. We choose three indicators for financial development which are total deposit, M_2 money, and domestic credit to private sector. We have not considered Maldives, Bhutan and Afghanistan because compared to other South Asian countries, the remittance inflow are significantly low. Moreover, we have considered those countries which are the top remittance receiving South Asian countries. We investigate the remittance-financial development relationship by using panel unit root and co-integration test with dynamic OLS.

The remainder of this paper is broken down into several sections. Section 2 represents review of the literature. Section 3 examines the data set and provides the information about the choice variables. Section 4 explains the empirical model. The findings are presented in section 5 and Section 6 concludes.

LITERATURE REVIEW

We organize the literature within three broader themes. First, we discuss studies which consider the relationship between financial development and economic growth. Then we present evidence for the relationship between remittances and economic growth. Finally, we present studies focusing on the association between remittances and financial development.

To begin with, any specific direction regarding the relationship between financial development and economic growth is difficult to state. Some studies show that financial development causes economic growth (Ince, 2011), some studies show that economic growth affects financial development of a country (Christopoulos and Tsionas, 2004; Caporale et al., 2009). Some studies show the bi-directional causality (Apergis et al., 2007; Adamphulous, 2010) and some others find ambiguous results. (Ansari 2002)

According to Greenwood and Jovanovic (1989) financial intermediation ensures high rate of capital return which enhances economic growth. Biitencourt (2012) also argues that financial development creates an environment where entrepreneurs invest in highly productive sector which in turn boosts economic growth. Several other studies focus on the long run and short run impact of financial development on economic growth. Some of those use time series data and follow vector error correction technique and Granger causality test (Ansari, 2002; Adampoulos, 2010; Ince, 2011; Lenka, 2015). Ince (2011) conducts a study for Turkey from the period between 1980-2010 where he uses broad money as ratio of GDP (M_2/GDP), domestic credit as ratio of GDP and stock market capitalization as indicators of financial development. This study supports the hypothesis of finance led economic growth but fails to prove the impact of economic growth on financial development. Lenka (2015) also finds the same result for India during 1980-2011 but he uses financial development index as an indicator. For Ireland, Adampoulos (2010) finds bi-directional causality between stock market development and economic growth but unidirectional causality from economic growth to credit market development. Unlike these studies, a study of Ansari (2002) for Malaysia during 1960-1990 gives unusual ambiguous results. In his study, he uses real M_1 , M_1/GDP as indicators of financial development. Many researchers use panel data set in order to investigate the relationship between financial development and economic growth. Apergis et al. (2007) use liquid liability, financial system, M_3/GDP ratio, bank credit to GDP ratio,

^v Studies which emphasize on the relationship between remittance and financial development are Chowdhury (2011), Agir et al. (2011), Aggarwal et al. (2006), Kunt et al. (2010) and Beine et al. (2012)

private sector credit to GDP ratio for 15 OECD and non OECD countries over the period 1975-2000. The panel cointegration results suggest bi-directional causality between these financial development indicators and economic growth. On the other hand, the studies of Christopoulos and Tsionas (2004) and Caporale et al. (2009) find only unidirectional causality from financial development to economic growth. Therefore, from the above discussion, it can be concluded that financial development has significant impact on economic growth.

Regarding the matter of remittances-economic growth, substantial numbers of studies are found. For example, Tahir et al. (2015) use time series data to depict the relationship between remittances and economic growth. The results from auto regressive distributed lag technique suggest positive impact on economic growth. This study is conducted for Pakistan which spans from 1977-2013. Iqbal and Sattar (2010) also use time series data and conclude that remittance must impact economic growth directly or indirectly. By using a multiple regression technique the authors find 0.4 percent GDP growth per annum due to one percentage point increase in remittance-GDP ratio in Pakistan. Unlike other studies, Karagoz (2009) uses ADF unit root and Johansen cointegration technique which ensures negative but at least one long run relationship among remittances, exports, foreign direct investment, domestic investment and economic growth in Turkey. However, a study of P. Ang (2007), presents mixed evidences for Philippines. The OLS results for national level data shows significant positive impact but the regional level data shows negative impact. Some recent papers use panel data and follow panel unit root and cointegration test. Among those studies, Das and Chowdhury (2011) use 11 top remittance earning countries to find the evidence of long run relationship and negative impact of economic growth^{vi}. Also Nsiah and Fayissa (2013) get the similar results when they conduct the study for some African, Latin American and Caribbean countries. So, previous studies provide ample evidences that remittances promote economic growth.

Few studies are found regarding the affiliation between remittances and financial development. According to Chowdhury (2011) there is no reverse causality for Bangladesh during 1971-2008 from the results of Johansen cointegration and Granger causality tests. This result is acceptable because in developing countries like Bangladesh, migrant workers send remittance money irrespective to country's financial development status. Here the authors use private domestic credit to GDP, bank credit to GDP and M_2 to GDP as financial development indicators. Agir et al. (2011) develop a financial development index from several financial development indicators for MENA (Middle East and North Africa) countries. The panel cointegration and causality test indicate that remittances and economic growth have both short run and long run impact on financial development but financial development and economic growth have only long run impact on remittances. With same estimation technique, the study of Fayissa and Nsiah (2012) also confirms the similar findings for 25 African and 19 American countries and the data spans from 1985-2007. Noman and Uddin (2012) consider four South Asian countries, India, Bangladesh, Pakistan and Sri Lanka in order to study the interrelation between banking sector development, remittances and per capita income during 1976-2005. The panel cointegration and granger causality suggests that banking sector development (measured by private sector credit disbursement) is affected by both remittances and GDP per capita but the exact results differs from country to country. Few other studies use fixed effect estimation, TOBIT specification and dynamic generalized ordered logit and show positive impact of remittances on economic growth (Aggarwal et al.,

^{vi} Bangladesh, Dominican Republic, El Salvador, Gambia, Guatemala, Honduras, Jamaica, Lesotho, Philippines, Senegal and Sri Lanka

2006; Kunt et al., 2010 and Beine et al., 2012). Thus it is very much obvious that remittances and financial development are intimately related.

This study contributes to the previous literatures in several ways. Firstly, this study focus on the top remittance receiving countries of South Asia whereas the previous literatures mainly concentrate on MENA(Middle East and North Africa region), American , African and specific developing countries. Secondly, we consider three indicators of financial development which are total deposit, M_2 money, and domestic credit to private sector. Thirdly, we consider Nepal, top remittance receiving country in South Asia, along with India, Pakistan and SriLanka. Fourthly, our study brings a new dimension as we have used most recent data which spans from 1990-2014. Even though Noman and Uddin (2012) consider the South Asian region, they consider only four South Asian countries; India, Bangladesh, Pakistan and SriLanka and use banking sector development as financial indicator. Furthermore, their study has used the data from 1976-2005 which is not latest. Finally, this study follows panel cointegration and dynamic OLS technique which are of limited use in previous literatures.

DATA

The data used in this study have been taken from the world data bank of World Bank development indicators^{vii}. The paper examines the relationship between financial development and inwards remittance income of five South Asian countries- Bangladesh, India, Nepal, Pakistan and Sri Lanka. Annual data has been collected for all the countries covering the period from 1990-2014. The study includes the latest data for all the countries only to avoid missing data. Besides, more than one country in consideration for the paper did not have credible data beyond the period of 1990. We have used panel data for this study where N equals 5 and T equals 25 years. The data set has been normalized to bring all of the variables into proportion with one another. For the normalization process we have taken each variable as percentage of Gross Domestic Product (GDP).

The data set contains the following variables: total deposit as percentage to GDP, M_2 money as percentage of GDP, Domestic credit to private sector as percentage of GDP and remittance inflow as percentage of GDP. The description of the variables is as follows^{viii}:

Total Deposit: Demand, time and saving deposits in deposit money banks as a share of GDP. Raw data are from the electronic version of the IMF's International Financial Statistics.

M2 Money: Money and quasi money comprise the sum of currency outside banks, demand deposits other than those of the central government, and the time, savings, and foreign currency deposits of resident sectors other than the central government.

Domestic credit to private sector: Refers to financial resources provided to the private sector, such as through loans, purchases of non-equity securities, and trade credits and other accounts receivable, that establish a claim for repayment.

Remittance Inflow: Workers' remittances and compensation of employees comprise current transfers by migrant workers and wages and salaries earned by nonresident workers. Data are the sum of three items defined in the fifth edition of the IMF's Balance of Payments Manual: workers' remittances, compensation of employees, and migrants' transfers.

Preliminary Data Analysis

^{vii}<http://databank.worldbank.org/data/reports.aspx?source=2&country=&series=NY.GDP.MKTP.CD&period>sighted on 02/02/2016.

^{viii}World Bank definitions and sources of variables.

We have conducted a preliminary data analysis to get a general idea about the relationship between financial development and remittance inflow for individual countries of the paper. The two way line graph shows an increasing trend from 1990-2014 in terms of all the variables for Bangladesh, India and Nepal. The data of Sri Lanka shows noticeable drops in the domestic credit disbursement and M2 money during 2007-08. On the other hand, only Pakistan shows no significant escalation for the variables of financial development and the remittance inflow as percentage to GDP data displays negative trend from the year 1990 to 2003.

Table 2. Correlation between bank deposit to GDP and remittance inflow to GDP

Bangladesh	India	Nepal	Pakistan	Sri Lanka	South Asia
0.9255 (0.000)	0.8906 (0.000)	0.9585 (0.000)	-0.0927 (0.6594)	0.8925 (0.000)	0.5121 (0.000)

Note: Figures in the parentheses are *P* values.

Table 3. Correlation between bank M2 money to GDP and remittance inflow to GDP

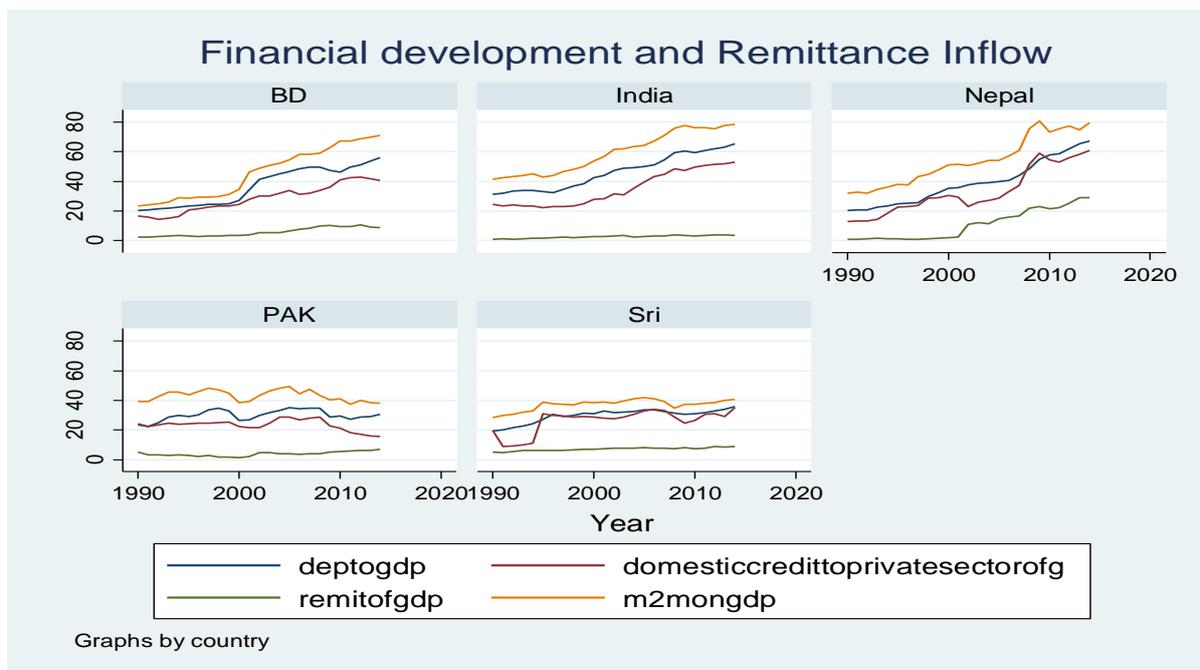
Bangladesh	India	Nepal	Pakistan	Sri Lanka	South Asia
0.9255 (0.000)	0.9517 (0.000)	0.9400 (0.000)	-0.4275 (0.0331)	0.9382 (0.000)	0.4908 (0.000)

Note: Figures in the parentheses are *P* values.

Table 4. Correlation between bank Credit to GDP and remittance inflow to GDP

Bangladesh	India	Nepal	Pakistan	Sri Lanka	South Asia
0.9214 (0.000)	0.8092 (0.000)	0.9080 (0.000)	-0.5592 (0.0037)	0.7017 (0.000)	0.6039 (0.000)

Note: Figures in the parentheses are *P* values



Source: Authors own calculation from the data of World Bank indicators.

Graph 1: Trend of Financial development variables and remittance inflow form 1990 to 2010

METHODOLOGY

We assume panel heterogeneity in our study. This heterogeneity normally arises in cross-country analyses (Pesaran *et al.* 1999). But all countries of our study are vastly different from each other in terms of output, income, trade, economics, policy, population and geographic size. Besides, these countries also differ based on literacy rate, skilled labors and number of migrants during the studied period. Thus the assumption of heterogeneity is justified in this case.

In order to investigate the long-run relationship between remittance income and financial development this paper will use the following model,

$$Y_{it} = \alpha + \beta RM_{it} + \mu_{it}$$

where, Y represents the factors influencing financial development in the i^{th} country at time t . The financial development indicators are Y_1 = deposit as percentage of GDP, Y_2 = M2 money as percentage of GDP and Y_3 = domestic credit to private sector as percentage of GDP. The explanatory variable RM represents the remittance inflow to each countries of South Asia.

So the three models that we will use in this research are,

$$\text{deptogdp} = \alpha + \beta \text{remitofgdp}_{it} + \mu_{it} \dots\dots\dots (1)$$

$$\text{m2mongdp} = \alpha + \beta \text{remitofgdp}_{it} + \mu_{it} \dots\dots\dots (2)$$

$$\text{credtogdp} = \alpha + \beta \text{remitofgdp}_{it} + \mu_{it} \dots\dots\dots (3)$$

Test Statistics

Test for Cross Sectional Dependency

Panel data often shows the characteristics of cross sectional dependency (CSD) which is often caused by common shocks and unabsorbed elements of the data. We have used cross sectional dependency test developed by Pesaran (2004) to confirm that the estimations are consistent (Selim *et al.* 2015)

Panel Unit Root Test

Researchers use different types of panel unit root test to examine whether all the variables are integrated at same order. The most common forms of test are Levin-Lin and Chu test, Im-Pesaran and Shin test, Pesaran test and Maddala and Wu test. Among them Levin-Lin and Chu test allows for two ways fixed effects. Thus the results show both unit specific fixed effects and unit specific time trends. It assumes that the individual process has no cross sectional dependency^{ix}. The Im-Pesaran and Shin test allows heterogeneity on the coefficient of the dependent variables. It requires a balanced panel data to compute the t test statistics. On the other hand, Maddala and Wu test can be conduct with an unbalanced panel data and uses bootstrapping procedure to control the effects of correlation between groups that can prompt significant size alterations^x. All of these tests except Pesaran (2007) ignore CSD that arises from unabsorbed common factors and macroeconomic and regional dependence (Bangake&Eggoh, 2011). The latest test developed by Pesaran (2007) takes into consideration the CSD heterogeneity which is epitomized in Cross-Sectional Augmented IPS (CIPS). This study uses all four tests to examine the stationarity of the data.

^{ix&10} Asterious and Hall (2007), Applied Econometrics- A modern approach, Pg 367-369

ECM Based Panel Co-Integration Test

There are different possible test for co-integration in panels. This paper used the test developed by Westerlund (2007)^{xi}. The underlying idea is to test for the absence of co-integration by determining whether the individual panel members are error-correcting or not. The first two statistics (Group statistics) are designed to test the alternative that the panel is co-integrated as whole and the next two tests (Panel statistics) the alternative that variables in at least one cross-section unit are co-integrated.

The error-correction tests assume the following data-generating process:

$$\Delta Y_{it} = c_i + a_{0i}(Y_{i,t-1}, b_i x_{i,t-1}) + \sum_{j=1}^{K1i} a_{1ij} \Delta Y_{i,t-j} + \sum_{j=-K2i}^{K3i} a_{2ij} \Delta x_{i,t-j} + u_{it} \dots\dots(4)$$

here a_{0i} is the error correction term or speed of adjustment term. If $a_{0i} = 0$ there is no error correction between the variables and x and y are not co-integrated. Thus, the idea is to test the null hypothesis of no co-integration by deducing whether the error-correction term in a restricted panel error-correction model is equal to zero. The tests are all normally distributed and general enough to accommodate cross-sectional dependence, unit-specific short-run dynamics, unit-specific trend and slope parameters.

Dynamic Ordinary Least Square Test

At the end of our analysis, we have performed a dynamic ordinary least square test to further strengthen the argument of long run equilibrium. This robust method was proposed by Stock and Watson (1993) for a parametric approach for estimating long run equilibrium which deals with simultaneity bias and small-sample bias among the regressors with the inclusions of lagged and lead values^{xiii}.

ANALYSIS OF THE EMPIRICAL RESULTS

Before conducting the stationarity test, we examine cross sectional dependency test using Pesaran (2004) CSD test. The results indicate that the null hypothesis of cross sectional independence is accepted at 5percentage significant level for all the dependent variables. Table 5 shows the results of the test.

Table 5. Cross Sectional Dependency:

Variables	CSD test Stat	P values
Deposit to GDP	2.752	0.0590
Private sector Credit to GDP	0.982	0.3261
M2 money to GDP	0.687	0.4922

The unit root test results are shown in table 6 & 7. The null hypothesis is $I(1)$. The choice of lag lengths is based on Akaike information criteria (AIC). We have used four different unit root tests which are Levi Lin and Chu test, Im- Pesaran and Shin test, Pesaran test and

^{xi}Westerlund, J. 2007. Testing for error correction in panel data. Oxford Bulletin of Economics and Statistics 69: 709–748.
^{xiii}Stock, J.H. and M. Watson, 1993, A simple estimator of co-integrating vectors in higher Order integrated systems, Econometrica, 61 783-820.

Maddala and Wu test. The test results show that all the variables have unit root at levels and are stationary at first difference.

Table 6. Panel unit root test of Levin-Lin-Chu and Im-Pesaran-Shin

Variables	Test statistic at level		Test statistic at first difference	
	Levin-Lin-Chu	Im-Pesaran-Shin	Levin-Lin-Chu	Im-Pesaran-Shin
<i>deptogdp</i>	1.2993 (0.9031)	1.8582 (0.9684)	-5.5952 (0.0000)***	-4.5336 (0.0000)***
<i>m2mongdp</i>	-0.3886 (0.3488)	0.8418 (0.8000)	-4.6359 (0.0000)***	-4.1848 (0.0000)***
<i>credtogdp</i>	0.2577 (0.6017)	1.5410 (0.9383)	-3.3434 (0.0004)***	-3.5686 (0.0002)***
<i>remitofgdp</i>	0.1086 (0.5432)	1.7033 (0.9557)	-8.7615 (0.0000)***	-8.3008 (0.0000)***

Note: *T*- statistics is with time trend of a balanced series. *** means significant at 1 percentage level

Table 7. Panel unit root test of Pesaran and Maddala -Wu

Variables	Test statistic at level				Test statistics at first difference	
	Pesaran test		Maddala and Wu test		Pesaran test	Maddala and Wu test
<i>deptogdp</i>	0.610	(0.729)	7.347	(0.692)	-2.576 (0.005)***	42.209 (0.000)***
<i>m2mongdp</i>	-0.956	(0.170)	6.784	(0.746)	-5.302 (0.000)***	71.357 (0.000)***
<i>credtogdp</i>	-0.583	0.280	5.328	0.868	-1.902 (0.029)***	36.203 (0.000)***
<i>remitofgdp</i>	-0.829	(0.204)	3.868	(0.953)	-7.779 (0.000)***	113.552 (0.000)***

Note: *T*- statistics is with time trend of a balanced series. *** means significant at 1 percentage level

Afterward, we examined the relationship between the factors of financial development and remittance inflow with panel co-integration test that is developed by Westerlund (2007). We have examined separate co-integration test for all the models specified in the methodology section of the paper. The co-integration test is carried out under the null hypothesis of no co-integration among the dependent and independent variables. Three error correction model based co-integration test shows co-integration of at least one cross sectional units and for the panel as whole. It is apparent from table8, 9 and 10 that the test results of *Gt* and *Gα* that the null hypothesis of no co-integration is rejected. Which indicates co-integration of at least one of the cross sectional units. Similar results of *Pt* and *Pα* also rejects the null hypothesis of no co-integration, which implies co-integration of the panel as a whole.

As we have established the rejection of no co-integration hypothesis, it is pivotal to define the speed of adjustment in the short run. The determination of short run adjustment (value of α_i) can be calculated by dividing *P*value of table 8, 9 and 10 with *T* (Selimet. al.) Table-8 shows the co-integration between deposit to GDP ratio and remittance income to GDP ratio. Here the value of *Pα* is -14.951, and the time period of the study is 25; therefore, the value of

α is $\alpha = Pa/T = -14.951/25 = -0.598$. So, the speed of adjustment towards the long run equilibrium is 0.598 per year.

Table 8. ECM- based panel co- integration test between Deposit to GDP and remittance inflow to GDP

Statistics	Value	Z- value	P-value
Gt	-3.807	-4.041	0.000
$G\alpha$	-19.575	-2.581	0.005
Pt	-6.039	-1.531	0.046
Pa	-14.951	-2.245	0.012

Dependent variable = Deposit to GDP; null hypothesis of the test: no co-integration

Table 9. ECM- based panel co- integration test between M2 money to GDP and remittance inflow to GDP

Statistics	Value	Z- value	P-value
Gt	-3.375	-2.837	0.002
$G\alpha$	-17.416	-1.855	0.032
Pt	-6.125	-1.631	0.041
Pa	-19.051	-3.780	0.000

Dependent variable = M2 money to GDP; null hypothesis of the test: no co-integration

Table 10. ECM- based panel co- integration test between Private sector credit to GDP and remittance inflow to GDP

Statistics	Value	Z- value	P-value
Gt	-3.358	-2.789	0.003
$G\alpha$	-24.186	-4.131	0.000
Pt	-6.831	-2.454	0.007
Pa	-13.367	-1.652	0.049

Dependent variable = credit to GDP; null hypothesis of the test: no co-integration

The result indicates that the deviation from the long-run relation between deposit as percentage of GDP and remittance inflow as percentage of GDP is adjusted at a rate of approximately 60 percent each year and it takes less than two years to restore equilibrium relation between the variables. Similarly, from table -9 and table-10 we can comprehend that the deviation from the long-run relation between M2 money as percentage of GDP and remittance inflow as percentage of GDP is adjusted at a rate of approximately 76.2 percent

and between private sector credit as percentage of GDP and remittance inflow as percentage of GDP is adjusted at a rate of approximately 53.47 percent each year.

As all the variables in the discussion are stationary at first difference the paper employed dynamic ordinary least square (DOLS) procedure to estimate the single co-integrating vector that characterizes the long-run relationship among the variables. Lag and lead terms included in DOLS regression have the objective of making its stochastic error term independent of all past innovations in stochastic regressors (Stock and Watson, 1983, p. 784). The number of leads and lags were selected according to the Akaike information criterion. Table 11, 12 and 13 presents the DOLS estimation results.

Table 11. Dynamic OLS to estimate the co-integration vector (Deposit to GDP and remittance inflow to GDP)

	<i>Coef.</i>	<i>Std. Err.</i>	<i>Z-value</i>	<i>P-value</i>
remitofgdp	1.014036	.4061839	2.50**	0.013

*** and ** indicate 1 percentage and 5 percentage levels of significance, respectively.

Table 12. Dynamic OLS to estimate the co-integration vector (M2 money to GDP and remittance to GDP)

	<i>Coef.</i>	<i>Std. Err.</i>	<i>Z-value</i>	<i>P-value</i>
remitofgdp	1.179697	.5196464	2.27**	0.023

*** and ** indicate 1 percentage and 5 percentage levels of significance, respectively.

Table 13. Dynamic OLS to estimate the co-integration vector (Private sector credit to GDP and remittance inflow to GDP)

	<i>Coef.</i>	<i>Std. Err.</i>	<i>Z-value</i>	<i>P-value</i>
remitofgdp	1.24419	.4064393	3.06***	0.002

*** and ** indicate 1 percentage and 5 percentage levels of significance, respectively.

The result of the DOLS illustrates comparable explanation of the relationship between the factors of financial development and remittance inflow. Here, the relationships among the dependent and independent variables for all the models are elastic. The DOLS estimations indicates that if remittance inflow as percentage of GDP rises by 1 percent, the bank deposit as percentage of GDP, M2 money as percentage GDP and private sector credit as percentage of GDP also increases by 1.01, 1.18 and 1.24 percent respectively.

CONCLUSION

The principal objective of the paper is to examine whether remittance inflow can facilitate financial development for South Asian countries. The study mainly focused on Bangladesh, India, Pakistan, Nepal and Sri Lanka and utilizes the data over the period of 1990 to 2014. The empirical analysis includes panel unit root and cointegration test and dynamic ordinary least square method to establish the long run relationship. Workers remittance income has become one of the leading sources of external finance for South Asian countries exceeding the flow of foreign aid and in some cases higher than the foreign direct investment. As the economic conditions of these countries improving lesser amount of foreign aids are forthcoming, on the hand lack of infrastructure, technology, human capital and political

instability often thwarts the inflow of foreign investment. Therefore, the importance of workers remittance income has increasingly being recognized by the researchers and policy makers. This paper is an attempt to find a realistic understanding of the impact of remittance income.

The main findings of the study indicate that remittance does have a positive impact on deposit creation, higher private credit disbursement and expansion of M2 money in the economies of South Asia. The result shows that if remittance as percentage to GDP goes up by 1 percent the financial development variables (the bank deposit as percentage of GDP, M2 money as percentage GDP and private sector credit as percentage of GDP) escalate by more than 1 percent.

This paper recommends all the major remittance recipient countries should priorities the channeling of remittance income into the financial system which will create more deposits and cheaper source of private credit for the business. There is still scope to further strengthen the argument by analyzing the relationship with more financial development indicators, higher number of countries and with different econometric analysis.

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