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Workers' Remittances Impact on the Economic Growth: Evidence from Capital Inflows in Bangladesh

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Abstract

This paper examines the macroeconomic determinants of workers' remittances in Bangladesh. Multiple regressions find that the macroeconomic variables such as real gross domestic product (RGDP), workers' remittances (WREMI), foreign direct investment (FDI), official development assistant (ODA), inflation rates (INFRAT) of Bangladesh have significant impact on RGDP. The study focused on the importance of WREMI inflow and its implication for economic growth in Bangladesh. Using time series data over a 35 year period, by using estimated multiple regressions approach, we analyze the impact of WREMI inflow on economic growth in Bangladesh for the period 1976-2010. WREMI income increased from low \$24 million in 1976 to over \$11.1 billion in 2010 (WDI, 2011). WREMI is one of the major sources of foreign exchange earnings and it exceeded FDI and ODA inflows to the developing countries (World Bank, 2006) and we found that growth in WREMI does lead to economic growth in Bangladesh. The paper also discusses economic growth issues arising from the results of the analysis in relation to WREMI in association with macroeconomic determinants. This determinant is statistically significant, supporting a mediating effect of investment between WREMI and economic growth and shows that WREMI effect on growth of RGDP positively and significant impact on foreign reserves in both the short run and long run.

Keywords: Remittances, Economic Development, Economic Growth

JEL Classification: F24, O11, O47

1. Introduction

The real gross domestic product (RGDP), workers' remittances (WREMI), foreign direct investment (FDI), official development assistant (ODA), inflation rates (INFRAT) are the most important macro-economic indicators for a country. These indicators are the integral part of the total developmental effort and national growth of all economies including Bangladesh. Considered this paper is that WREMI from migrants in the various countries to Bangladesh will depend more on the macroeconomic conditions in world economy, as a migrant's ability to send transfers will depend on conditions where he or she is based.

There is some microeconomic literature that considers the motivations to remit, but this paper

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will not explore into these considerations. Instead, it will take a macro perspective on the issue. In this paper, an analytical framework is used to estimate the effects of WREMI on economic growth in Bangladesh, using latest time series data for the period 1976 to 2010. We examined here is whether WREMI contributed to economic growth in Bangladesh and considered that, however, since WREMI are used to supplement domestic investment and, or consumption, it must have contributed to economic growth directly or indirectly, but there have no record in Bangladesh.

Bangladesh, being one of the top WREMI-recipient countries in the world, has drawn attention to the WREMI-RGDP relationship in between 1976 and 2010, a total of 6.8 million people emigrated temporarily from Bangladesh (BMET, 2010). Bangladesh is one of the leading WREMI recipient countries as the export earnings of labor services growing at a speedy rate from the early 1990s. The flow of WREMI has become one of the largest foreign exchange earners for the country. WREMI income increased from low \$24 million in 1976 to over \$11.1 billion in 2010 (WDI, 2011). Revenues from WREMI in the country exceed various types of foreign exchange inflow, particularly FDI, ODA and net earnings from exports, but WREMI is one of the major sources of foreign exchange earnings and it exceeded FDI and ODA inflows to the developing countries (World Bank, 2006). While WREMI cannot be considered as a substitute for FDI and other ODA, it may ease short-run foreign exchange constraints at times other financial flows decline due to external factors. The result of these trends is that WREMI, FDI and ODA as a source of external capital flows in the developing world, like Bangladesh in Figure 1. Indeed, WREMI were larger than the total of all public and private capital inflows—including FDI, ODA. WREMI inflows to Bangladesh are increasing at an average annual rate of 19 percent in the last 30 years from 1979 to 2008 (Hussain, Naeem, 2009). The flow of WREMI increased steadily from US\$24 million in 1976 to US\$1949.2 million in 2000 and started to play a key role in the economic development of the country. However, from 2001, the trend shows a dramatic increase of 400 per cent to US\$9689.3 million in 2009 and US\$11.1 billion in 2010 (Bangladesh Bank, 2010). While the flow of remittances slowed down quite rapidly in the region as a result of global financial crisis, the flow of remittances grew robustly by 24 per cent in Bangladesh during 2009.

Five macroeconomic series over the period 1976-2010: RGDP, WREMI, FDI, ODA and INFRAT. All series are represented in current US Dollars values, denominated in US \$. Appendix-A shows that while growth stable over the period, WREMI receipts remain fairly stable, increase gradually at first, and then rise steeply but with little variation. WREMI have become an important source of foreign currency earnings to promote economic development in this country, for the most part from developed countries to developing countries that depend on foreign earnings from export manpower. The importance of this flow of WREMI has increased considerably in recent decade's source of income for many developing countries. RGDP indicates that WREMI income in Bangladesh has gradually increased significantly in the last 35 years, with some minor fluctuations. These trends in WREMI, increases in WREMI flows have greatly significant and to minimize the problem arising from shortages of foreign exchange reserve which is badly needed to pay the import bills. WREMI are not only used as a mechanism for the survival of the poor in developing countries but also as a risk sharing mechanism, a stable source of investment and for future consumption smoothing. Every year a huge number of labor

workers are going abroad and sending WREMI in Bangladesh which is one of the major sources of our national income like, foreign exchange reserves. Figure I, II and Appendix-C 1 of the figure, again, highlights the stability of the WREMI series relative to other capital inflows. WREMI, FDI, ODA, macroeconomic indicators, are topics usually related to RGDP, like economic growth. The availability of foreign exchange through WREMI has not only helped the recipient countries in achieving a reasonably high economic growth by reducing the current account deficit, it has also reduced their external borrowing as well as external debt burden. For capital deficient countries, like Bangladesh, WREMI are considered to be an important source of foreign exchange. These WREMI have a positive impact on Bangladesh's economy through improved balance of payments (BOP) position and reduced dependence on external borrowing. Significant flows of WREMI also helped Bangladesh recover from the adverse effects of oil price shocks, reduced the unemployment problem, and improved standard of living of recipient households. According to the WDI (2011), estimated official WREMI were US\$167 billion for developing countries in 2005. The inflows of WREMI to Bangladesh have consistently increased over the last 40 years. Bangladesh was the 10th largest recipient of WREMI among the developing countries in terms of average per migrant for the period 1990 to 2005, and it ranked 14th among all of the WREMI -recipient countries in terms of the total amount of WREMI received in 2005.

This paper is concerned about the multiple regression econometric analysis of the determinant of WREMI inflow in Bangladesh. The variables that we have taken are RGDP, WREMI, FDI, ODA and INFRAT of Bangladesh. In our regression analysis we have taken time series data. The data that we have used in our analysis are taken from World Bank development indicator (WDI), 2011. After operating regression analysis in software MINITAB-13.20 version, we got the result significant and observing the obtained result we can illustrate that the macroeconomic variables of the Bangladesh have significant impact on the inflow of WREMI in Bangladesh. The rest of the paper is organized as follow. Section 2 presents a review of literature on WREMI in Bangladesh. Model specification, data and methodology are given in section 3. Section 4 discusses empirical results on developments in WREMI and economic growth over the past thirty-five years, while the final section concludes the study is to examine the linkages between WREMI income and economic growth on the economy of Bangladesh.

2. Review of Literature

A large number of studies have been carried out to show how WREMI affect economic growth. Some suggested WREMI affect economic growth via FDI, ODA or financial development process of the country. WREMI are global phenomenon and there has been considerable debate on the development impact of WREMI on economic growth. However, there are concerns whether WREMI could have significant and positive impact on economic growth. Many studies on WREMI have attempted to address that evaluated at both the international and national levels, provides some insight into the relationship between growth of national economy and WREMI. More than one year into the global financial crisis, remittances continue to rise in South Asia and the Philippines. Inflows of WREMI to these countries increased rapidly before the global financial crisis. Their continued strength has important implications for the balance of payments (BOPs) and macroeconomic policies in these countries: In Bangladesh, the strength of remittances in conjunction with weak imports caused a record current account surplus in FY2009

(July 2008–June 2009) according to Almekinders, G. et al. (2010).

Chami, et al (2003) utilize a static empirical approach encompassing OLS, fixed-effects and instrumental variable techniques on a sample of 108 countries over the period 1970-2004 to investigate the effect of remittances on growth. Growth in real per capita GDP was regressed on the ratio of workers' remittances to GDP (expressed in logs) and a standard set of controls indigenous to the empirical growth literature. To address the issue of endogeneity the instrument 'workers' remittances to the rest of the world' was conceived. This study found a significant positive effect in only one OLS regression but could not find any significant effects in any of the fixed-effects regressions.

In contrast, Spatafora (2005) finds that there is no direct link between per capita output growth and remittances. Meanwhile, in one of the larger cross country surveys, Chami et al. (2003) conclude that remittances have a negative effect on economic growth across a sample of 113 countries. Pradhan et al. (2008) find that remittances have a small, positive impact on growth in a 36 country cross-sectional study using a linear regression model in which remittances from one of five variables. At developing countries, Kapur (2004), net and gross remittances against other private and public capital flows. His study shows that while other capital flows (such as FDI) exhibit notable fluctuations over time, remittances were the most stable capital flow during the period 1990-2001. Another study by Ratha (2003) complements that of Kapur and they argues that remittances are generally a less volatile, more dependable, source of funding than private capital flows and foreign direct investment (FDI). Elbadawi and Rocha (1992) using data for six countries show that macroeconomic variables play an important role in determining remittances. Whether remittances promote economic growth is an important issue of debate amongst economists.

Many studies have attempted to address the impact of WREMI on economic growth and poverty alleviation. Taylor (1992) and Faini (2001) also find a positive association between remittances and economic growth. Aggarwal et al. (2006) conducted a study of 99 countries over the period 1975-2003 and find that remittances have a positive effect on bank deposits and credit to GDP. The authors then interpolate the positive effect on development by invoking existing studies showing the positive impact of these two variables on economic growth. Burki (1991) concluded that workers' remittances have positive economic and social effects on households receiving incomes from the Middle East. A few academic papers addressed the economic effects of WREMI but none of the studies used empirical exercise to investigate their impact on longer-term economic growth. Burney (1987) investigated the impact of workers' remittances from the Middle East on Bangladesh's GNP growth, balance of payments, and domestic savings, using time-series data for 1969-70 to 1985-86. The study concluded that foreign exchange made available because of the workers' remittances from the Middle East, had not only helped in reducing the current account deficit, but also reduced the external debt burden, improved debt servicing ability and decreased the need for additional foreign loans. The study mentioned that nothing, however, is known about the exact magnitude of remittances' contribution to the GNP growth.

We also analyze the relation between workers' remittances and economic growth, but we are

mainly interested in analyzing the macroeconomic determinants. I accomplish this by studying the structural relationship between two variables, WREMI and RGDP. The study also found that WREMI, FDI, ODA have positive impact on RGDP growth, like consumption, investment and trade balance, but INFRAT has negative impact on RGDP growth which seems to be an important indicator of the economic development. There is, close to, macroeconomic analyze about the impact of remittances on longer-term economic growth. This paper fills this gap and focuses on the macroeconomic effect of remittance flows on economic growth in Bangladesh. Remittances are almost as large as FDI, and more than twice as large as the official aid received by developing countries (Gammeltoft, 2002; Ratha, 2007). Foreign exchange reserves have significantly stabilized Bangladesh's financial sector and estimate whether there is a long-run relationship between economic growth and WREMI in Bangladesh.

Iqbal and Sattar (2005) found that in the absence of worker remittances, it was likely that exchange rate, monetary and fiscal policies will come under pressure. Inflow of workers' remittances affects economic growth positively by reducing current account deficit, improving the balance of payment position and reducing dependence on external borrowing. The results from Johanson co-integration tests, however, provide some evidence that GDP is the most likely to have a long run relationship to WREMI. Our study here is that when using a multiple regression model methodology to estimate the RGDP and WREMI relationship. This is especially well-defined for the more recent years. Foreign remittance is an important source of foreign exchange earnings for Bangladesh since 1970. During the past four decade Bangladesh received significant amount of WREMI, however, fluctuation were also observed in the inflow of WREMI.

The general conclusion of these studies suggest that remittances have positive effects on economy of Bangladesh in terms of aggregate consumption, investment, reduction in current account deficit, external debt burden and improve education/skills of the households. WREMI also play an important role in human capital investment in the recipient country through relaxing resource constraints. Cattaneo (2005) found that remittances are typically spent on investment in physical assets as well as investment on human capital such as education and health, which promotes growth. Jongwanich (2007) examined the impact of workers' remittances on growth and poverty reduction in developing Asia-Pacific. The results suggested that, while workers' remittances have a significant impact on poverty reduction through increasing income, smoothing consumption and easing capital constraints of the poor, but they have marginal impact on growth working through domestic investment and human capital development. Kumar (2010) investigate the relationship between remittance inflow and economic growth of the Philippines by using the Bounds test analysis. They find that remittances have positively affected economic growth. Calero (2008) explored that remittances increases school enrollment and decrease the extent of child work. Moreover the study finds that remittances are used to finance education when households are facing aggregate shocks as these are associated with increased work activities. International remittances also perform an important role in reducing the extent of inequality and poverty.

Several studies have helped to prove that remittances help households move out of poverty (Adams, 2003), lower mortality rates (Kanaiaupuni, 1998) and increase educational and housing

spending (Adams, 2005). Catrinescu et al (2006) explored that remittances exert a weakly positive impact on long term macroeconomic growth. Furthermore the study also supports the idea that development impact of remittances enhances in the presence of sound macroeconomic policies and institution. Having access to credit can help increase investment opportunities in areas of developing countries that previously produced little, leading to growth and a positive trend relationship between WREMI and RGDP and shows that real GDP growth is positively correlated to WREMI during 1976 to 2010 and WREMI emerged to be the second important source of capital inflow for economic growth in Bangladesh (World Bank development indicator, WDI, 2011).

3. Data and Methodology

3.1 Data Sources

The paper used the data of the five indicators such as RGDP, WREMI, FDI, ODA and INFRAT for the past four decades starting from year 1776 to 2010 from the “World Development Indicators (WDI) 2011” published on April, 2011 by The World Bank. The growth of the indicators between years and over the years is showed by change of the respective year. The major outcome of the paper is strong linkages between RGDP and WREMI in the economy of Bangladesh.

We have gathered annual data for the period 1976-2010. The data are denominated in U.S dollars (U.S \$) and come from the World Development Indicators (WDI) database of the World Bank (See Appendix A). Values have been adjusted to RGDP (us\$, Base 2000), WREMI (current us\$), FDI (current US\$), ODA (current US\$), and INFRAT in change of percentage in real terms. Second, we have included summary statistics, multiple regression analysis and analysis of variance (ANOVA) of macroeconomics indicators in Appendix B. Finally the graphical presentation is also adopted to show the trend and growth of the indicators.

3.2 Methodology

The diagnostic check of the normality, stationarity, and regression of the considered series is carried out by three different methods. First is Anderson-Darling Normality (ADN) test by descriptive statistics, second is the unit root test by Augmented Dickey-Fuller (ADF) test and finally, also, Ordinary Least Squares (OLS) test by multiple regression analysis. Given these stylized facts and despite the limitations in our analysis, it seems important to take into consideration the factors that may be driving international remittances. The purpose of this paper is to determine the exogenous effect of remittances on growth of RGDP in Bangladesh. We employ an Ordinary Least Squares (OLS) framework to estimate the causal effect of remittances on growth.

4. Results and Discussion

4.1 ADF Unit Root Test

The first-differenced series of per capita remittances and economic growth suggest no evidence

of changing means, indicating that the per capita remittances and economic growth series may be integrated of order. To statistically validate these findings, we formally test the stationarity properties of these two series using the Augmented Dickey-Fuller (ADF) unit-root test. We apply the ADF test to the per capita remittances and economic growth series separately.

Table-1: ADF Unit Root Test (Exogenous is Constant)

Null Hypothesis	Level of Significances	Critical t-values	Variable	Test statistic
Real GDP has a unit root	5%	-2.957110	Level Data	2.301716
			First Difference	3.111356
Remittances has a unit root	5%	-2.976263	Level Data	-0.908328
			First Difference	8.155710

From the table 1, GDP series has a unit root, i.e., the series is non-stationary because the computed t-value of GDP level data is 2.301716, which is smaller in absolute terms than the critical value at 5% level of significance. To test whether the series is integrated in first order, its first difference is taken and its stationary property is tested using ADF Unit Root test. In that case, the computed t-value 3.111356 is greater in absolute terms than the critical value at 5% level, which means the RGDP is stationary. Similarly, the stationary property is tested for the variable WREMI. It is found that, the computed t-value for WREMI level data is -0.908328. Since this is smaller in absolute terms than the critical value, it can be said that WREMI series has a unit root, i.e., the series is non-stationary. Then its first difference is taken and ADF Unit Root test is applied. In this case, the computed t-value 8.155710 is greater in absolute terms than the critical value, so the first difference of series WREMI is stationary.

Table-2: Johansen Co-integration Test Statistics

RGDP and REMI	Level of Significances	Critical t-values	Variable	Test statistic
	5%	15.41	RGDP and REMI	18.304

To determine the Johansen Co-integration test, table 2, between RGDP and WREMI. The test statistic is found to be 18.30443, which is greater than the critical value 15.41 at 5% level of significance. The results of the Augmented Dickey-Fuller (ADF) test for the stationary of the two original series are presented in Table 1. We now test the stationarity of the first difference of both series by applying the ADF test on the first difference series. So it is found that the variables RGDP and WREMI are co-integrated. Since the mentioned two variables, RGDP and WREMI satisfied the stationary property and they are co-integrated.

4.2 Regression Analysis

The explanatory variables chosen in the equation are those that appear in growth regressions. As most of the standard tests for stationary are, recommended for the large sample size of the time-series data, keeping in view the small sample size used in the study. This section presents a simple growth of RGDP model that impact of WREMI on RGDP growth in Bangladesh. We also, in addition, used other explanatory variables like FDI, ODA, INFRAT in the analysis. We specify an empirical to explore the impact of growth of RGDP, representing economic growth, is specified as follows of the regression equation:

$$RGDP = \beta_0 + \beta_1(WREMI)_t + \beta_2(FDI)_t + \beta_3(ODA)_t - \beta_4(INFRAT)_t + \mu_t$$

Where RGDP is real gross domestic product at U.S \$ price base 2000, WREMI is workers' remittances at current U.S \$ price, FDI is foreign direct investment at current U.S \$ price, ODA is official development assistant at current U.S \$ price, INFLA is inflation rate, μ is well behaves error term and t is the period of time from 1976 to 2010. The expected signs of $\beta_0 > 0$, $\beta_1 > 0$, $\beta_2 > 0$, $\beta_3 > 0$, $\beta_4 < 0$ respectively.

$$RGDP = 2.57^{E+10} + 4.31(WREMI)_t + 18.4(FDI)_t + 1.74(ODA)_t - 2.84^{E+08}(INFRAT)_t$$

To estimate the model, a multiple regression analysis was used in order to reflect the explanatory nature of the variables. To verify the validity of the model, two major evaluation criteria were used: (i) the a-priori expectation criteria which is based on the signs and magnitudes of the coefficients of the variables under investigation, (ii) Statistical criteria which is based on statistical theory, which in other words is referred to as the First Order Least Square (OLS), consisting of R-square (R^2), F-statistic and t-test.

Table-3: Coefficient, SE Coefficient, T and P Values

Predictor	Coefficient	SE Coefficient	T	P	N
Constant	25701101877	4393041605	5.85	0.000	35
WREMI	4.3065	0.9209	4.68	0.000	35
FDI	18.393	8.979	2.05	0.000	35
ODA	1.736	3.362	0.52	0.000	35
INFRAT	-283563330	175843692	-1.61	0.000	35
S = 6520070256		R-Sq = 0.893	R-Sq (adj) = 0.879		

The regression results for economic growth function in Table 3. The results of the primary investigation of this paper – whether capital flows emphasizes that data in long time series must be trended so that the estimated coefficients are founded by OLS method and remittances are causing growth in Bangladesh. In the case of the OLS with fixed effects analysis, a positive and highly significant coefficient, 5% level, on WREMI is obtained. OLS, in case of, with fixed

effects specification, weather was required to obtain a significant coefficient on WREMI. The results reported in regression equation is generally satisfactory in the sense that signs of the coefficients are mostly as expected and they are statistically significant at the usual levels of confidence on economic growth in Bangladesh. We found a positive and highly significant relationship between WREMI and RGDP growth, implying that higher remittances are associated with higher economic growth. The estimated coefficient 4.3065 implies that an increase in WREMI-RGDP ratio by one percentage point leads to GDP growth by 4.3065 percent per annum. These results seem to support the proposition developed earlier that remittances had positively contributed to output growth in Bangladesh during 1976 to 2010. Thus, the sustainable level of WREMI may be an important precondition for accelerating the growth of RGDP.

Table 3 also contains the results for FDI and ODA as ratios to RGDP. Both variables are highly significant with positive signs. The estimated positive coefficient of FDI is 18.393, which indicates that one percentage point increase in FDI-RGDP ratio increases RGDP growth by about 18.393 percent per annum. Similarly, the estimated coefficient of ODA is 1.736. This finding tends to support the notion that the higher rate of FDI and ODA leads to higher rate of economic growth in Bangladesh. Estimated coefficient of ODA, on contrast, is -283563330, which indicates that one percentage point increase in INFRAT-RGDP ratio lead by decrease RGDP growth about -283563330 percent per annum. Mundell and Tobin (1963) pointed out that an increase in the rate of inflation results in a higher cost of holding money and portfolio shift from money to capital, consequently leading to higher investment and growth. An alternative view is that the rising inflation rate may have adverse impact on economic growth in developing countries, which can be explained through various transmission mechanisms. The estimated coefficient of INFRAT is found negative and significant in equation shows a negative impact on economic growth.

Table-4: Analysis of Variance (ANOVA)

Source	DF	SS	MS	F	P
Regression	4	1.06945E+22	2.67361E+21	62.89	0.000
Residual Error	30	1.27534E+21	4.25113E+19		
Total	34	1.19698E+22			
Durbin-Watson statistic = 2.32					

The R-square (R^2), adj- R^2 , F-statistic and t-test is, concerned with the overall explanatory power of the regression analysis, used to test the significant contribution of each of the independent variables on the dependent. At 5% level of significance, the F-statistic show that the model is useful in determining if the explanatory variables have any significant influence on the dependent variable as the computer F-statistic which is 62.89 is greater than the tabulated F statistic valued at 2.61. F testing used to measure goodness fitting of model parameters estimated. As the p value of F statistics is very low i.e. very close. The model, therefore, is a

significant. The F and p-values for the relationship between RGDP and WREMI are statistically significant and include enabled a better fit of the model, as reflected in the higher within- R^2 and adjusted- R^2 statistic and estimated of explanatory variable show significantly produces better results indicating the range from 0.893 to 0.879.

The Durbin-Watson statistic for all regressions is found very low with large constant coefficients and standard errors of estimation. D-W test show that multiple correlation coefficient to measure the strength of relationships correlation, Adjusted R^2 or coefficient R^2 , which indicates the proportion of explained changes to the overall changes. F testing used to measure goodness fitting of model parameters estimated. At 5% level of significance, if the calculated value for DW decline the minimum limit means there is serial correlation. D-W statistic, to sum up, show that three our explanatory factors, which have a significantly positive impact on RGDP growth and one, are inflation rate, significantly negative impact on RGDP growth. Overall, one of the key findings of this study is that among the explanatory variables taken in the analysis, WREMI prove to be the major contributor to economic growth.

Appendix-C.1, an increase in RGDP of a country is generally taken as an increase in the standard of living of its inhabitants. Bangladesh's economy has gone through a various stages of decline and high economic growth over the first four decades (1976-2010). Bangladesh's average economic growth rate since independence has been lower than the average growth rate of the world economy during the period. Average annual RGDP growth rates were -5.5% in the 1970s, 0.82% in the 1980s, 5.94% in the 1990s, 5.94% in the 2000s, and 6.1% in the 2010s. Average annual growth fell from independent of Bangladesh and gradually increase till to date with significantly. WREMI of Bangladesh's living abroad has played important role in Bangladesh's economy and foreign exchange reserves. It shows a tendency of WREMI as percentage of RGDP over a period of 1976-2010 in the specific context of Bangladesh. The trend continued to show a rising amount of \$10.84 billion was received in FY 2010-2011.

In this study, higher remittances are expected to be positively associated with higher economic growth. The availability of foreign exchange through WREMI is helping Bangladesh in achieving a reasonably high economic growth by reducing the current account deficit; it also reduced its external borrowing as well as external debt burden. Thus, the sustainable level of WREMI is expected to be an important prerequisite for accelerating the real output growth in Bangladesh.

6. Conclusion

This paper has estimated the impact of WREMI, FDI, ODA and INFRAT on economic growth of RGDP in Bangladesh, using time series data from 1976-2010. WREMI in the short and long-run stand out to be statistically significant and co-integrated to economic growth. We find, in addition, a positive and significant relationship among WREMI, FDI, ODA and growth of RGDP, on contrast, INFRAT of Bangladesh have negative relationship with WREMI inflow. To investigate whether the macroeconomic factors of the home and host countries can affect the WREMI inflow in Bangladesh. Multiple regression frameworks is used to separate out the effects of WREMI and some other key macroeconomic factors on RGDP growth. The linkage of WREMI on RGDP, like economic growth in Bangladesh could be due to a number of factors,

including the multiplier effect, whereby injected capital through consumption indirectly contributes to economic development and growth through the flow on effect. Additionally, despite WREMI spending on investment being low, even a small portion can help to alleviate liquidity constraints and directly contribute to growth. This is especially compelling for Bangladesh given that employment overseas helps somewhat in alleviating unemployment pressures at home. Now seems to conclude that macroeconomic factors of home and host countries have significant impact on WREMI. As indicated above, our results establish that WREMI play a significant role in the promotion of economic growth in Bangladesh.

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Appendix-A: Data Sources

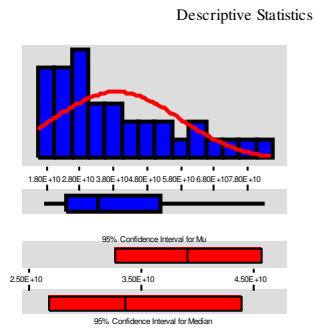
Year	RGDP (us\$, Base 2000)	Remittance (current us\$)	FDI (current US\$)	ODA (current US\$)	Inflation rate
1976	17614771185	18761275.07	5420000	496960000	-17.63041926
1977	18085623890	78875039.64	6980000	783070000	-3.210155926
1978	19364971579	115435372.5	7700000	987430000	25.61888559
1979	20294806754	171138702.7	-8010000	1162660000	12.56450596
1980	20461050013	338666742.9	8510000	1276720000	17.55506712
1981	21238978734	381052158	5360000	1098740000	10.52792557
1982	21743716016	526463664.2	6960000	1338400000	9.687499283
1983	22616962795	642408496.9	403978.5575	1043330000	8.515265824
1984	23788673522	500747417.4	-553269.3983	1187320000	14.04688355
1985	24555449226	502471375.8	-6660000	1128030000	11.14965706
1986	25598704785	576282490.1	2436499.344	1425460000	8.001182335
1987	26554115959	747808893.9	3205086.762	1788610000	10.88005368
1988	27127473044	763622141	1838242.499	1614670000	7.600678225
1989	27836138078	757979547.6	247908.2739	1799740000	8.500223397
1990	29489968538	778865574.4	3238781.189	2092760000	6.335597185
1991	30474743435	769365706.8	1390444.322	1878790000	6.596235171
1992	32010406325	911759971.1	3721853.382	1818030000	2.976369766
1993	33474682526	1007375043	14049886.52	1368850000	0.286969943
1994	34842024065	1150881239	11147788.33	1742550000	3.771827247
1995	36558011931	1201664267	1896372.127	1281540000	7.345332195
1996	38247711533	1344661209	13529831.54	1228060000	4.234503616
1997	40308326777	1525825322	139376153.1	1010630000	3.090097174
1998	42415457211	1599665558	190059373	1162140000	5.274366309
1999	44480763467	1796671304	179662970.3	1219300000	4.65573068
2000	47124925462	1958106581	280384629.7	1171730000	1.85966087
2001	49610300682	2094137427	78527040.08	1043720000	1.585394615
2002	51800799317	2847658313	52339473.35	906100000	3.195375137
2003	54523446362	3179970789	268285231.8	1392150000	4.527629598
2004	57942340648	3572205812	448905400.7	1413780000	4.240428765
2005	61393084272	4302411782	813321971.9	1317650000	5.074714915
2006	65463038830	5417662350	697206284.1	1219830000	5.172373514
2007	69670899876	6553125797	652818718.9	1514590000	6.786450298
2008	73983829245	8925333246	1009623164	2061400000	8.789101226
2009	78231358239	10507631662	674246907.7	1226940000	6.520954326
2010	82795988931	10837728288	784546807	1357420000	6.410704149

Sources: World Bank Development Indicators (WDI), 2011

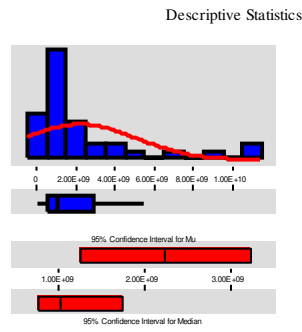
Appendix-B: Summary of Data

Variable	Mean	Standard Deviation	Minimum	Maximum	N
RGDP (US\$)	3.9192E+10	1.8763E+10	1.7615E+10	8.2796E+10	35
WREMI(US\$)	2240126302	2875795918	18761275	1.0838E+10	35
FDI(US\$)	181489072	295066038	-8010000	1009623164	35
ODA (US\$)	1330260000	351365990	496960000	2092760000	35
INFRAT	6.36	6.62	-17.63	25.62	35

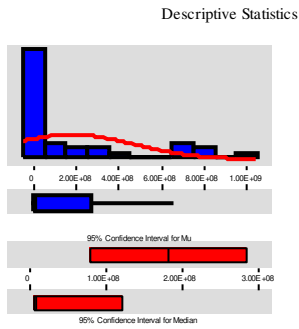
Appendix-C: Graphs of Data



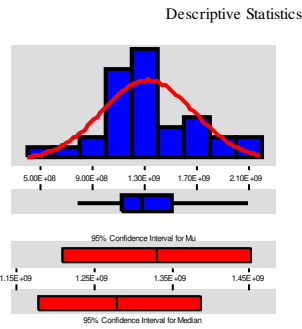
a) Normality Test: RGDP



b) Normality Test: WREMI



c) Normality Test: FDI



d) Normality Test: ODA

Figure- C 1: Anderson-Darling Normality Test of a) Real GDP, b) Workers Remittances, c) FDI and d) ODA inflow in Bangladesh, FY 1976-2010