Southeast Asian Journal of Economics 9(2), August 2021: 73-99
Received: 16 October 2020
Accepted: 7 May 2021

Internal Economic and Political Shocks and Inward Remittances in Bangladesh

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Abstract

This paper explores the effect of economic and political instability (measured from media coverage), in addition to macro variables, such as deposit rate, exchange rate, inflation rate, and oil price, on the inflow of remittances to Bangladesh. An ARDL model is employed using monthly data from January 2013 to December 2019 to study the impact of the aforementioned factors in determining the amount of remittances that enter Bangladesh through official channels. Economic/political instability is found to have a negative impact on remittances in the long run, while deposit rate and exchange rate are found to be positively related to remittances. In the short run, economic/political stability

is found to have no statistically significant impact on remittance flows, while inflation is positively associated and remittances in the previous period are negatively associated with remittances in the current period.

Keywords: Bangladesh, remittances, political instability
JEL Codes: F22, F24

1. Introduction

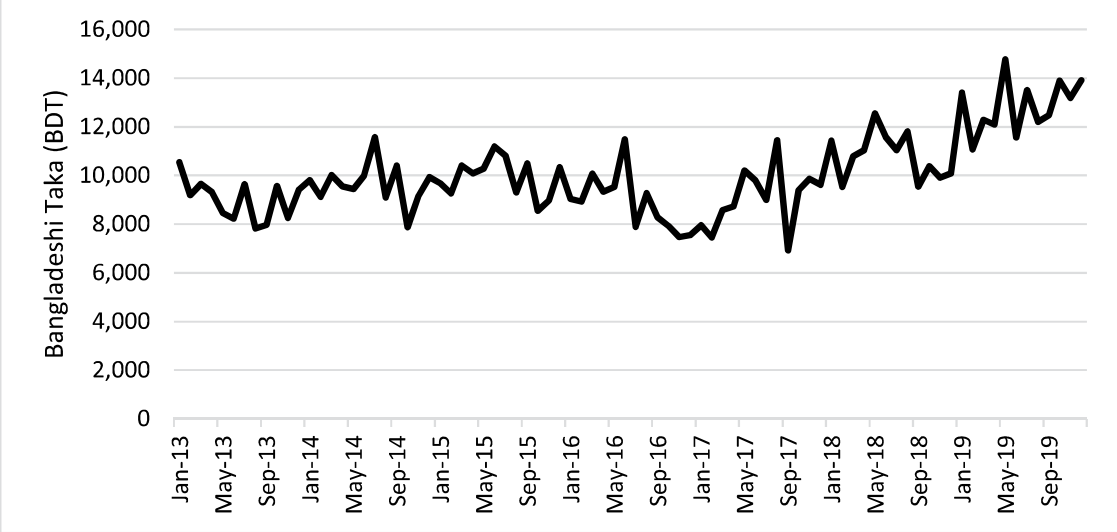
Bangladesh has become one of the major recipients of remittances over the years. Since the 1970s, remittances have been on rise, from $11.8 million in 1974 to reaching an all-time high of $18,205 million in the year 2019-2020 (Bangladesh Bank, 2020). The main reason for the substantial increase in remittances is due to the massive outflow of migrant workers from Bangladesh to foreign countries, mostly to the Middle East, starting from the 1970s. Economic globalization during the 1980s and 1990s created an increase in demand for migrant workers, resulting in more workers from Bangladesh working abroad, ultimately resulting in a steady and increasing the flow of remittances to Bangladesh.

According to Siddiqui (2004), inward remittances generate notable benefits to Bangladesh's economy in terms of macro and microeconomic impacts. One of the major impacts of remittances is the balance of payment support it provides, as it is one of the vital sources of foreign currency earnings, which is used to finance the imports of raw materials and capital goods for industrial use and development. Raihan, Khondker, Sugiyarto, and Jha (2009) finds that remittances also play a role in improving a recipient household's well-being and reducing poverty. It helps smoothing out consumption of the recipient household and minimizes the effects of economic shocks on household welfare. As a major portion of remittances is transferred through official banks in Bangladesh, of which a part is saved in deposit accounts, Muktadir-Al-Mukit and Islam (2016) finds that there is a positive impact of remittances and the credit amount, thus there is more room for investment, which eventually plays

an important role in the growth of any nation. Akter (2016) also strengthens the concept of economic growth due to remittances as they find a significant positive relationship between them.

In 1974, the Wage Earners' Scheme was introduced, allowing nonresident Bangladeshis to remit their earnings to Bangladesh through legal channels. Remittances soon began to enter Bangladesh at an increasing rate. Remittance inflows increased steadily from the 1970s and reached an all-time high around July of 2019. The main reason for such a steady increase in remittances was due to labor migration from Bangladesh for overseas employment starting from the 1970s. Raihan et al. (2009) find that during 1978-79, workers started migrating to countries in the Middle East, then during the 1990s markets were opened for Bangladeshi migrants in Malaysia and Singapore. Finally, from 2001 workers began to migrate to European countries. Unskilled workers amount to more than half of total migration, followed by skilled and semi-skilled workers, and very limited professionals. The following figure gives an overview of remittance inflows over the last few years.

Figure 1: Monthly Inward Remittances



Note: Over the whole time period, the highest monthly remittance was on July 2019, while the lowest on September 2017, after which remittance is seen on the rise.

Source: Bangladesh Bank (2020).

According to the Bangladesh Bank (2020), since 1976 the Kingdom of Saudi Arabia has employed the greatest number of migrant workers from Bangladesh – about 3,600,039 – followed by UAE (2,367,591) and Oman (1,415,911). These oil producing countries are the major source of overseas employment for Bangladeshi workers. The Kingdom of Saudi Arabia has been the largest source of remittance income to Bangladesh since 1976, along with United Arab Emirates, Qatar, United States (US), Malaysia, Oman, United Kingdom, and Kuwait.

Raihan et al. (2009) discuss how remittances enter Bangladesh both formally and informally. Informal channels include: personally hand carried cash without declaration; sending cash through home-bound friends and relatives; and predominantly through *Hundi*, which is an informal financial channel or market popular in Bangladesh to transfer money internationally. This market works outside the regulatory body when a large amount of foreign currency needs to be transferred. Star Business Report (2018) reported that informal channels are used mainly due to its swift and easy transferability and absence of charges, but also due to exchange rate depreciation. According to Bangladesh Bank (2020), many bankers and experts state that when using formal channels, remittance senders can buy either a Bangladeshi taka (BDT) draft or a US dollar draft from foreign banks and exchange houses or very easily and directly send money to their own bank accounts maintained in Bangladesh or to their nominated person's/relative's bank accounts in Bangladesh.

As remittances have become a crucial component of Bangladesh's economy and households, the main aim of this paper is to find out how macro variables affect the inflow of remittances through the official channels. The findings can be useful to policy-makers to attain better insight into how policies related to the macro variables, such as interest rate, inflation rate, exchange rate and, most importantly, political instability may affect the inflow of remittances to Bangladesh.

2. Literature review

As the purpose of this paper is to investigate and explore the determinants of remittances, it is important to look into the existing literature. A simple framework focusing on "altruism" as a motive to remit is used by Bouhga-Hagbe (2004), focusing on Egypt, Jordan, Morocco, Pakistan, and Tunisia and their agricultural GDP as an indicator for economic hardship. The paper finds that as agricultural GDP falls, remittances tend to increase, suggesting that altruism plays a part in workers' decisions to send money back to their home country. Similarly, a study on Morocco (Bouhga-Hagbe, 2004) finds that altruism, attachment to homeland, and economic growth in the countries of residence are the major long-run determinants of remittance inflows to Morocco. Laniran and Adeniyi (2015), in the case of Nigeria, find that remittance inflows occur due to portfolio options rather than altruism, as remittances respond positively to differentials in interest rates, inflation rate, and exchange rate.

A country's economic condition plays a major role determining the amount of remittances that enter or exit a country. Conducting their study on Brazil, Colombia, the Dominican Republic, El Salvador, Mexico, and the U.S., Vargas-Silva and Huang (2006) find the macroeconomic condition of the host country to be more significant than the condition of the home country. In the case of Gulf Cooperation Council (GCC) countries, a rise in real GDP due to rising oil prices leads to higher remittance outflows, which is very helpful in mitigating the effects of oil price shocks on an oil-importing country (Ilahi & Shendy, 2008). Remittances are found to be very responsive to Bangladesh's interest rate and the GDP of host countries according to Hasan (2008). Their econometric analysis finds that a 1% increase in the domestic interest rate leads to a 1.94% increase in remittances, while a 1% increase in the GDP of host countries considered in the research leads to a 3.06% rise in remittances. When a host country's economic conditions are strong, remittance flows tend to increase. Abdel-Rahman (2006) observes that higher GDP in the Kingdom of Saudi Arabia leads to a higher outflow of remittances. The study also finds significance of real interest rate differential between home and host country

and political stability. The degree of government stability negatively affects the outflow of remittances from the Kingdom, where in situations of high instability, remittance outflows increase to home countries of the workers.

Using a reactance theory framework, Clee and Wicklund (1980) explain how consumer behavior can change depending on the freedom they have to act in a given situation and the level of threat that arises while undergoing that act. As an application of this theory, several authors have considered the relationship between political instability and remittance flows. A study by Jewel (2015) on Bangladesh takes into consideration political stability and the absence of violence indicator from World Bank's good governance indicator database and finds that political stability has a positive impact on the inflow of remittances in the short and long run. A broader study on the effect of political instability on remittance inflows in Latin America and the Caribbean and Sub-Saharan Africa finds that an increase in political instability of the Sub-Saharan African countries had no effect on their inward remittances, but in the case of Latin America and the Caribbean, inward remittances decrease due to higher instability (Agbegha, 2006). Political and economic conditions play a huge part in how consumers behave. Conducting research on the effects of political instability on consumption and savings, Fielding (2003) finds as political instability rises, savings tend to fall, while short-term consumption rises. Apart from savings and consumption, private investments are also linked to the level of political instability of a country. Feng (2001) conducts a study on developing countries and obtains that political freedom promotes private investment, while political instability and uncertainty have a negative effect on the level of private investment in a developing country.

A study by Withanalage (2019) finds that up until 1992 remittances to Sri Lanka were dominated by altruistic motives followed by self-interested motives. This change in flow of remittances was further assessed at country level adjusted for migration and remittance policies. Using factor analysis and an Autoregressive Distributive Lagged (ARDL) model, the authors find that long-run positive determinants of remittances in Sri Lanka are per capita GDP

and government stability. Furthermore, accountability and socio-economic status are identified as short-run determinants. The study demonstrates that unlike altruistically driven migrants, Sri Lankan migrants are highly susceptible to economic and political stability and are motivated to send money when the economic and political conditions of the home country are favorable for investment.

Sub-Saharan countries are often in the middle of conflicts and political instability, which has led to the development of a body of literature that uncovers the relationship between remittances and political instability and conflicts. Ajide and Alimi (2019) show a causal relationship between political instability and remittances using a panel of 22 Sub-Saharan African countries over a period of 1994 to 2015. Their results using fixed effects and Generalized Method of Moments reveal how remittances act as a shock absorbing mechanism to macroeconomic fluctuations in times of political turmoil. They further establish that countries with less political instability tend to receive more remittances than countries with high political instability. In a similar strand of literature, Adenutsi and Ahortor (2021) suggests that government measures to promote political stability, good governance, and law and order send a positive signal to Sub-Saharan African migrants to remit more funds to their home countries.

Yoshino et al. (2019) investigate the determinants of remittance inflows by developing countries across 12 countries in the East Asia, Pacific, and South Asia region. Their paper reveals that real effective exchange rate, gross enrollment ratio of secondary education, trade openness, and political stability can all increase the inflow of remittances. Their results show a negative correlation between political stability and remittances. Another paper by Hor and Pheang (2017) reveals that altruistic motives of migrant workers of Cambodia, Laos, Vietnam and Myanmar to send remittances had a negative relationship with the political stability index along with GDP per capita and home currency exchange rate. Debt crisis is also one of the major blocks of political instability. According to Faure (2017), the Greek debt crises along with the worsening of other macroeconomic factors resulted in a contraction in remittance inflows.

He further argues that the inflow of remittances is positively correlated with the quality and the level of trust in the political and institutional systems.

Existing literature confirms that economic shocks and political instability affect migrants' decisions to send remittances, but how they perceive the severity of such shocks and how they utilize information available in their decision-making may largely depend on the source of information. When it comes to consumer behavior, how the media tends to portray the condition of the economy plays a crucial role. The direct impact of events that adversely affect socio-political conditions could be exacerbated by the media tone. Boydstun, Highton, and Linn (2017) find that economic attitudes are significantly related to economic performance and media tone. According to Ju (2008), news media may over-indulge in highlighting negative news. They find evidence that negative news tends to appear more on the front pages regardless of economic conditions being good or bad. Furthermore, they also find evidence that the media ends up determining how people perceive reality. It is important to understand that peoples' perception matters when it comes to taking risks. Tausch and Zumbuehl (2016) find a positive correlation between negative news and individuals worries - that people end up taking fewer risks with a negative frame of mind, which dampens the level of investment in the economy. Apart from finding out that media tone varies from actual economic performance, and consumers are significantly affected by media, Boydstun, Highton and Linn (2017) also find that the effect of media on consumer behavior brings significant consequences to an economy. They find that media can change consumer behavior to an extent that they can become detached from economic reality. Irrational optimism or pessimism occurs, which leads consumers to make severe changes to their consumption levels or even their savings and investment decisions.

A considerable amount of literature exists investigating determinants of remittances taking into account deposit rate, inflation rate, exchange rate, and oil price. However, only a few take into account that negative events/shocks could potentially disrupt the flow of remittances. A slightly different approach

is taken by Jewel (2015) where the World Bank's measurement of political stability is taken as a factor in determining the size of remittances. In contrast to previous literature particularly on Bangladesh, this paper considers peoples' perceptions of political instability influenced by news reports and media tone on inward remittances.

3. Methodology

The Bangladesh Bank website is a major source of data for the variables pertaining to the study. This paper employs monthly data for all the variables from January 2013 to December 2019. Taking into consideration studies by Boydstun, Highton, and Linn (2017), Ju (2008), and Tausch and Zumbuehl (2016), it can be inferred that economic agents are influenced by media tone, thus, influencing economic decisions like consumption and investment. Therefore, adverse events/shocks themselves may have direct impact on the number of remittances that enter Bangladesh along with the additional impact of media coverage related to such events on people's perception and behavior. To better capture the dynamics between the macro variables and remittances for the case of Bangladesh, this paper uses monthly data and, in addition to the macro variables, a variable named "political instability" (captured from highlighted media coverage of adverse events within the economy) is constructed and included in this study to control for the effect of economic/political instability on inward remittances.

For the data period January 2013 to December 2019, daily news from 7 leading (highest circulating) newspapers are examined by a panel of graduate students and cross-checked by the authors to record reports of major adverse economic/political events. News about events which can cause major disruptions in the economy and may have significant impact on consumer sentiment are considered. Headlines/front page news with enlarged fonts, highlighting, or marked in red on any news indicating possible adverse impacts on the economy are considered. The newspapers that were used to construct the variables

were *The Daily Star*, *The Daily Ittefaq*, *Prothom Alo*, *Independent*, *The Daily Sun*, *Dhaka Tribune,* and *Financial Express*. Using the information, a binary variable is first constructed, where the variable takes the value 1 if such event is reported by majority newspapers, while in the absence of such news coverage the value taken 0 for the day. The variable "political instability" is finally constructed by taking the monthly aggregates of such news that portray negative tone and are then used for the monthly analysis. The assumption is the higher the frequency of negative news coverage, the greater would be the impact on decision-making of economic agents. Examples of reports/news considered to capture political/economic instability are: "Hartal in 16 districts today"; "Corruption in keeping gas-connection closed"; "Farmers flood-hit"; "Blood, Shock, Horror-Holey Artisan"; "Khaleda Zia (leader of Opposition party) lands in jail"; "Major roads under blockade"; etc.

The election of 2013 and a few months following the election seem to have had an impact on the inflation rate and the political instability variable upon visual inspection. Also, the oil price dropped significantly after the same period. These incidences may indicate the presence of a structural break; however, no statistical evidence is found for the existence of such break. CUSUM tests following the ARDL model confirm that coefficients remain stable over time, thus a structural break is ignored in the modelling process.

Taking support from the existing literature, the model is constructed as follows:

$$REM_t = \beta_0 + \beta_1 ER_t + \beta_2 INF_t + \beta_3 DEP_t + \beta_4 PIS_t + \beta_5 OIL_t + u_t \quad (1)$$

Where *REM* is the monthly inward remittance expressed in BDT, *DEP* is monthly average deposit rates taken as a proxy for interest rate, *ER* is the monthly average BDT to US dollar exchange rate, *INF* is the monthly inflation rate, *OIL* is the world oil price, and *PIS* (Political Instability) is the major economic/political instability indicator as reported by the media.

Since officially remittances enter Bangladesh through banks, the monthly deposit rate is taken as a proxy for the interest rate. We explore whether fluctuations in the deposit rate cause disturbances in the inflow of remittances. The relationship between exchange rate and remittances is also necessary to investigate, since at times of high exchange rates (depreciation of BDT), it is profitable to send more money to Bangladesh, since more BDT is received in exchange for US dollars. The inflation rate reduces the purchasing power of the people, thus this paper also explores the relationship between inflation rate fluctuations and remittances. Since most of the remittances are used for consumption, it is important to see if rising/falling inflation rate plays a part in determining higher/lower remittance inflows. Oil-price shocks cause major impediments on oil-importing countries all around the world. Oil-producing countries are the major source of remittances for Bangladesh, thus this paper intends to examine if oil price shocks cause any disturbances in the inflow of remittances. Finally, economic/political instability – our main variable of interest – leads to changes in consumer and producer behavior. We use the measure of political instability from newspapers discussed above to capture effects of economic/political instability on remittances, both directly and indirectly through changes in consumer sentiment/behavior influenced by negative media tone.

4. Empirical Analysis

All the variables are tested for a unit root since a regression model using non-stationary time series variables could potentially yield spurious results. Spurious results may come with higher r-square values and t-ratios that do not follow the standard t-distribution. An Augmented Dickey Fuller (ADF) regression with maximum lag length of 12 (Schwarz information criterion) is used to determine the existence of a unit root. The test results are reported in Table 1.

Table 1. Unit Root Test Result

VARIABLES	At Level t-Statistic	Prob	1st Difference t-Statistic	Prob.*
REM	-1.78	0.3875	-10.97**	0.0001
OIL	-1.99	0.2875	-6.60**	0.0000
ER	0.47	0.9848	-5.66**	0.0000
DEP	-1.97	0.2953	-3.61**	0.0075
INF	-1.32	0.6167	-11.41**	0.0001
PIS	-5.50**	0.0001	-9.47**	0.0000

Source: Authors' calculations.

An Augmented Dickey-Fuller (ADF) test is used for each variable, indicating a presence of unit root in the level data except for *PIS*. The ADF test is applied on the 1st differenced data to check for stationarity, and the problem of spurious regression is eliminated since stationarity is attained at the first difference for all the variables. All the critical values are greater than the tabulated value after the first difference with a probability near zero. Thus, the variables are highly significant at the 5% level.

In order to test the relationship between variables of different order and to confirm rationality for cointegration for a small dataset, the Autoregressive Distributive Lagged (ARDL) model bound testing approach is used, an approach developed by Pesaran, Shin, and Smith (2001). This technique is preferable when dealing with variables that are integrated of different order: I (0), I (1), or a combination of both. Furthermore, according to Haug (2002), the ARDL bounds testing approach is more suitable for a small sample size and the short run and long run parameters are estimated simultaneously. Given that the variable political instability is stationary at level, this model is an appropriate approach. The major advantage of this approach lies in its identification of the cointegrating vectors where there are multiple cointegrating vectors. However, according to Chandio, Jiang, and Rehman (2019), in presence of (I2), the process becomes invalid, which is confirmed to be not the case here.

4.1 ARDL Specification

$$\Delta REM_t = \beta_0 + \sum_{i=1}^{k1} \beta_1 \Delta REM_{t-i} + \sum_{i=0}^{k2} \beta_2 \Delta ER_{t-i} + \sum_{i=0}^{k3} \beta_3 \Delta INF_{t-i} + \sum_{i=0}^{k4} \beta_4 \Delta DEP_{t-i} + \sum_{i=0}^{k5} \beta_5 \Delta PIS_{t-i} + \sum_{i=0}^{k6} \beta_6 \Delta OIL_{t-i} + \beta_7 REM_{t-1} + \beta_8 ER_{t-1} + \beta_9 INF_{t-1} + \beta_{10} DEP_{t-1} + \beta_{11} PIS_{t-1} + \beta_{12} OIL_{t-1} + \varepsilon_t \quad (2)$$

The above equation shows the ARDL model estimated, using a maximum of 4 lags (based on AIC and HQ criteria from running a Vector Auto Regression on level variables). The reduced ARDL model chosen based on AIC is (4, 0, 0, 1, 1, 0) lags of each variable, as ordered in the equation above. The bounds test approach is based on the Wald-test (F statistic). Pesaran et al. (2001) state two critical values for the cointegration test. The lower critical bound I (0) assumes that there is no cointegration between the variables examined, and upper critical value I (1) means there is cointegration between the variables examined. Thus, if the F-statistic is greater than the upper bound critical value the H_0, no cointegration is rejected. On the other hand, if F-statistic is lower than the lower bound critical value the H_0, no cointegration cannot be rejected. Lastly, if the computed F-statistic falls between the lower and upper bound, the results are inconclusive.

$$H_0: \beta_7 = \beta_8 = \beta_9 = \beta_{10} = \beta_{11} = \beta_{12} = 0$$
$$H_0: \beta_7 \neq \beta_8 \neq \beta_9 \neq \beta_{10} \neq \beta_{11} \neq \beta_{12} \neq 0$$

The calculated F-statistic with critical values from Narayan (2005) generated for small sample sizes of between 30 and 80 observations is used to detect for cointegration where the F-statistic from a joint Wald test is used to test the null hypothesis that the βs are not jointly equal to 0. Each of the variables were set as dependent variables to test for cointegration.

$$\Delta ER_t = \beta_0 + \sum_{i=1}^{k1} \beta_1 \Delta REM_{t-i} + \sum_{i=0}^{k2} \beta_2 \Delta ER_{t-i} + \sum_{i=0}^{k3} \beta_3 \Delta INF_{t-i} + \sum_{i=0}^{k4} \beta_4 \Delta DEP_{t-i} + \sum_{i=0}^{k5} \beta_5 \Delta PIS_{t-i} + \sum_{i=0}^{k6} \beta_6 \Delta OIL_{t-i} + \beta_7 REM_{t-1} + \beta_8 ER_{t-1} + \beta_9 INF_{t-1} + \beta_{10} DEP_{t-1} + \beta_{11} PIS_{t-1} + \beta_{12} OIL_{t-1} + \varepsilon_t \quad (3)$$

$$\Delta INF_t = \beta_0 + \sum_{i=1}^{k1} \beta_1 \Delta REM_{t-i} + \sum_{i=0}^{k2} \beta_2 \Delta ER_{t-i} + \sum_{i=0}^{k3} \beta_3 \Delta INF_{t-i} + \sum_{i=0}^{k4} \beta_4 \Delta DEP_{t-i} + \sum_{i=0}^{k5} \beta_5 \Delta PIS_{t-i} + \sum_{i=0}^{k6} \beta_6 \Delta OIL_{t-i} + \beta_7 REM_{t-1} + \beta_8 ER_{t-1} + \beta_9 INF_{t-1} + \beta_{10} DEP_{t-1} + \beta_{11} PIS_{t-1} + \beta_{12} OIL_{t-1} + \varepsilon_t \quad (4)$$

$$\Delta DEP_t = \beta_0 + \sum_{i=1}^{k1} \beta_1 \Delta REM_{t-i} + \sum_{i=0}^{k2} \beta_2 \Delta ER_{t-i} + \sum_{i=0}^{k3} \beta_3 \Delta INF_{t-i} + \sum_{i=0}^{k4} \beta_4 \Delta DEP_{t-i} + \sum_{i=0}^{k5} \beta_5 \Delta PIS_{t-i} + \sum_{i=0}^{k6} \beta_6 \Delta OIL_{t-i} + \beta_7 REM_{t-1} + \beta_8 ER_{t-1} + \beta_9 INF_{t-1} + \beta_{10} DEP_{t-1} + \beta_{11} PIS_{t-1} + \beta_{12} OIL_{t-1} + \varepsilon_t \quad (5)$$

$$\Delta PIS_t = \beta_0 + \sum_{i=1}^{k1} \beta_1 \Delta REM_{t-i} + \sum_{i=0}^{k2} \beta_2 \Delta ER_{t-i} + \sum_{i=0}^{k3} \beta_3 \Delta INF_{t-i} + \sum_{i=0}^{k4} \beta_4 \Delta DEP_{t-i} + \sum_{i=0}^{k5} \beta_5 \Delta PIS_{t-i} + \sum_{i=0}^{k6} \beta_6 \Delta OIL_{t-i} + \beta_7 REM_{t-1} + \beta_8 ER_{t-1} + \beta_9 INF_{t-1} + \beta_{10} DEP_{t-1} + \beta_{11} PIS_{t-1} + \beta_{12} OIL_{t-1} + \varepsilon_t \quad (6)$$

The results for the bound test for the variables are shown in Table 2. The remittance variable shows cointegration with other variables. The above table shows that the F-statistic is 4.177, where the F-statistic exceeds the upper bound of the critical value band, thus the null hypothesis of no long-run relationship between the variables cannot be accepted. This test result suggests that there exists a long-run relationship between remittances and the other variables.

Table 2. Bound Test

Variables	F-Bounds Test	Null Hypothesis: No levels relationship		
	F-statistic	Significance	I (0)	I (1)
REM	4.177213	5%	2.62	3.79
INF	2.361236	5%	2.62	3.79
DEP	2.265392	5%	2.62	3.79
ER	2.478391	5%	2.62	3.79
PIS	2.590940	5%	2.62	3.79
OIL	2.532199	5%	2.62	3.79

Source: Authors' calculations.

From the estimated ARDL model, a long run cointegrating form is derived and presented in Table 3. The results show that exchange rate, deposit rate, and political instability are statistically significant at the 5% level, where exchange rate and deposit rate have a positive impact on remittances in the long run, whereas political instability is found to negatively affect remittances. As expected, the higher the exchange rate, the greater the amount of remittances in domestic currency, and hence the positive relationship with remittances is observed. A higher deposit rate is also found to attract more remittances, as those who send remittances for investment/saving motives logically would try to capitalize on the increased returns from savings/investment. The negative relationship observed between political instability and remittances from the results supports existing literature. Political and economic instability erodes confidence among investors as expected.

Table 3. Long Run (Cointegrating Form)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ER	6.236654	1.027573	6.069304	0.0000
INF	-0.431461	0.411809	-1.047722	0.2982
DEP	0.600540	0.185562	3.236331	0.0018
PIS	-0.053994	0.026349	-2.049204	0.0440
OIL	-0.097883	0.096931	-1.009823	0.3159

Source: Authors' calculations.

Impacts of inflation and oil price are found to be statistically insignificant, which could be due to the relatively short data period considered; however, the signs of the coefficients could be justified. With a major portion of total remittances coming from oil producing countries, increases in oil prices means increasing income of the host countries, and hence, remittances sent from those countries can be expected to increase as a result. As for inflation, a consumption motive (remittances sent from altruism to help family members) could play a significant role in the short run. Inflation in the home country would mean an increase in the cost of living for family members, potentially resulting in higher amounts sent as remittances. However, in the long run, persistent inflation could be perceived as a sign of economic instability, thus it may adversely affect remittance inflow that arises from the investment motive.

4.2 ARDL Error Correction Model.

The paper further develops an error correction model (ECM) in order to test for the speed of adjustment and how the variables converge towards equilibrium in the long run. The following equation shows the Error Correction Form where λ explains the speed of adjustment and ECT is the error correction term which is derived from the residuals obtained in Equation (2).

Having established that there is evidence of a long-run relationship among the variables, the error correction form is presented in Table 4 to look into short-run dynamics. The results confirm the existence of a long-run relationship among the variables, as the cointegrating equation (CointEq (-1)) has a negative coefficient that is statistically significant. It implies that there is a long run reversion to equilibrium if there is any deviation. The speed of adjustment back towards the long run is 62 percent in a given period.

Table 4. Error Correction Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.853888	0.938873	-5.169909	0.0000
D (REM (-1))	-0.347762	0.093313	-3.726850	0.0004
D (INF)	0.982272	0.357463	2.747896	0.0076
CointEq (-1)*	-0.620666	0.119937	-5.174934	0.0000

Source: Authors' calculations.

Remittances in the previous period and inflation are the only variables found to have an impact in the short run, where the immediate past amounts of remittances negatively affect the current amount. This may be because most of the remittance senders are in fact on a fixed pay scale (low-skilled laborers bound by contract), and for them to send a larger amount (through borrowing or savings in the host country) in one month may need to be compensated by sending a smaller amount in the following month (s). Unexpected inflation in the short run could mean larger amounts required for consumption purposes by family members, hence, larger amounts could be sent because of the consumption motive (out of altruism).

To test for the overall impact (joint short run and long run) of the macro variables considered, a Granger Causality test is carried out. All the variables were used in this exercise; however, only the following relationships in Table 5 were established in terms of causality. The results show that there is bi-directional causality between the exchange rate and remittances at 5% and 10% significance levels, respectively. Inflation and deposit rate granger cause remittances at the 10% significance level. The results confirm that there are in fact strong overall impacts of the variables exchange rate, inflation, and deposit rate on remittances.

Table 5. Pairwise Granger Causality Tests (statistically insignificant variables are omitted)

Null Hypothesis:	F-Statistic	Prob.
ER does not Granger Cause REM	6.11678	0.0034
REM does not Granger Cause ER	2.68319	0.0747
INF does not Granger Cause REM	2.87601	0.0624
DEP does not Granger Cause REM	2.61955	0.0793

Notes: Statistically insignificant variables are omitted.
Source: Authors' calculations.

To understand the ARDL model goodness of fit, diagnostic tests are carried out and reported in Table 6 along with some key statistics. The joint significance of all the regressors measured by the F-statistic confirms the overall fit of the model, where the null hypothesis of joint significance of the variables (equal to zero) cannot be accepted. The adjusted R-square is not very high, but most of the deviation is explained by the explanatory variables. The LM test confirms that the errors are not serially correlated. A lag of 4 was selected based on AIC. The null hypothesis of homoskedasticity cannot be rejected in the heteroskedasticity test, confirming the variance remains stable across the whole sample. The overall specification and fit of the model are good as indicated by the statistics and further confirmed by the stability test.

Table 6. Diagnostic and Key Statistics

Tests	Critical Values
Adjusted R-square	0.6110
F TEST	F stat 16.90823
	Prob. (0.00000)
LM TEST	F-statistic F (4,69) 1.751287
	Prob. (0.1487)
Heteroskedasticity Test: Breusch-Pagan-Godfrey	F-statistic (8,73)1.4969
	Prob. (0.1733)

Source: Authors' calculations.

A stability test was carried out using the cumulative sum of recursive residuals to assess parameter stability. The following figure shows CUSUM and CUSUM of squares test for the ARDL model. According to Bahmani-Oskooee and Nasir (2004), the null hypothesis that the regression equation is correctly specified cannot be rejected if the plots of the statistic remain well within the critical bounds of the 5% significance level. It is clear from Figures 2 and 3 that the plots of both the CUSUM and CUSUM of squares are well within the boundaries and hence confirms the stability of the long-run coefficients of the regressors, indicating no structural break within this time period .

Figure 2: CUSUM

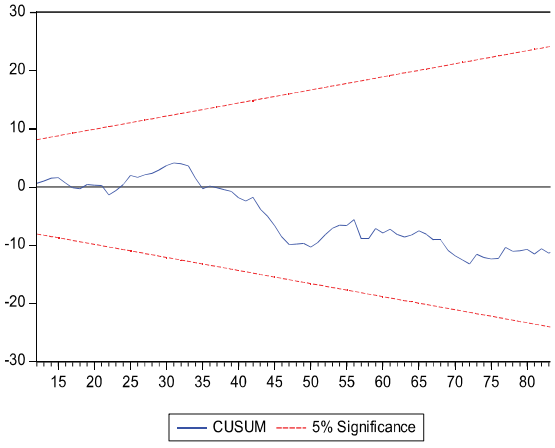
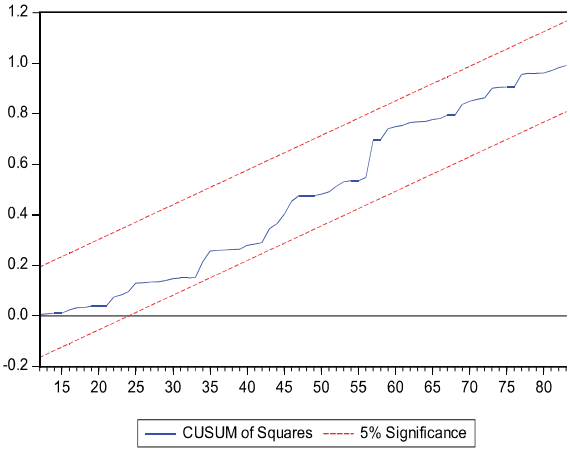


Figure 3: CUSUM of Squares



5. Conclusion

As remittances have proven to be an important factor for the progression of the Bangladesh economy over the years, it is of utmost importance to understand the relationship between other macro variables and remittances, as policy measures related to one variable could have significant impacts on others. The purpose of this paper was to examine whether economic/political instability affects remittance inflows to Bangladesh, taking into account other macroeconomic variables such as inflation, exchange rate, deposit rate, and oil price. The findings in this paper indicate that economic/political instability negatively affects remittances, but the impact of inflation and oil price is found

to be statistically insignificant, which could be due to the small sample size. As expected, exchange rate and deposit rate are found to have positive impacts on inward remittances.

From the error correction model, it is found that in the short run remittances in the previous period and inflation have significant impacts on remittances in the current period. While past remittances negatively impact current remittance amounts, inflation in the current period is found to positively affect remittances as expected. Granger causality tests confirm a strong relationship between the exchange rate, deposit rate, and remittances. Exchange rate and remittances exhibit two-way causality, while the deposit rate has unidirectional causality on remittances.

Political players must be aware of the impact of their actions on remittance inflows. The findings of this paper can serve as a reminder of how instability can lead to a decline in remittances, where remittances are often quoted as one of the key drivers of economic growth in Bangladesh. Policy-makers, on the other hand, must bear in mind that recent restrictive prescriptions by the central bank to the financial sector to lower the interest rate (to bring all deposit rates within 6% and lending rates within 9%) could have significant impacts on remittances in the long run, as inference can be drawn from the findings of the paper where deposit rate is found to have a significant negative impact on remittances. Political stability for the smooth running of economic activities is imperative as usual.

Further research can be carried out considering income and inflation differentials between Bangladesh and host countries. Also, taking into consideration host countries' economic/political conditions as portrayed in the media could give a more robust picture about the dynamics between macro variables and inward remittances to Bangladesh.

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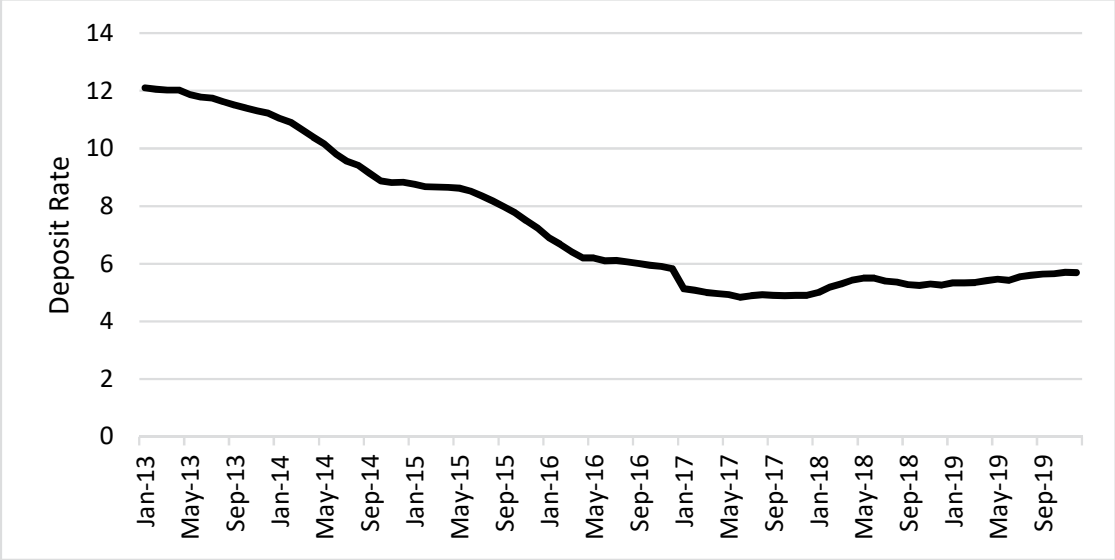
Appendix

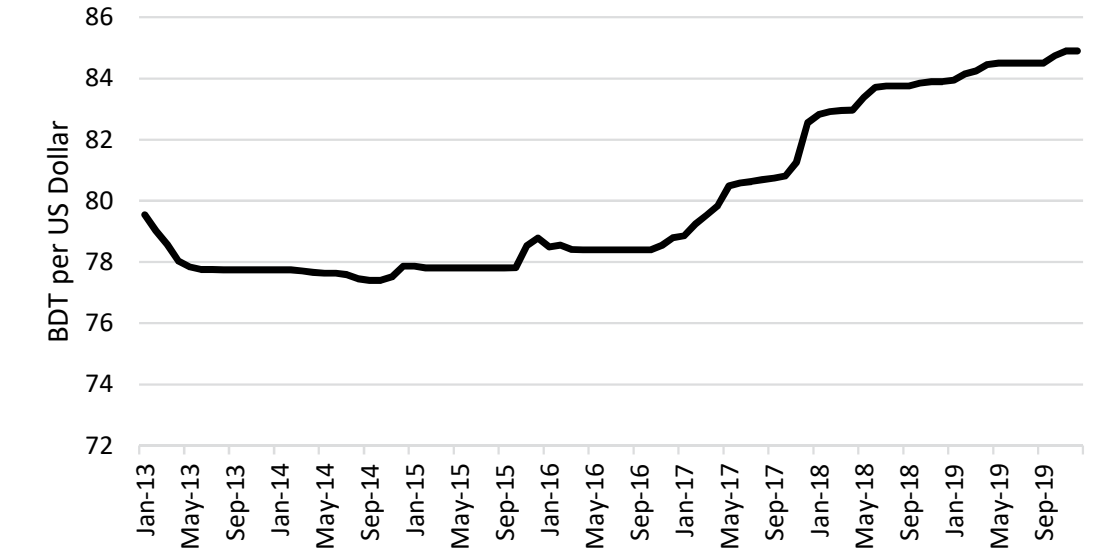
This research is conducted for the period from January 2013 to December 2019. Monthly data for each of the macro variables are used for a more in-depth analysis, using ARDL approach.

Appendix Figure 1. Monthly Deposit Rate



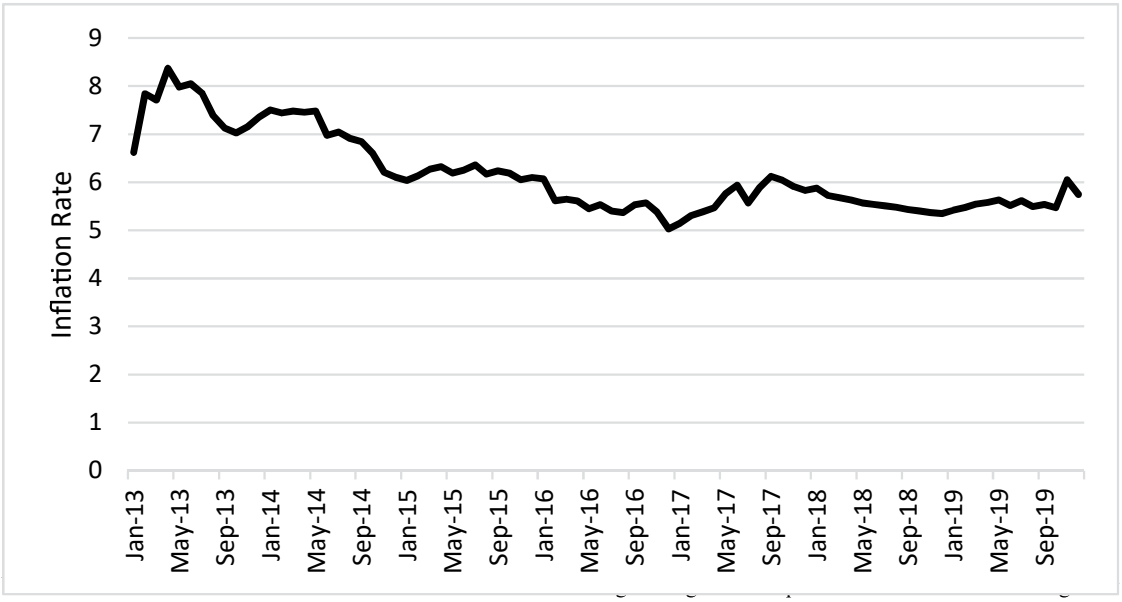
Note: Deposit rate was on the decline since 2013 till 2017, after which it has remained steady
Source: Bangladesh Bank (2020).

Appendix Figure 2. Monthly Exchange Rate



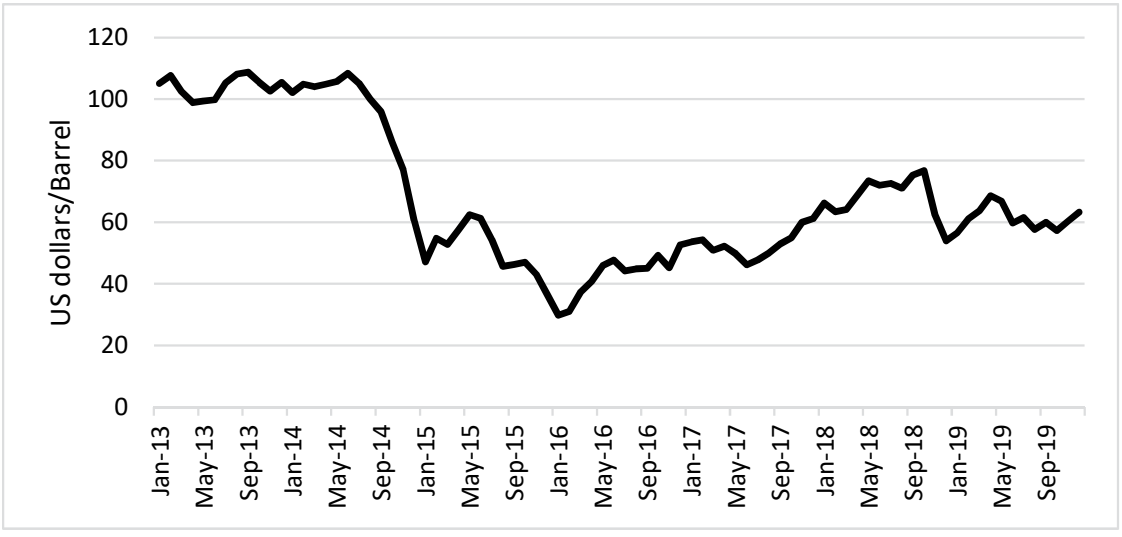
Note: The exchange rate was very steady in first half of the period under study, but the cost of dollar increases during the second half. The lowest observed rate was on the month of September and October 2014, while the highest on the month of July and August 2018.
Source: Bangladesh Bank (2020).

Appendix Figure 3. Monthly Inflation Rate



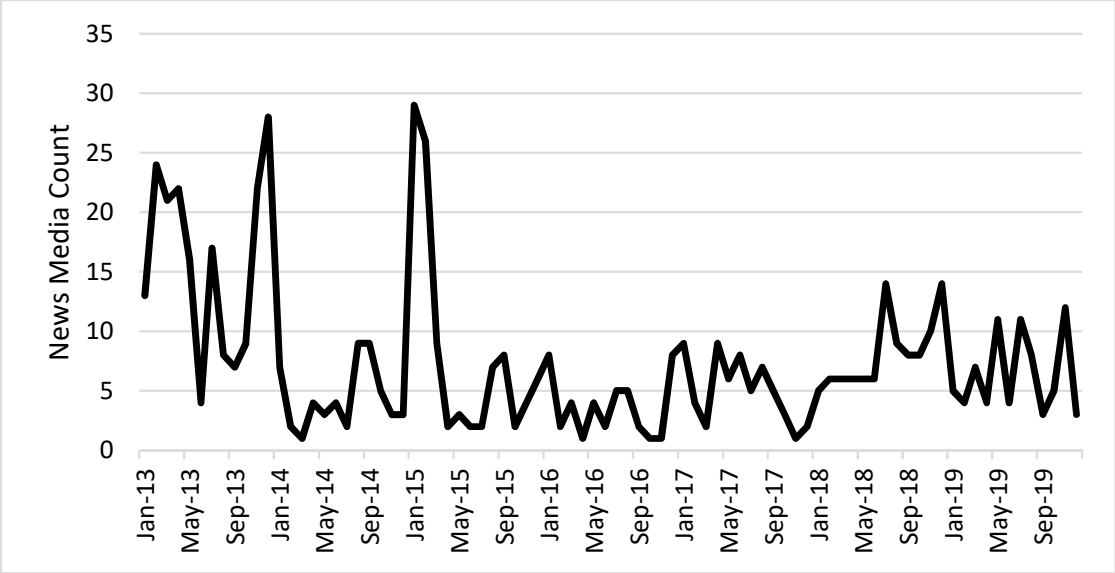
mid 2014. The graph shows inflation rate remained fairly steady over the time period hovering around 6% since 2015.
Source: Bangladesh Bank (2020).

Appendix Figure 4. Monthly Oil Prices



Note: There is a sharp drop in the oil price starting from September 2014, reaching its all-time low in the month of January 2016. The highest is observed in the month of September 2013. After a sharp drop, oil prices recovered over the next three years.
Source: World Bank (2020).

Appendix Figure 5. Political Instability Counts from News Media



Note: Fluctuation in the series is observed in 2013-14, before and after election when the country observed increased political turmoil, after which the series fluctuated randomly over time.

Source: Various newspapers as described in text.