Bangladesh's Remittance Trends: Unpacking the Macroeconomic Influences

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Abstract

This study endeavors to reveal the macroeconomic determinants influencing remittance inflows to Bangladesh, a country heavily dependent on the remittance income for macroeconomic stability and development. Based on the annual data ranging from 1980-2023, the paper employs Autoregressive Distributed Lag (ARDL) model for cointegration to determine both short-run and long-run associations between remittance growth and major macroeconomic variables including GDP growth, inflation, interest rate differentials, exchange rate fluctuations, unemployment in host countries and global oil prices. The study reveals that remittance growth is counter-cyclical to the GDP growth of Bangladesh and pro-cyclical with respect to the economic conditions of host countries while inflation and unemployment in host economies demonstrate strong positive impacts. These patterns of behavior suggest altruistic motives dominate remittance behavior particularly in economic distress in home country and inflationary pressure abroad. This paper confirms the existence of long-run cointegration among the variables and highlights the rapid short-run responsiveness of remittance growth due to host-country labor market shocks. The diagnostic tests validate the model's robustness, normality and stability. The negative sign of error correction term (ECT) suggests adjustment of the variables toward long-run equilibrium but value more than 1 indicates a problem which may have arisen from using less frequency time series data. Future research should explore the association of remittance inflows with macroeconomic determinants using high frequency data and incorporating non-linearities in the model.

Keywords: Remittances, ARDL, macroeconomic determinants, Co-integration, ECT.

JEL Classification: F24, F22, E60, O11, O15, C32

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1.0 Introduction

Shewly Islam, resident of a small village of Bangladesh, used funds sent by her husband working in Italy not merely for daily needs but to launch small-scale enterprises—establishing cattle farms, poultry, and a fishery. She proudly shares "After my husband returns home, just to make sure that he is not unemployed, I have built these farms ourselves. From these farms I acquire up to 15 lakh (1.5 million) takas annually. Moreover, I have employed 10 workers in my farms. I have seen from my surrounding people that using remittance, they have started some sort of small self-employment for them." (Mostafiz, 2023). Like the example of Shewly, remittances have emerged as a pivotal driver of economic development and financial stability across numerous developing economies, particularly those characterized by substantial labor-exporting nations. The financial transfers made by migrant workers to their families in their countries of origin constitute a critical source of foreign exchange and play a significant role in alleviating poverty, elevating household living standards, and improving broader macroeconomic indicators. Bangladesh is no exception which saw an average annual flow of USD 19.90 billion in the past 10 years making remittances as one of the key drivers of the economy (Bangladesh Bank). Here, remittance inflows account for a considerable share of gross national income and have been instrumental in sustaining balance of payments equilibrium, bolstering the domestic currency, and stimulating economic growth through heightened consumption expenditures. Over the past several decades, the persistent influx of remittances has profoundly influenced Bangladesh's macroeconomic landscape. As one of the world's foremost remittance-receiving countries, Bangladesh exhibits substantial reliance on these external financial inflows to maintain economic resilience amid both domestic and global uncertainties. Remittances from Bangladeshi migrants have steadily increased, especially during the period examined in this study. This development offered a measure of relief in mitigating the persistent current account deficit. This rise in remittances is largely credited to various government measures designed to promote the use of formal remittance channels. Key actions included provision of cash incentives for remittances, simplifying regulatory processes, and introducing official recognition programs for remitters. However, the magnitude and effects of remittance flows are contingent upon many other diverse

arrays of micro and macroeconomic variables in both source and recipient countries. Prominent among these determinants are total number of migrants, the economic conditions in both the origin and the destination countries, exchange rate fluctuations, interest rate differentials, inflationary dynamics, GDP growth trajectories, labor market conditions, investment opportunities and institutional factors such as the efficiency of the financial system and the robustness of regulatory frameworks.

A rigorous examination of the micro and macroeconomic determinants influencing remittance flows is essential for informing policy measures that optimize their developmental impact. Within the Bangladeshi context, empirical analysis of these factors yields valuable insights into the structural patterns governing remittance behavior and informs the design of strategies aimed at promoting financial inclusion, augmenting foreign exchange reserves, and supporting long-term economic sustainability. Accordingly, this study focuses on investigating the key macroeconomic variables that shape the volume and stability of remittance flow. In this regard the study tries to find out whether there is a long run relationship between macroeconomic variables (such as real gross domestic product, interest rate, inflation rate, exchange rate) and size of remittances inflow in Bangladesh. In addition, the study examines the short run long run impacts of the identified macroeconomic variables on migrants' remittances inflow in Bangladesh. Furthermore, an attempt has been made to find out how do migrants' remittance inflows respond to macroeconomic shocks caused by these variables in Bangladesh. We begin by outlining the theoretical framework surrounding the determinants of remittances, followed by a detailed review of the literature at the macroeconomic level. And finally, through comprehensive analysis, with the help of sophisticated econometric techniques.

2.0 Literature Review

According to (IMF, 2010) "Remittances represent household income from foreign economies arising mainly from the temporary or permanent movement of people to those economies. Remittances include cash and noncash items that flow through formal channels, such as via electronic wire, or through informal channels, such as money or goods carried

across borders. They largely consist of funds and noncash items sent or given by individuals who have migrated to a new economy and become residents here, and the net compensation of border, seasonal, or other short-term workers who are employed in an economy in which they are not resident." A wide range of studies have explored the determinants of remittances from both microeconomic (Cox & Stark, n.d.; Funkhouser, 1995; Gilal & Hong, 2024) and macroeconomic (Banerji & Chandrawanshi, 2021; Jijin et al., 2022) perspectives, utilizing various methodologies across different countries and regions, often yielding diverse findings. While global literature provides robust frameworks for understanding remittance dynamics, studies specific to Bangladesh are relatively sparse and often limited in scope, time frame, or econometric rigor. This lack of understanding makes it difficult for policymakers to design effective strategies to encourage the use of formal remittance channels, improve access to financial services, and reduce the use of informal systems like hundi. This study aims to fill the exiting gap with the help of existing literature and using updated data from 1980 to 2020 which is relatively large sample comparing the previous studies and using robust panel techniques to isolate the macroeconomic drivers of remittance inflows to Bangladesh.

The motivations for remittance flows are typically framed under two paradigms: altruistic motives and self-interest motives. (Lucas & Stark, 1985) introduced influential ideas that fundamentally shaped the understanding of migration and remittance patterns. They identified altruistic motives and self-interest motives (including "enlightened self-interest" or "tempered altruism") as key drivers of migrant behavior. In this context, altruism implies that migrants gain satisfaction from improving the welfare of their families back home, whereas self-interest indicates that remittances are motivated by the expectation of future returns by investing in home country assets. These motivations underpin decisions to remit, influenced by, implicit family contract, specifically in the forms of loan repayment (Djajić, 1986; Durand et al., 1996; Russell, 1986; Solimano, 2004; Stark, 1991) and co-insurance (Solimano, 2004). The loan repayment model posits that an implicit agreement exists between the migrant and their family, whereby the family invests in the individual's education and often covers the costs associated with migration—such as travel expenses and initial subsistence in the

destination country. This investment is later repaid by the migrants once they have become financially established abroad (Brown, 1997; Poirine, 1997).

A related but distinct framework is the co-insurance model of the implicit family contract, which emphasizes risk-sharing within the household. According to this theory, families send members—typically those with higher education levels—abroad as a strategy to mitigate economic uncertainty. This approach assumes that economic conditions in the origin and host countries are not perfectly correlated, allowing the family to diversify risk (Solimano, 2004).

At the micro-analytical level, the focus is typically on individuals' motivations for sending remittances. A range of micro-level factors—such as the socio-demographic characteristics of migrants and their families which encompass factors such as the migrant's age, gender, level of education, marital status, duration of stay, migration costs, exposure to risk, household income, wealth, size of the household of the remitter, household needs, specific family characteristics, experiences of shocks and dependency ratio- also play a significant role in influencing remittance behavior (Agarwal & Horowitz, 2002; Gilal & Hong, 2024; Holst & Schrooten, 2006; Islam & Nasrin, 2015; Nabi, 2012). Macroeconomic factors influencing remittance flows include the number of migrants, economic conditions in both host and home countries, differences in interest rates, unemployment differentials between the host and home nations, wage, income, exchange rate fluctuations, inflation levels, the state of financial development, and available investment opportunities (Gilal & Hong, 2024).

While considering the macro-economic variables that influence remittances flow elaborately, a stream of literature suggests that remittances increase during periods of economic growth in the recipient (home) country. This pro-cyclical behavior reflects self-interest motivations, where migrants view remittances as investments or responses to improved economic opportunities. Empirical evidence supporting this view comes from El-Sakka & Mcnabb (1999), Giuliano & Ruiz-Arranz (2009), Vargas-Silva & Huang (2006) all of whom find that higher GDP per capita in-home countries correlate with increased remittances. Contrarily, remittances are often described as counter-

cyclical, rising during economic downturns in the recipient country. This behavior reflects altruistic motives, whereby migrants remit funds to support family welfare during hardship. Evidence for this comes from studies such as(Amuedo-Dorantes & Pozo, 2006; Bettin & Zazzaro, 2012; Yang, 2008). These studies consistently report a negative relationship between GDP per capita and remittances. Studies such as (Swamy (1981) and (Elbadawi & Rocha, 1992) consistently find that stronger economic activity in host countries correlates with increased remittances. Conversely, unfavorable conditions in the home country (e.g., inflation, unemployment) often lead to increased remittances under altruistic motives (Bouhga-Hagbe, 2006; Vargas-Silva & Huang, 2006). The link between domestic inflation and remittance flows is unclear. High inflation may indicate weak economic policy, discouraging investment-driven remittances, while altruistic remitters may send more to support household welfare (Ali, 2012). Exchange rate fluctuation is cited as another critical determinant of remittances in many publications. Currency depreciation in the home country can increase the local purchasing power of remittances, encouraging migrants to send more funds. Studies by Bouhga-Hagbe (2006), and (Yang, 2008) confirm this relationship. These findings typically align with altruistic remittance behavior, especially under inflationary conditions. However, some panel data studies (Lueth & Ruiz-Arranz, 2008) found mixed or even negative effects of depreciation on remittance flows. An IMF study (Chami et al., 2005) using panel data from 87 countries (1980–2003) found that eliminating exchange rate distortions raised remittances by 1–2% of GDP, highlighting the significant impact of policies and regulations on remittance inflows. The role of interest rate differentials remains debated. Some studies (Azizi, 2017; Giuliano & Ruiz-Arranz, 2009; Quinn, 2005) find that higher interest rates in the home country attract remittances, consistent with investment motivations. El-Sakka and McNabb (1999) argue that interest rate differentials may deter remittances if migrants perceive higher returns abroad. (Hassan & Holmes, 2019) further distinguish between short-run and long-run effects, noting a positive short-term but negative long-term relationship. (Glytsos, 1997) in his study differentiates between remittances from temporary and permanent migrants, finding that temporary migrants remit mainly for investment and future consumption, while permanent migrants remit out of altruism. The unemployment rate in the host

countries influences the remittance growth in home country. This can be caused through liquidating the assets in the host countries by the migrants and bringing savings in home country due to uncertainty (Dustmann & Weiss, 2007) and remitting more money by working more hours to achieve the target faster (Yang & Choi, 2007). Moreover, the global oil prices can impact the remittance flows from host countries to home countries. Several studies found strong association between global oil price shock and remittance inflows (Das, 2020; Muhammad et al., 2022; Zahran, 2023).

Specific studies on Bangladesh remain limited. However, those available, including Barua et al., (2007), Datta & Sarkar (2014), Hasan (2008) and Rahman & Wadud (2014) emphasize the significance of GDP differentials, inflation, interest rates, and exchange rates. These variables have mixed influences depending on whether remittances are viewed through altruistic or investment lenses. Datta & Sarkar (2014), Nabi (2012), and Barua et al. (2007) found strong and consistent evidence that economic conditions in host countries significantly affect remittance flows. Specifically, host country GDP was found to have a positive and statistically significant impact on remittances in both Nabi's and Barua et al.'s studies, suggesting that improved economic performance in labor-receiving countries enhances migrants' capacity to remit. This aligns with findings from global literature (e.g. Elbadawi & Rocha, 1992 and Swamy, 1981) reinforcing the idea that remittance behavior is pro-cyclical with respect to host country income. In contrast, the economic condition of the home country, proxied by domestic GDP, exhibits a negative relationship with remittance inflows in the studies by Nabi (2012). This suggests a counter-cyclical pattern—migrants increase remittances in response to economic downturns at home, often to support consumption smoothing among recipient households. Such behavior is indicative of altruistic motivations, where remittances act as informal insurance during times of domestic economic stress. This altruism is further supported by Barua et al. (2007), who show that income differentials between host and home countries—measured by per capita GDP at purchasing power parity—positively correlate with remittance flows. The role of the exchange rate is also uniformly significant in the aforementioned three studies. A depreciation of the Bangladeshi Taka against foreign currencies leads to increased remittances, as evidenced in

Datta & Sarkar (2014), Nabi (2012), and Barua et al. (2007). This can be attributed to both wealth effects and improved purchasing power in the home country, which incentivize migrants to remit more funds, particularly through formal channels. Moreover, the appreciation of the host country currency increases the relative value of remitted amounts in domestic terms, thus encouraging further transfers. The impact of inflation presents a more nuanced picture. While Nabi (2012) finds no significant effect of inflation on remittances, Barua et al. (2007) detect a negative and weakly significant relationship, particularly when the differential between home and host countries is high. This suggests that inflation-induced macroeconomic uncertainty in Bangladesh may deter remittance flows, especially those motivated by investment or savings purposes.

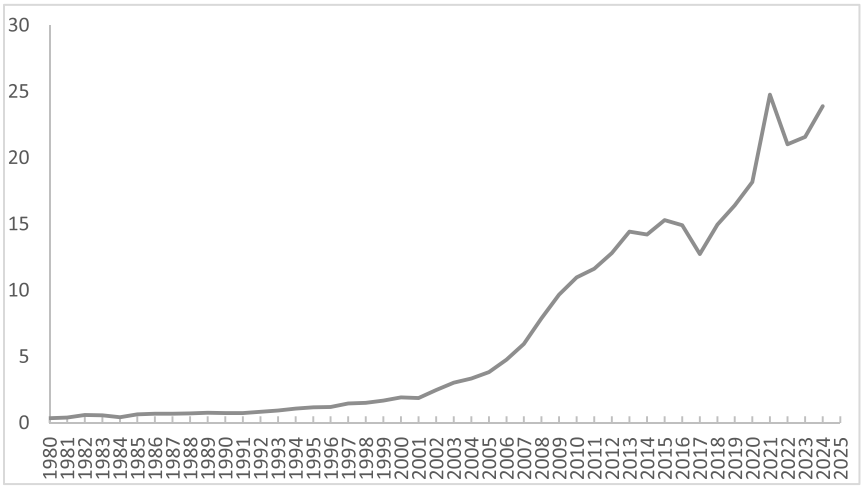
Finally, evidence of investment motives for remitting is mixed. While Datta & Sarkar (2014) acknowledge the theoretical relevance of portfolio motives, they do not explicitly test them. Barua et al. (2007), however, provide limited empirical support for investment motives, finding some significance for real interest rate differentials in alternative regression models using data from six major host countries. This indicates that remittance flows may, under certain conditions, respond to relative returns on financial assets, though altruism remains the dominant behavioral driver in the Bangladeshi context. In sum, the findings from these studies converge on several robust determinants of remittance inflows to Bangladesh: host country income, domestic economic hardship, exchange rate movements, interest rate and inflation. Altruistic motivations consistently underpin remittance behavior, while investment considerations play a more marginal and context-dependent role. Policymakers seeking to sustain and enhance remittance inflows must therefore focus on macroeconomic stability, exchange rate competitiveness, and the development of efficient, low-cost financial infrastructures to attract remittances through formal channels.

3.0 Remittances of Bangladesh: Some Stylized Facts

Remittances have become a cornerstone of Bangladesh's economic framework, playing a crucial role in sustaining national income, bolstering foreign exchange reserves, and improving the standard of living for millions of households. As one of the leading remittance-

receiving countries in the world, Bangladesh has continually reaped the benefits of financial inflows from its extensive diaspora. These earnings, primarily generated by migrant workers employed across a range of sectors overseas, have not only supported individual families but also provided critical macroeconomic stability by supplementing the country's fiscal and external accounts.

Figure 1: Trend of remittance flow (in billion USD)

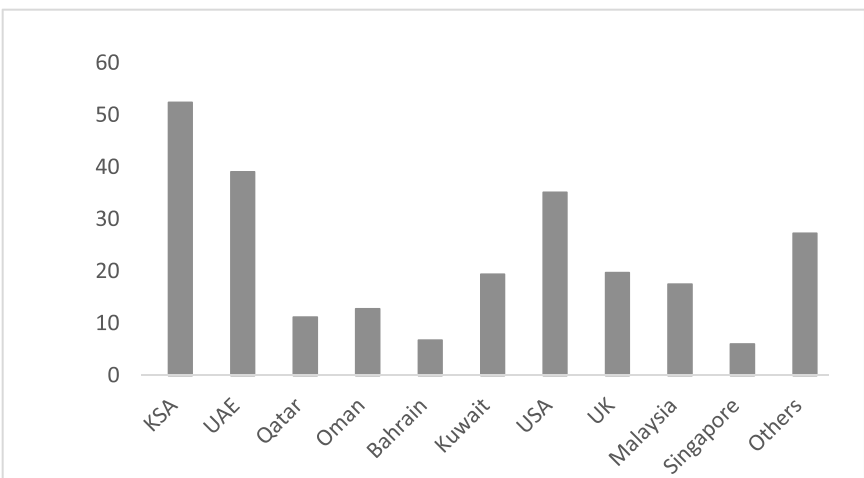


Source: *Bangladesh Bank*

Over the past few decades, the volume of remittance inflows into Bangladesh has shown a steady upward trend, with notable resilience even during global economic downturns. There were two times when the remittance inflows declined sharply. From FY2015 to FY2017, the remittance reduced for several reasons like- the decrease of oil revenue in Gulf countries which in turn reduced the migrants' income, fiscal tightening of GCC countries and increase of the expansion of hundi (curb market) (Bangladesh Bank, 2017). In the second phase of remittance down-turn is during the COVID shock (FY2021 to FY2023) worldwide. According to the *World Migration Report 2024*, Bangladesh ranked as the 8th largest recipient of international remittances in 2022, alongside countries like India, Mexico, China, and the Philippines. Bangladesh continuously ranks among the top ten remittance receiving countries of the world. This placement underscores the critical role that remittances play in the Bangladeshi economy and reflects the country's strong and

sustained reliance on its migrant workforce abroad. According to Bangladesh Bank data, remittances accounted for an average of 6.4% of the country's GDP over the past decade, positioning them as the second-largest source of foreign exchange earnings after ready-made garment (RMG) exports. In times of global stress, remittances have proven to be a reliable buffer. During the COVID-19 pandemic, when trade and RMG exports declined sharply, remittance inflows surged to a record high of USD 24.8 billion in FY2020–21. Historically Bangladesh faces deficit in trade account. According to data from the Bangladesh Bank, the country's current account deficit stood at USD 6.5 billion in FY2023–24, down from USD 18.6 billion in FY2021–22. Amid global inflationary pressures and dollar shortages in FY2022–23, remittances helped finance 60–65% of the country's merchandise trade deficit with a flow of 21.6 billion. In FY2023–24, remittance inflows reached approximately USD 23.9 billion, equivalent to 10.65% of GDP that year, reinforcing Bangladesh's status as one of the most remittance-dependent economies in South Asia.

Figure 2: Flow of remittance from source countries in last 15 years (in billion USD)



Source: *Bangladesh Bank*

The bar chart presents a longitudinal snapshot of remittance inflows to Bangladesh, categorized by source countries over a 15-year span. The data reveal a clear geographical concentration of remittance sources, with

predominant reliance on Middle Eastern countries—particularly the Gulf Cooperation Council (GCC) states such as Saudi Arabia (KSA) and the United Arab Emirates (UAE). Over this period, Saudi Arabia has been the largest single source of remittances, followed by the UAE. The United States ranks third and is the highest contributor among non-Middle Eastern countries. Mid-level contributions come from Kuwait and the United Kingdom, while from the Asian region Malaysia also plays notable role. This distribution reflects both traditional labor migration corridors and the gradual diversification of destination countries for Bangladeshi migrants. Hence, this study uses these findings while examining the macroeconomic determinants of remittance in Bangladesh.

4.0 Data and Methodology

4.1 Data

This study utilizes annual time-series data spanning the period from 1980 to 2023. As illustrated in Figure 2 (Section 3), the empirical evidence indicates that Saudi Arabia, the United Arab Emirates (UAE), the United States of America (USA), the United Kingdom (UK), and Malaysia have consistently ranked as the top five source countries for remittance inflows to Bangladesh over the past 14 years (2010–2023).

Given the structural and economic similarities between Saudi Arabia and the UAE—both being major Gulf Cooperation Council (GCC) economies with significant Bangladeshi migrant labor populations—this study selects Saudi Arabia as the representative case for the Middle Eastern region. Additionally, among the developed economies in this group, the United States has been prioritized due to its substantial and stable remittance contributions. Furthermore, Malaysia is included as a key remittance-sending country, reflecting its importance as a major destination for Bangladeshi migrant workers in Southeast Asia.

This study further enriches the empirical analysis by incorporating key macroeconomic determinants of remittance flows, including inflation rates, interest rates, exchange rates, and GDP growth for both Bangladesh and the major remittance-sending countries. By integrating these domestic and host-country economic indicators into our model

specification, we account for the dual influence of source- and recipient-economy conditions on remittance behavior, thereby enabling a more robust examination of the underlying transmission mechanisms. The description of the variables is given in Table 1.

Table 1: Data Description

Variables	In EViews	Unit	Description	Data Source
Remittances	rem3_gr	Percent	Yearly remittance growth to Bangladesh	BB
Oversees Employment	empl_gr	Percent	Year on year growth rate of remitters sending abroad	BB
Exchange Rate	exr_ch	Percent Change	Yearly percentage change in the nominal exchange rate of BDT/USD	BB
GDP Growth (Home)	gdpgr_bd	Percent	Yearly GDP growth rate of Bangladesh	WDI
GDP Growth (Host)	gdpgr_wa	Percent	Weighted Average GDP growth of host countries (KSA, USA, Malaysia)	WDI
Inflation	inf_wa	Percent	Annual average inflation rate	Malaysia, USA: WDI KSA: Macrotrends
Interest Rate Differential	intr_dif	Percent	Difference between Bangladesh interest rate and average interest rate of USA and malaysia USA: Annual 3 months T-bill rate Bangladesh: Annual Deposit Rate Malaysia: Annual Deposit Rate	USA: FRED Bangladesh & Malaysia: WDI
Unemployment Rate	unemp	Percent	Average Unemployment rate of host countries (USA and Malaysia only. Saudi Arabia dropped due to data limitation).	WDI
Oil Price	oil	Number	USD per barrel of Crude oil, Brent	World Bank Commodity Price

BB = Bangladesh Bank, WDI = World Development Indicators, FRED = Federal Reserve Bank of St. Louis

4.2 Methodology

This study attempts to determine the short-run and long-run macroeconomic determinants of remittance growth in Bangladesh. To do so, we employ the Autoregressive Distributed Lag (ARDL) bounds testing approach developed by Pesaran et al. (2001). The ARDL model allows for testing the presence of cointegration in the presence of I(0) and I(1) variables, while traditional method requires variables to be I(1). Moreover, the ARDL approach is free from the issue of endogeneity arising from the use of lags of the dependent variables in the model.

$$\Delta Y_t = \beta_0 + \sum_{i=1}^{n} \beta_i \Delta Y_{t-1} + \sum_{j=1}^{n} \gamma_j \Delta X_{1t-j} + \cdots + \sum_{k=1}^{n} \delta_k \Delta X_{nt-k} + \theta_0 Y_{t-1} + \theta_1 X_{1t-1} + \cdots + \theta_n X_{nt-1} + \varepsilon_t \text{ ----(1)}$$

Here, Y_t denotes the dependent variable which is remittance inflow to Bangladesh. X_t represents a list of independent variables which are overseas employment of Bangladeshi labour (empl), change in nominal exchange rate of BDT per USD (exr_ch), GDP growth rate home (gdpgr_bd), GDP growth rate host countries (gdpgr_wa), interest rate differential between home and host countries (intr_dif), Inflation in host countries (inf_wa), unemployment rate in host countries (unemp_a), oil price in global market (oil). These variables have been taken after extensive review of literature.

To determine the existence of long run relationships, we need to perform cointegration test. In this case, the null hypothesis will be $\theta_0 = \gamma_j = 0$ and the alternative hypothesis will be $\theta_0 \neq \gamma_j \neq 0$. Once cointegration among the variables is established, the error correction estimation is performed based on the equation (2).

$$\Delta Y_t = \beta_0 + \sum_{i=1}^{n} \beta_i \Delta Y_{t-1} + \sum_{j=1}^{n} \gamma_j \Delta X_{1t-j} + \cdots + \sum_{k=1}^{n} \delta_k \Delta X_{nt-k} + \theta Z_{t-1} + \varepsilon_t \text{--- (2)}$$

Where, $Z_{t-1} = (Y_{t-1} - \alpha_0 - \alpha_1 X_{1t-1} \ldots - \alpha_n X_{nt-1})$

This equation is then used to determine the long-run relationships between dependent and independent variables.

5.0 Results and Discussion

5.1 Data Validation and Model Specification

5.1.1 Stationarity Test

Before starting the estimation, the data needs to be stationary to perform OLS. The detailed unit root test results have been shown in Appendix A. Based on the unit root test results and graphs the following inferences have been drawn (Table 2).

Table 2: Data Stationarity Test Summary (Authors' Calculation)

Variables	At Level			First Difference		
	C	C & T	without C & T	C	C & T	without C & T
rem3_gr	Stationary	Stationary	Stationary	Stationary	Stationary	Stationary
empl_gr	Stationary	Stationary	Stationary	Stationary	Stationary	Stationary
exr_ch	Stationary	Stationary	Stationary	Stationary	Stationary	Stationary
gdpgr_bd	Stationary	Stationary	Non-Stationary	Stationary	Stationary	Stationary
gdpgr_wa	Stationary	Stationary	Non-Stationary	Stationary	Stationary	Stationary
inf_wa	Stationary	Stationary	Stationary	Stationary	Stationary	Stationary
intr_dif	Stationary	Non-Stationary	Non-Stationary	Stationary	Stationary	Stationary
unemp_a	Non-Stationary	Non-Stationary	Non-Stationary	Stationary	Stationary	Stationary
oil	Non-Stationary	Non-Stationary	Non-Stationary	Stationary	Stationary	Stationary

Note: *Here, C refers to Constant, T refers to Trend*

Source: *Authors' Calculation in EViews 14*

From the above table, the variables rem3_gr, empl_gr, exr_ch, gdpgr_bd, gdpgr_wa, inf_wa are stationary at level and can be used as it is in the model. On the other hand, intr_dif, unemp_a and oil are non-stationary at level and are stationary at first differences. That's why the first differences of unemp_a and oil have been taken for analysis in the following parts. As the data are mixture of I(0) and I(1), the ARDL approach seems suitable (Pesaran et al., 2001).

5.1.2 Variable Description and Summary Statistics

An overview of the summary statistics of different variables are shown in Table 2. Overseas employment growth shows highest variability with right-skewed distribution. Contrary to this, home country GDP growth (gdpgr_bd) exhibits a more symmetric distribution and less volatility. Change in nominal exchange rate (exr_ch) and host countres' inflation (inf_wa) are examples of variables that exhibit positive skewness, but host countries GDP (gdpgr_wa) is left-skewed (-1.33). Overseas employee growth (empl_gr) contains high tails (13.44) indicating possibility of outliers in the data.

Table 3: Summary Statistics (Author's Calculation)

Variable	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis
rem3_gr	11.65	10.76	56.60	-26.12	16.33	0.18	4.05
empl_gr	16.47	10.36	256.46	-45.58	50.05	2.72	13.44
exr_ch	4.71	3.73	22.97	-4.59	5.23	1.34	5.31
gdpgr_bd	5.27	5.24	7.88	2.13	1.43	-0.25	2.28
gdpgr_wa	2.74	3.14	7.08	-8.27	3.09	-1.33	5.45
inf_wa	2.20	2.07	7.26	-0.97	1.67	0.79	4.02
intr_dif	5.19	5.07	10.79	0.88	2.28	0.26	2.55
d_unemp	-0.01	-0.22	2.84	-1.41	0.85	1.44	5.55
d_oil	1.04	-0.76	31.30	-46.57	14.94	-0.59	4.89

Source: *Authors' Calculation in EViews 14*

Table 3 exhibits the results of the correlation matrix of different variables. Remittance growth (rem3_gr) is positively correlated with overseas employment growth (empl_gr), nominal exchange rate change (exr_ch), and host countries' inflation (inf_wa), but negatively correlated with host countries' GDP growth (gdpgr_wa). Strong negative correlations are found between host countries unemployment (d_unemp) and host countries' GDP growth (gdpgr_wa) and oil price (d_oil), while oil price (d_oil) is positively linked to host countries GDP growth (gdpgr_wa) (0.38) and host countries' inflation (inf_wa) (0.33). These results indicate possible interdependencies among macroeconomic variables and require further analysis to be performed.

Table 4: Correlation Matrix (Authors' Calculation)

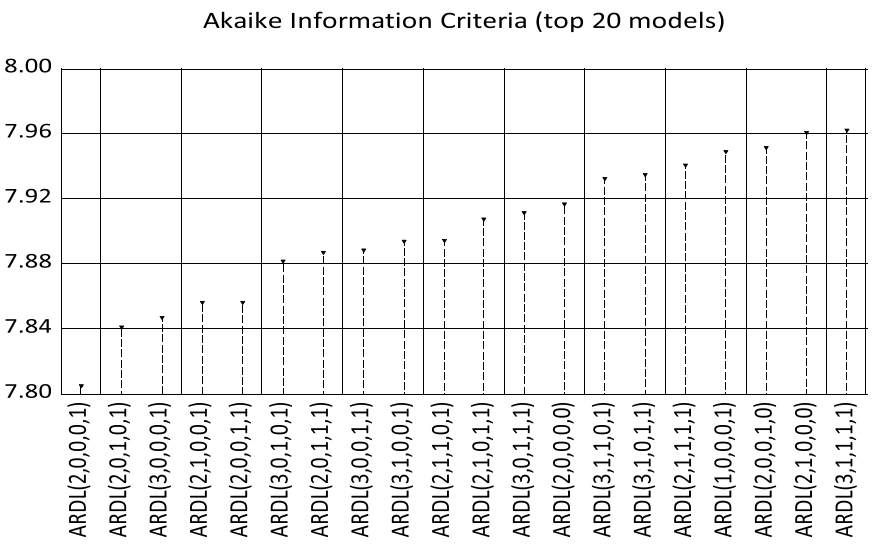
	rem3_gr	empl_gr	exr_ch	gdpgr_bd	gdpgr_wa	inf_wa	intr_dif	d_unemp	d_oil
rem3_gr	1.00								
empl_gr	0.24	1.00							
exr_ch	0.34**	0.34**	1.00						
gdpgr_bd	-0.26	0.10	-0.21	1.00					
gdpgr_wa	-0.30*	0.02	-0.37**	0.40***	1.00				
inf_wa	0.35**	0.27*	0.07	0.17	0.20	1.00			
intr_dif	-0.20	-0.15	-0.28*	-0.14	0.11	-0.09	1.00		
d_unemp	0.47***	0.18	0.24	-0.20	-0.58***	-0.04	-0.06	1.00	
d_oil	-0.01	0.18	0.09	0.18	0.38**	0.33**	-0.20	-0.33**	1.00

Source: *Authors' Calculation in EViews 14*

5.1.3 Model Selection and Specification

Based on the data diagnosis, the ARDL model is going to be used to estimate the mode. To determine the optimal lag structure, the Akaike Information Criterion (AIC) has been used. Based on the evaluated results of 20 different models, the best fitting model for this estimation is ARDL (2,0,0,0,1) (Figure 3).

Figure 3: The Akaike Information Criterion (AIC) for 20 Models



Source: *Authors' Calculation in EViews 14*

5.1.4 Cointegration *Test*

Considering the outcomes of the unit root tests, we need to identify whether there is any existence of long-run relationship among the variables. To do so, ARDL bounds test has been performed to determine any cointegration among the variables. The summary results have been presented in Table 5.

Table 5: ARDL Bound Test Results

Null hypothesis		No levels relationship	
Number of dynamic cointegrating variables		4	
Deterministics		Rest. constant (Case 2)	
Sample size		38	
F-statistics		**10.565**	
	Critical Values at 10%	*Critical Values at 5%*	*Critical Values at 1%*
I(0)	2.46	2.947	4.093
I(1)	3.46	4.088	5.532

Source: *Authors' Calculation in EViews 14*

Here, the F-stat of 10.565 exceeds the thresholds of all critical values which suggest rejecting the null hypothesis of no level relationships. Therefore, it is evident that there is strong cointegration at all levels.

5.1.5 Stability of the Model

Having conducting unit root tests and cointegration tests, a stability test has been conducted to determine the stability of the model. Firstly, Ramsey RESET test has been performed to determine whether the model is correctly specified.

Table 6 Ramsey RESET Test Summary Table

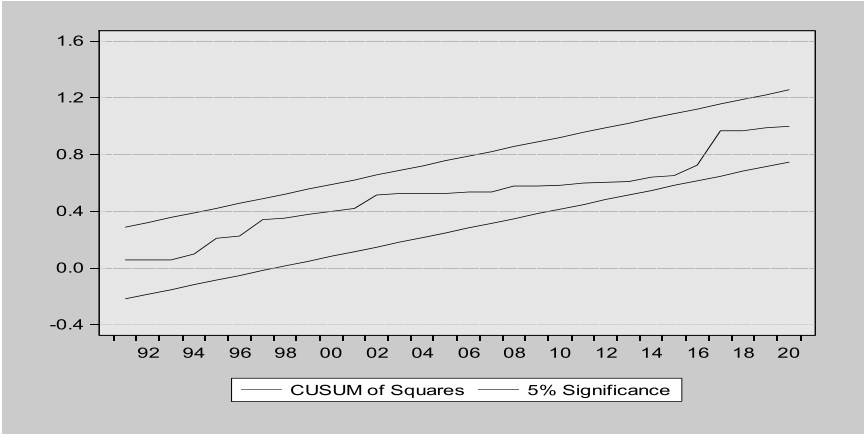
Test Component	Value	Probability	Interpretation
Null Hypothesis	No misspecification (correct functional form)	-	-
F-statistic	0.488	0.4902	>0.05→Fail to reject null
t-statistic	0.699	0.4902	>0.05 → Fail to reject null
Likelihood Ratio	0.635	0.4257	>0.05→Fail to reject null
Fitted² Coefficient	-0.0168	0.4902	Insignificant (p>0.05)

Source: *Authors' Calculation in EViews 14*

The F-statistics, t-statistics and Likelihood Ratio are greater than the critical value (0.05) which indicate rejecting the null hypothesis of misspecification. Moreover, the squared fitted term is statistically insignificant which confirms the functional form of the model is adequate.

Having confirmed the correct specification and functional form of the model, the CUSUM of squares test has been conducted to assess the stability of regression coefficients over time through examining for structural breaks in the time series model.

Figure 4: CUSUM of Squares (CUSUMQ) Test Plot



Source: *Authors' Calculation in EViews 14*

From the above graph, it is evident that there is no structural breaks or parameter inconsistency of the model. The error variance is stable over time. As a result, the ARDL relationship remains stable over time.

5.1.6 Normality Test

Based on the summary of the normality test results (Table 7), it can be concluded that the model follows a multivariate normal distribution (Joint JB p-value = 0.774).

Table 7: Normality Test Summary

Statistic	Value	Benchmark	Interpretation
Mean	$-2.08 \times 10^{-15} \approx 0$	0	Residuals are centered at zero.
Median	-0.225	-	Slightly negative median.
Std. Deviation	9.661	-	Moderate spread around the mean.
Skewness	-0.424	0	Mild left skew (longer left tail).
Kurtosis	3.497	3	Slightly heavy tails (leptokurtic).
JB p-value	0.465	> 0.05	Fail to reject normality (residuals are normal).

Source: *Authors' Calculation in EViews 14*

From the Jarque-Berra test, the p-value of 0.465 is greater than the critical value confirming the normal distribution of residuals.

5.1.7 Test for serial correlation

To identify serial correlation, the Breusch-Godfrey LM test for serial correlation has been performed. From the Table 8, the both F-statistic of 1.311 (p = 0.286) and an Obs*R^2 statistic of 3.253 (p = 0.197) fail to reject the null hypothesis of no serial correlation at two lags. This is further supported by the Durbin-Watson statistics of 2.024 (≈2) for uncorrelated residuals. The p-value of lagged residuals (RESID(-1) of 0.495, RESID(-2) of 0.249) of this test equation ar statistically

insignificant which confirm the absence of autocorrelation (Detailed result in Appendix C). These results jointly validate the model's error-term independence assumption.

Table 8: Breusch-Godfrey Serial Correlation LM Test

Test Statistic	Value	p-value	Remarks
F-statistic	1.3108	0.2856	Fail to reject null ($p > 0.05$)
Obs*R-squared	3.2532	0.1966	Fail to reject null ($p > 0.05$)
Durbin-Watson Stat	2.023840	≈2	No autocorrelation detected

Source: *Authors' Calculation in EViews 14*

5.1.8 Test for heteroscedasticity

The Breusch-Pagan-Godfrey test yields an F-statistic of 1.002 ($p = 0.450$) and an Obs*R^2 statistic of 7.198 ($p = 0.409$), failing to reject the null hypothesis of homoskedasticity. Moreover, the Scaled explained SS also conforms with F-statistics of homoskedasticity. These results indicate that the error variance is constant, confirming the standard error estimates of the ARDL model.

Table 9: The Breusch-Pagan-Godfrey test

Test Statistic	Value	p-value	Null Hypothesis (H_0)	Remarks
F-statistic	1.002	0.450	Homoskedasticity	Fails to reject H_0
Obs*R-squared	7.198	0.409	Homoskedasticity	Fails to reject H_0
Scaled explained SS	5.601	0.587	Homoskedasticity	Fails to reject H_0

Source: *Authors' Calculation in EViews 14*

From the different data diagnostics, we can conclude that the data are normally distributed, not serially correlated and homoscedastic in nature.

Moreover, the variables are cointegrated and there is a long-term relationship. Based on the model stability result, we found that the model is correctly specified and no omitted variable bias. Therefore, we can estimate the relationship using ARDL model for this study.

5.2 Results

After establishing the cointegration between variables, we estimate the Equation (2) to determine the short run and long-run coefficients of the model. After validating and checking the reliability of the model, the short-run and long-run relationships between remittance and the macroeconomic variables are discussed. Primarily, the model is estimated considering the rem3_gr as regressed variable and empl_gr exr_ch gdpgr_bd gdpgr_wa inf_wa d_intr_dif d_unemp d_oil as regressors. The time series of the data has been taken from 1980 to 2020 to avoid the COVID shock impact from the model. Based on the findings from the ARDL model (Appendix F), it is found that empl_gr (p-value= 0.9825), exr_ch (p-value = 0.7105), d_intr_dif (p-value= 0.8375), d_oil (p-value= 0.8973) are not statistically significant at all. Therefore, these variables have been dropped from the model and estimated the results. Based on these new estimates, long-run and short-run dynamics of the model have been discussed.

5.2.1 Long Run Relationships

The ARDL model reveals the significant long-run relationship between remittance growth in Bangladesh with major macroeconomic variables. Domestic GDP growth (GDP growth of Bangladesh) has a significant negative relationship with remittance growth which supports the counter-cyclical nature of remittances. The reason behind this nature is that when the growth of home country decreases, the income of the family decreases and the remitters try to provide more remittances to family to support them in distress. This finding is supported by the empirical results of Amuedo-Dorantes & Pozo (2006); Bettin & Zazzaro (2012) Yang (2008). The inflation in host countries has a significant positive impact on remittance growth. This relationship arises from rational behavioral responses by migrants: as inflation erodes the real value of savings in host-country currencies, remitters strategically reallocate resources toward cross-border transfers to preserve the purchasing power

of household incomes in their origin countries. Empirical evidence like (Adams & Page, 2005; Bettin & Zazzaro, 2018; Gupta et al., 2009; Yang, 2008) consistently support this result. This compensatory mechanism aligns with the 'target income hypothesis,' wherein migrants prioritize maintaining fixed consumption thresholds for dependents despite macroeconomic shocks (Gupta et al., 2009). The unemployment rate in the host countries leads to the most significant change in remittance growth in home country. A one percent increase in the unemployment rate causes 14.67 percent increase in remittance growth in home country. This can be caused through several channels- (i) returning migrants liquidate host-country assets, bringing savings home during economic downturns (Dustmann & Weiss, 2007); (ii) migrants remits more by working more hours to achieve the target faster (Yang & Choi, 2007). The GDP growth rate of host countries (gdpgr_wa), although statistically insignificant (coefficient 1.15, p-value 0.21), suggests a positive relationship with remittance growth, in line with the theory. This positive relationship suggests that productivity increases in the host countries increases the income of migrants and their capacity to remit in the home country.

Table 10: Long-Run Dynamics of the ARDL Model

Variable	Coefficient	p-value
GDPGR_BD	-2.935**	0.048
GDPGR_WA	1.148	0.208
INF_WA	3.616***	0.009
D_UNEMP(-1)	14.673***	0.002
Constant (C)	21.365***	0.011

Source: *Authors' Calculation in EViews 14*

5.2.2 Short-Run Dynamics

The estimated error correction term (ECT) is negative and highly significant. Although the sign of this adjustment is aligned with the theory, the coefficient of ECT is -1.5 which exceeds the expected

theoretical range between 0 and -1. This anomaly may be due to the limitations of using less frequency data (here, annual data). As in this case, the model suggests 150 percent of annual adjustment to equilibrium meaning that remittance is normally adjusted in every 8 months. Future studies may consider using high frequency data to address this issue.

The short-run dynamics are smaller in magnitude but very highly significant. The first difference of unemployment differential d(d_unemp) dominates the short-run dynamics suggesting migrants react quickly to labor market shocks. While a 1 percent increase in the first difference in the unemployment differential causes 7.54 percent increase in the remittance growth rate. On the other hand, the first difference of the lagged dependent variable d(rem3_gr(-1)) is positive and statistically significant (coefficient = 0.341, p = 0.000) which indicates that past growth in remittance flows influences current growth.

Table 11: Short-Run Dynamics of the ARDL Model

Variable	Coefficient	p-value
REM3_GR(-1) (ECT)	-1.507***	0.000
D(REM3_GR(-1))	0.341**	0.014
D(D_UNEMP)	7.536***	0.007

Source: Authors' Calculation in EViews 14

5.2.2 Diagnostic Test Results

The diagnostic test results of the ARDL (2,0,0,0,1) model advocates that the estimated model is well-specified and statistically robust. The R-squared value (0.7516) and adjusted R-squared value (0.7374) assure the goodness of fit of the model and 75 percent variation in the dependent variable remittance growth (rem3_gr) can be explained by the variation in the selected independent variables. The F-statistics of 52.96 suggests that the overall regression model is highly significant. There is no autocorrelation in the residuals, as indicated by the Durbin-Watson test score of 1.72, which is quite near 2. Both the Schwarz Criterion (SC) and the Akaike Information Criterion (AIC) have values that are within a reasonable range. Moreover, from the previous data analysis in data and

model specification part of this section, the ARDL bounds testing result confirm the existence of cointegration. Overall, the diagnostics tests results validate the reliability of the estimated ARDL (2,0,0,0,1) model for both short-run and long-run interpretation.

Table 12 : Diagnostic Tests Summary

Test	Statistics / Value	Interpretation
R-squared	0.7516	The model explains about 75.16% of the variation
Adjusted R-squared	0.7374	After adjusting for DF, the explanatory power remains high.
F-statistic	52.96 (p = 0.0000)	The overall model is highly significant
Durbin-Watson statistic	1.7177	Indicates no severe autocorrelation in residuals
Akaike Info Criterion	7.5053	A lower value suggests better model fit with parsimony
Schwarz Criterion (SC)	7.6346	Helps confirm model selection; slightly higher than AIC

Source: *Authors' Calculation in EViews 14*

6.0 Conclusion and Policy Recommendation

The macroeconomic determinants of the remittance inflow in country-specific and cross-country aspects have been covered broadly in the current literature and several studies found in case of Bangladesh as well. However, the less studies have been found which have covered long data range and taken into consideration of several host countries' macroeconomic determinants. This paper tries to bridge this literature gap by taking data range from 1980 to 2023, later dropped data of 2021 to 2023 to avoid the structural problems from Covid shocks, and taking the variables of three countries as host countries by applying the ARDL bounds testing approach. The empirical results confirm the presence of long-run cointegration relationship between remittance growth and

different macroeconomic variables. Remittance growth is found to be counter-cyclical with respect to home country's economic conditions whereas, pro-cyclical to the economic conditions of the host countries. Inflation in host countries exerts a positive long-run effect on remittances which implies that remitters find it less attractive to save in host countries than to remit more in the home country. Moreover, unemployment shocks in host countries positively impact on the remittance inflow as the remitters try to make extra earnings before returning and remit all their previous and current earnings.

In short run, remittance behavior is responsive to the change in the unemployment differential indicating the quick adjustment of remittance growth from host countries labor market situations. In addition, the past growth in remittance flows influences current growth of the remittances. The diagnostic tests of the model validate the robustness of the model-residuals are normally distributed, no serial correlation and homoscedastic. The error correction term (ECT) is negative and statistically significant, suggesting adjustment of the variables toward long-run equilibrium. However, the negative ECT value of more than 1 indicates the problem arising from using data with less frequency.

Despite the positive relationship between remittance growth and unemployment in host countries, there is possibility of future remittance loss due to the unemployment in the host economies. To reduce this risk, the government of Bangladesh can diversify the migrant's destination and provide insurance supports of the remitters if migrants return to home country due to unemployment hike in host countries. The exchange rate should be market based as this will shift the remittance sending from informal channel to formal channel. One of the objectives of this study is to contextualize the behavioral equations used in the projection tools developed by World Bank and IMF in the medium-term macroeconomic framework used by the Finance Division. These macroeconomic determinants with these coefficients can be incorporated into the model to make the projection more accurate. Last but not the least, as this study has used annual data and faced a possible problem from aggregation, future research should explore the association of remittance inflows with macroeconomic determinants using high frequency data and incorporating non-linearities in the model.

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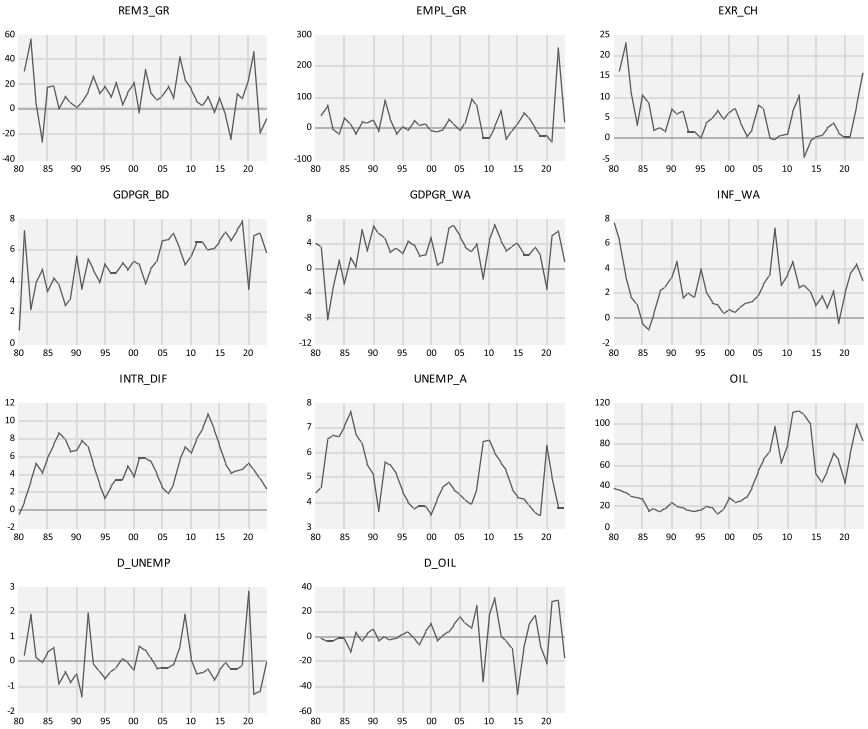
Appendix

Appendix A

1. Unit Root Results

At Level										
		rem3_gr	**empl_gr**	**exr_ch**	**gdpgr_bd**	**gdpgr_wa**	**inf_wa**	**intr_dif**	**unemp_a**	**oil**
With Constant	t-Statistic	-5.74	-5.79	-5.49	-5.55	-4.90	-4.18	-3.30	-2.45	-1.38
	Prob.	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.13	0.58
		***	***	***	***	***	***	**	n0	n0
With Constant & Trend	t-Statistic	-5.75	-5.61	-5.01	-9.25	-4.19	-4.14	-3.15	-3.00	-2.52
	Prob.	0.00	0.00	0.00	0.00	0.01	0.01	0.11	0.14	0.32
		***	***	***	***	**	**	n0	n0	n0
Without Constant & Trend	t-Statistic	-4.34	-6.18	-2.54	0.55	-1.28	-2.36	-1.19	-0.62	-0.38
	Prob.	0.00	0.00	0.01	0.83	0.18	0.02	0.21	0.44	0.54
		***	***	**	n0	n0	**	n0	n0	n0
At First Difference										
		d(rem3_gr)	d(empl_gr)	d(exr_ch)	d(gdpgr_bd)	d(gdpgr_wa)	d(inf_wa)	d(intr_dif)	d(unemp_a)	d(oil)
With Constant	t-Statistic	-4.35	-6.74	-6.77	-9.30	-9.16	-7.87	-4.30	-6.37	-5.89
	Prob.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		***	***	***	***	***	***	***	***	***
With Constant & Trend	t-Statistic	-4.24	-6.73	-7.18	-9.15	-9.05	-7.96	-4.40	-6.33	-5.85
	Prob.	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
		***	***	***	***	***	***	***	***	***
Without Constant & Trend	t-Statistic	-4.43	-6.83	-6.85	-9.28	-9.23	-7.95	-4.36	-6.45	-5.91
	Prob.	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		***	***	***	***	***	***	***	***	***

2. Graphs of variables



Appendix B

Dependent	tau-statistic	Prob.*	z-statistic	Prob.*
REM3_GR	-7.150123	0.0065	-47.36508	0.0044
EMPL_GR	-6.429119	0.0284	-118.4599	0.0000
EXR_CH	-4.616346	0.4172	-29.50793	0.3709
GDPGR_BD	-2.321498	0.9960	-11.34639	0.9943
GDPGR_WA	-5.569704	0.1219	-35.92785	0.1222
INF_WA	-4.536611	0.4512	-27.35320	0.4844
D_INTR_DIF	-5.171717	0.2169	-34.13705	0.1750
D_UNEMP	-7.666059	0.0021	-49.48117	0.0019
D_OIL	-5.800253	0.0843	-37.57708	0.0847

*MacKinnon (1996) p-values.

Intermediate Results:

	REM3_GR	EMPL_GR	EXR_CH	GDPGR...	GDPGR...	INF_WA	D_INTR...	D_UNEMP	D_OIL
Rho - 1	-1.127740	-1.564510	-0.702570	-0.355151	-0.855425	-0.651267	-0.812787	-1.178123	-0.894692
Rho S.E.	0.157723	0.243347	0.152192	0.152983	0.153585	0.143558	0.157160	0.153680	0.154251
Residual variance	170.7817	1563.336	15.93034	1.063872	4.225254	1.534760	1.444632	0.362829	133.7743
Long-run residual variance	170.7817	5331.761	15.93034	0.645968	4.225254	1.534760	1.444632	0.362829	133.7743
Number of lags	0	1	0	1	0	0	0	0	0
Number of observations	42	41	42	41	42	42	42	42	42
Number of stochastic trends**	9	9	9	9	9	9	9	9	9

**Number of stochastic trends in asymptotic distribution

Appendix C: LM Test for Serial Autocorrelation

Null hypothesis: No serial correlation at lag h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	23.59493	36	0.9445	0.522145	(36, 24.7)	0.9631
2	32.77274	36	0.6229	0.819587	(36, 24.7)	0.7122
3	37.21104	36	0.4131	0.988664	(36, 24.7)	0.5214
4	52.08472	36	0.0404	1.706295	(36, 24.7)	0.0837

Null hypothesis: No serial correlation at lags 1 to h

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	23.59493	36	0.9445	0.522145	(36, 24.7)	0.9631
2	NA	72	NA	NA	(72, NA)	NA
3	NA	108	NA	NA	(108, NA)	NA
4	NA	144	NA	NA	(144, NA)	NA

*Edgeworth expansion corrected likelihood ratio statistic.

Appendix D: Normality Test

Component	Skewness	Chi-sq	df	Prob.*
1	0.089516	0.048079	1	0.8264
2	-0.146118	0.128104	1	0.7204
3	-0.659276	2.607869	1	0.1063
4	0.404723	0.982806	1	0.3215
5	-0.470017	1.325494	1	0.2496
6	0.221502	0.294379	1	0.5874
Joint		5.386731	6	0.4953

Component	Kurtosis	Chi-sq	df	Prob.
1	2.334876	0.663584	1	0.4153
2	3.484242	0.351735	1	0.5531
3	3.295092	0.130619	1	0.7178
4	2.809419	0.054482	1	0.8154
5	3.755239	0.855580	1	0.3550
6	2.320083	0.693431	1	0.4050
Joint		2.749431	6	0.8396

Component	Jarque-Bera	df	Prob.
1	0.711663	2	0.7006
2	0.479838	2	0.7867
3	2.738488	2	0.2543
4	1.037288	2	0.5953
5	2.181073	2	0.3360
6	0.987811	2	0.6102
Joint	8.136161	12	0.7744

*Approximate p-values do not account for coefficient estimation

Appendix E: Ramsey Reset Test

	Value	df	Probability
t-statistic	0.698866	29	0.4902
F-statistic	0.488414	(1, 29)	0.4902
Likelihood ratio	0.634661	1	0.4257

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	57.19963	1	57.19963
Restricted SSR	3453.477	30	115.1159
Unrestricted SSR	3396.278	29	117.1130

LR test summary:

	Value
Restricted LogL	-139.6011
Unrestricted LogL	-139.2838

Variable	Coefficient	Std. Error	t-Statistic	Prob.
REM3_GR(-1)	-0.246021	0.179395	-1.371396	0.1808
REM3_GR(-2)	-0.456005	0.211265	-2.158451	0.0393
GDPGR_BD	-4.030899	2.127715	-1.894474	0.0682
GDPGR_WA	1.520251	1.045738	1.453759	0.1568
INF_WA	5.257625	2.688492	1.955604	0.0602
D_UNEMP	11.32102	6.015902	1.881850	0.0699
D_UNEMP(-1)	10.20710	5.385121	1.895427	0.0680
C	28.18219	12.60506	2.235785	0.0332
FITTED^2	-0.016782	0.024014	-0.698866	0.4902

R-squared	0.456914	Mean dependent var	10.35130
Adjusted R-squared	0.307097	S.D. dependent var	13.00069
S.E. of regression	10.82188	Akaike info criterion	7.804410
Sum squared resid	3396.278	Schwarz criterion	8.192260
Log likelihood	-139.2838	Hannan-Quinn criter.	7.942404
F-statistic	3.049815	Durbin-Watson stat	1.656786
Prob(F-statistic)	0.012884		

Appendix F: ARDL Results

ARDL Model Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Distributed-lag Regressors				
Dependent				
REM3_GR(-1)	-0.201774	0.153366	-1.315641	0.2002
REM3_GR(-2)	-0.308406	0.145013	-2.126740	0.0435
Independent				
EMPL_GR	0.001529	0.068863	0.022199	0.9825
EXR_CH	-0.245312	0.653486	-0.375389	0.7105
GDPGR_BD	-3.109834	1.567101	-1.984451	0.0583
GDPGR_WA	1.286748	1.096585	1.173413	0.2517
INF_WA	3.155692	1.639440	1.924860	0.0657
D_INTR_DIF	0.351023	1.693573	0.207268	0.8375
D_UNEMP	7.378673	2.854062	2.585323	0.0159
D_UNEMP(-1)	8.283096	3.620465	2.287854	0.0309
D_OIL	-0.024025	0.184337	-0.130333	0.8973
D_OIL(-1)	0.197500	0.167061	1.182205	0.2482
Deterministic Regressors				
C	23.54403	10.15254	2.319029	0.0289
R-squared	0.485838	Mean dependent var		10.35130
Adjusted R-squared	0.239041	S.D. dependent var		13.00069
S.E. of regression	11.34089	Akaike info criterion		7.960206
Sum squared resid	3215.393	Schwarz criterion		8.520433
Log likelihood	-138.2439	Hannan-Quinn criter.		8.159531
F-statistic	1.968570	Durbin-Watson stat		1.881611
Prob(F-statistic)	0.074153			

*Note: p-values and any subsequent test results do not account for model selection.

ARDL Revised Model with dropped insignificant variables-

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
Distributed-lag Regressors				
Dependent				
REM3_GR(-1)	-0.201774	0.153366	-1.315641	0.2002
REM3_GR(-2)	-0.308406	0.145013	-2.126740	0.0435
Independent				
EMPL_GR	0.001529	0.068863	0.022199	0.9825
EXR_CH	-0.245312	0.653486	-0.375389	0.7105
GDPGR_BD	-3.109834	1.567101	-1.984451	0.0583
GDPGR_WA	1.286748	1.096585	1.173413	0.2517
INF_WA	3.155692	1.639440	1.924860	0.0657
D_INTR_DIF	0.351023	1.693573	0.207268	0.8375
D_UNEMP	7.378673	2.854062	2.585323	0.0159
D_UNEMP(-1)	8.283096	3.620465	2.287854	0.0309
D_OIL	-0.024025	0.184337	-0.130333	0.8973
D_OIL(-1)	0.197500	0.167061	1.182205	0.2482
Deterministic Regressors				
C	23.54403	10.15254	2.319029	0.0289

R-squared	0.485838	Mean dependent var	10.35130
Adjusted R-squared	0.239041	S.D. dependent var	13.00069
S.E. of regression	11.34089	Akaike info criterion	7.960206
Sum squared resid	3215.393	Schwarz criterion	8.520433
Log likelihood	-138.2439	Hannan-Quinn criter.	8.159531
F-statistic	1.968570	Durbin-Watson stat	1.881611
Prob(F-statistic)	0.074153		

*Note: p-values and any subsequent test results do not account for model selection.

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
		Long-run Regressors		
Linear: Dependent				
REM3_GR(-1)	-1.507193	0.192165	-7.843207	0.0000
Linear: Independent				
GDPGR_BD	-2.934954	1.425738	-2.058551	0.0483
GDPGR_WA	1.148200	0.892380	1.286672	0.2080
INF_WA	3.615928	1.296388	2.789232	0.0091
D_UNEMP(-1)	14.67258	4.352106	3.371375	0.0021
Deterministic				
C	21.36490	7.914850	2.699344	0.0113
		Short-run Regressors		
Linear: Dependent				
D(REM3_GR(-1))	0.340858	0.131104	2.599913	0.0143
Linear: Independent				
D(D_UNEMP)	7.536257	2.597216	2.901668	0.0069
R-squared	0.751626	Mean dependent var		-0.848184
Adjusted R-squared	0.693672	S.D. dependent var		19.38537
S.E. of regression	10.72921	Akaike info criterion		7.768480
Sum squared resid	3453.477	Schwarz criterion		8.113235
Log likelihood	-139.6011	Hannan-Quinn criter.		7.891142
F-statistic	12.96934	Durbin-Watson stat		1.717692
Prob(F-statistic)	0.000000			