



**IMPACT OF REMITTANCES ON ECONOMIC GROWTH, EXCHANGE
RATE AND HOUSEHOLD CONSUMPTION EXPENDITURES IN
BANGLADESH**

By

HOSSAIN MOHAMMAD SHAHADAT

**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,
in Fulfilment of the Requirements for the Degree of Doctor of Philosophy**

January 2024

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DEDICATION

To my honourable parents, late grandparents and beloved family members. I would also dedicate the PhD thesis to my wife and upcoming future generation



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment
of the requirement for the degree of Doctor of Philosophy

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Chairman : Associate Professor Lee Chin, PhD
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This thesis aims to examine the impact of remittances on economic growth, exchange rate and household consumption expenditures in Bangladesh. The first objective of the study is to examine the impact of remittances on economic growth, in particular how the development of domestic financial sector influences a country's capacity to take advantage of remittances. Bangladesh's remittances, specifically inflows, are an important source of income support and economic growth. Employing ARDL model on a dataset of 46 years from 1976 to 2021, this study finds that remittances boost growth in Bangladesh with developed financial systems. The study also finds that capital formation is positively associated with economic growth in the long run while remittance is negatively influencing economic growth. Thus, policies should focus on developing the financial system, reducing the cost of remitting and encouraging migrants to send remittances using formal channels.

In the second objective, this study explores whether that changing levels of remittances may have impact on real exchange rate using disaggregated sectorial data for Bangladesh. Based on estimation of ARDL, the results show that 80% of the short -run error is adjusted during a period, however, the workers' remittances are statistically insignificant in both the short term and long term. Therefore, we concluded that this study unable to capture the spending effects of remittances in Bangladesh. This study further examines another phenomenon of Dutch Disease, i.e. the resource movement effect of remittances by specifying the tradable and non-tradable output as the dependent variable, in addition to the standard equation that has the real exchange rate as the regressed. Nevertheless, the results also failed to capture this effect. Based on the findings the study provides recommendations to the policymakers to be more cautious in utilizing the remittances so that the phenomenon that is known as Dutch Disease can be avoided.

The third objective analyses the impact of international remittances on household spending behaviour in the Bangladesh context. The total household spending has been classified into several categories, namely education, health, food, consumed and durable goods, housing and land. For addressing the self-selection bias, the study applied the propensity score matching technique. Findings from the study reveal that remittances have positive and significant impact on the amount spent on almost all the spending categories except higher education at university level and housing (mud and bamboo). In this regard, the policymakers should find the process of how to motivate the householders to spend the remittances for the purpose of higher education. The study can be useful for the government and household decision-makers to utilize the remittances sent from abroad. This study contributes to the

body of knowledge with recent variations on the microeconomic impact of remittances at the household level in a remittance-receiving country.

Keywords: Economic Growth, Remittances, Financial Development, Real Exchange Rate

SDG: GOAL 8: Decent Work and Economic Growth



Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

**KESAN KIRIMAN WANG KE ATAS PERTUMBUHAN EKONOMI, KADAR
PERTUKARAN ASING DAN PERBELANJAAN PENGGUNAAN ISI
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Tesis ini bertujuan untuk mengkaji kesan kiriman wang terhadap pertumbuhan ekonomi, kadar pertukaran dan perbelanjaan penggunaan isi rumah di Bangladesh. Objektif pertama kajian adalah untuk mengkaji kesan kiriman wang ke atas pertumbuhan ekonomi, khususnya bagaimana pembangunan sektor kewangan tempatan mempengaruhi keupayaan sesebuah negara untuk menerap terimaan kiriman wang. Menggunakan model ARDL pada set data selama 46 tahun dari 1976 hingga 2021, kajian ini mendapati bahawa dengan sistem kewangan yang matang, kiriman wang boleh meningkatkan pertumbuhan ekonomi di Bangladesh. Kajian itu juga mendapati bahawa pembentukan modal mempergaruhi pertumbuhan ekonomi secara positif dalam jangka panjang manakala pengiriman wang mempunyai pengaruh negatif terhadap pertumbuhan ekonomi. Oleh itu, dasar kerajaan harus memberi tumpuan kepada pembangunan sistem kewangan, mengurangkan kos kiriman wang dan menggalakkan migran menghantar kiriman wang menggunakan saluran rasmi.

Dalam objektif kedua, kajian ini mengkaji sama ada perubahan tahap kiriman wang memberi kesan ke atas kadar pertukaran sebenar dengan menggunakan data sektoral untuk negara Bangladesh. Berdasarkan kaedah ARDL, keputusan menunjukkan bahawa 80% daripada ralat jangka pendek diselaraskan dalam satu tempoh, namun, kiriman wang adalah tidak signifikan secara statistik dalam kedua-dua jangka masa pendek dan panjang. Oleh itu, kesimpulan dibuat bahawa kajian ini tidak dapat mengesahkan kesan perbelanjaan kiriman wang di Bangladesh. Kajian ini seterusnya mengkaji satu lagi fenomena yang dikenali sebagai Penyakit Belanda, iaitu kesan pergerakan sumber kiriman wang dengan menggunakan keluaran boleh diniagakan dan tidak boleh diniagakan sebagai pembolehubah bersandar, di samping persamaan piawai yang mempunyai kadar pertukaran sebenar sebagai pembolehubah. Namun begitu, keputusan juga gagal untuk mengesahkan kesan ini. Berdasarkan dapatan kajian tersebut, kajian ini memberi saranan kepada penggubal dasar supaya lebih berhati-hati dalam menggunakan penerimaan kiriman wang tersebut agar fenomena yang dikenali sebagai Penyakit Belanda dapat dielakkan.

Objektif ketiga menganalisis kesan kiriman wang antarabangsa terhadap tingkah laku perbelanjaan isi rumah dalam konteks Bangladesh. Jumlah perbelanjaan isi rumah telah diklasifikasikan kepada beberapa kategori, iaitu pendidikan, kesihatan, makanan, barangan guna habis dan barangan tahan lama, perumahan dan tanah, dan tanah serta penggunaan pelbagai. Untuk menangani bias pemilihan sendiri, kajian ini menggunakan teknik padanan skor kecenderungan. Dapatan kajian menunjukkan bahawa kiriman wang mempunyai kesan positif ke atas jumlah yang dibelanjakan untuk hampir kesemua kategori perbelanjaan kecuali pendidikan tinggi di peringkat universiti dan perumahan (lumpur dan buluh). Justeru itu, penggubal dasar harus

mencari proses bagaimana untuk memotivasikan isi rumah membelanjakan wang kiriman yang diterima bagi tujuan pengajian tinggi. Kajian ini memberi manfaat kepada kerajaan dan ketua isi rumah untuk menggunakan kiriman wang yang dihantar dari luar negara. Selain itu, kajian ini menyumbang kepada pengetahuan terkini mengenai kesan mikroekonomi kiriman wang di peringkat isi rumah di negara penerima kiriman wang.

Kata Kunci: Perkembangan ekonomi, Wang hantaran, Pembangunan Kewangan, Kadar Pertukaran Sebenar

SDG: MATLAMAT 8: Pekerjaan yang Sesuai dan Pembangunan Ekonomi

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This thesis was submitted to the Senate of the Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

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TABLE OF CONTENTS

	Page
ABSTRACT	i
ABSTRAK	iv
ACKNOWLEDGEMENTS	vii
APPROVAL	viii
DECLARATION	x
LIST OF TABLES	xv
LIST OF FIGURES	xvii
LIST OF ABBREVIATIONS	xviii
 CHAPTER	
 1 INTRODUCTION	 1
1.1 Introduction	1
1.2 Background of the Study	1
1.3 The Effects of Remittance	5
1.3.1 The Effects of Remittance on Economic Growth	5
1.3.2 Remittance and Financial Development	10
1.3.3 Remittance and Exchange Rate	12
1.3.4 Remittance and Consumption Expenditures	18
1.4 The People's Republic of Bangladesh	20
1.5 Problem Statement	25
1.6 Research Questions	28
1.7 Research Objectives	29
1.8 Research Hypotheses	29
1.9 Significance of the Study	30
1.10 Structure of the Thesis	32
1.11 Definition of the Key Terms	33
1.12 Chapter Summary	34
 2 LITERATURE REVIEW	 35
2.1 Introduction	35
2.2 The Impact of Remittances on Economic Growth	36
2.2.1 Theoretical Literature Review	36
2.2.2 Empirical Literature Review	42
2.3 The Impact of Remittances on Exchange Rate	50
2.3.1 Theories of Exchange Rate	50
2.3.2 Empirical Literature Review	60
2.4 The Impact of Remittances on Household Consumption Expenditures	65
2.4.1 Theoretical Literature Review	65
2.4.2 Empirical Literature Review	67
2.5 Gaps in the Literature	70
2.5.1 Remittances on Economic Growth	70
2.5.2 Remittances on Exchange Rate	71

2.5.3	Remittances on Household Consumption Expenditures	72
3	METHODOLOGY	74
3.1	Introduction	74
3.2	The Impact of Remittances on Economic Growth	74
3.2.1	Theoretical Framework	74
3.2.2	Model Specification	75
3.2.3	Variables, Measurement and Data Sources	82
3.2.4	Method of Estimation	82
3.3	The Impact of Remittances on the Exchange Rate	89
3.3.1	Theoretical Framework	89
3.3.2	Model Specification	97
3.3.3	Variables, Measurement and Data Sources	99
3.3.4	Method of Estimation	100
3.4	The Impact of Remittances on Household Consumption Expenditures	101
3.4.1	Theoretical Framework	101
3.4.2	Model Specification	109
3.4.3	Variables, Measurement and Data Sources	113
3.4.4	Method of Estimation	116
4	RESULTS AND DISCUSSION	121
4.1	Introduction	121
4.2	The Impact of Remittances on Economic Growth	122
4.2.1	Descriptive Statistics	123
4.2.2	Correlation Analysis	124
4.2.3	Data Analysis, Result and Discussion	126
4.3	The Impact of Remittances on Exchange Rate	133
4.3.1	Descriptive Statistics	133
4.3.2	Correlation Statistics	135
4.3.3	Data Analysis, Result and Discussion	136
4.4	The Impact of Remittances on Household Consumption Expenditures	154
4.4.1	Descriptive Statistics	155
4.4.2	Estimating Propensity Score	159
4.4.3	Stratifying and Balancing Propensity Score	162
4.4.4	Estimating Causal Effect and Discussion	167
5	CONCLUSION	172
5.1	Introduction	172
5.2	Summary of the Study	172
5.2.1	The Impact of Remittances on Economic Growth	172
5.2.2	The Impact of Remittances on the Exchange Rate	174
5.2.3	The Impact of Remittances on Household Consumption Expenditures	175
5.3	Policy Implications and Recommendation of the Study	177
5.4	Limitations of the Study	180
5.5	Future Research Directions	181

REFERENCES	186
APPENDICES	201
BIODATA OF STUDENT	215
LIST OF PUBLICATIONS	216



LIST OF TABLES

Table	Page
1.1 Macroeconomic Indicators of Bangladesh	22
2.1 Positive and Negative Effects of Remittance	47
3.1 List of Variables	82
3.2 List of Variables	100
3.3 Description of the Variables for Analyzing the Marginal Spending Behaviour	115
4.1 Summary of Descriptive Statistics	123
4.2 Summary of Correlation Statistics	124
4.3 Unit Root Test for Stationarity	126
4.4 Co-Integration Relationship's Bounds Test Results	126
4.5 ARDL Model's Estimated Long-Term Coefficients. Dependent Variable: EG	127
4.6 ARDL's Short-Run ECM Results. Dependent Variable: EG	129
4.7 Summary of Descriptive Statistics	133
4.8 Correlation Statistics	135
4.9 Unit Root Test for Stationarity	136
4.10 Bounds Test Results for Co-Integration Relationship	137
4.11 ARDL Model's Estimated Long-Term Coefficient. Dependent Variable: Real Effective Exchange Rate	138
4.12 ARDL's Short-Run ECM results. Dependent Variable: Real Effective Exchange Rate	140
4.13 Bounds Test Results for Co-Integration Relationship	144
4.14 ARDL Model's Estimated Long-Term Coefficients. Dependent Variable: Agriculture (AGR)	144
4.15 ARDL'S ECM Results. Dependent variable: Agriculture (AGR)	145
4.16 Bounds Test Results for Co-Integration Relationship (1,2,1,1,1,1)	147

4.17	Estimated Long-Term Coefficients for the Selected ARDL Model. Dependent Variable: MFG	148
4.18	Results of ECMs for the Selected ARDL. Dependent Variable: MFG	148
4.19	Bounds Test Results for Co-Integration Relationship	151
4.20	Estimated Long-Term Coefficients for the Selected ARDL Model. Dependent Variable: SERS	151
4.21	Results of ECMs for the Selected ARDL. Dependent Variable: SERS	152
4.22	Description of Different Spending Categories	156
4.23	Average Spending on Different Goods by Remittance Status	159
4.24	Results for the Propensity Score Matching (Logit Model)	160
4.25	Balancing Test of Propensity Score Matching for the Nearest Neighbour Estimator (Bias Percentage)	164
4.26	Indicators of the Quality of Different Matching Techniques	165
4.27	PSM Results for the Total Amount Spent on Different Spending Categories	168
4.28	PSM Results for the Budget Shares of Different Spending Categories	170

LIST OF FIGURES

Figure	Page
1.1 Top Remittance Receivers in 2022	3
1.2 Remittance and Economic Growth	6
1.3 Remittance (US \$ Billion) and Real Effective Exchange Rate (REER)	14
1.4 Some Economic Indicators of Bangladesh	22
3.1 Research Framework	77
3.2 Research Framework	90
3.3 Research Framework	102
4.1 Time Series Plots of the Variables Used in the Analysis	124
4.2 CUSUM Test	132
4.3 CUSUMSQ Test	132
4.4 Time Series Plots of the Variables Used in the Analysis	134
4.5 CUSUM Test	142
4.6 CUSUM of Square Test	142
4.7 CUSUM Test	146
4.8 CUSUMSQ Test	146
4.9 CUSUM Test	149
4.10 CUSUM of Square Test	150
4.11 CUSUM Test	153
4.12 CUSUM of Square Test	153
4.13 ROC Curve for the Estimated Participation Equation with the Logit Model	161
4.14 Quality of Matching	166
4.15 Balancing Property of the Estimated Propensity Score	166

LIST OF ABBREVIATIONS

EG	Economic Growth
FD	Financial Development
CF	Capital Formation
LF	Labor Forces
ARDL	Autoregressive Distributed Lag
ECM	Error Correction Model
REER	Real Effective Exchange Rate
PPP	Purchasing Power Parity
FEER	Fundamental Equilibrium Exchange Rate
BEER	Behavioral Equilibrium Exchange Rate
TOT	Term of Trade
TNT	Relative Price of Non-tradable to Tradable goods
MON	Money Supply
RES	Foreign Exchange Reserve
HIES	Household Income and Expenditure Survey
PSM	Propensity Score Matching
ATT	Average Treatment Effect on the Treated
WDI	World Development Indicators

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter commenced with a discussion of the study's context. Then, the problem statement was discussed. Following this, the research objectives, significance of the study, and proposed thesis structure were discussed. Lastly, a concise summary of the thesis was provided.

1.2 Background of the Study

The term "remittance" refers to the transfer of goods or monetary resources by migrants to their respective relatives and families residing in their countries of origin (Adams, Richard & John, 2003; Sanjeev, Catherine & Smith, 2007, as cited in IMF, 2021). A multitude of labourers engage in international travel for the purpose of employment, with the primary objective of acquiring financial resources to provide sustenance and assistance to their respective families and kin residing in their countries of origin (Swing, 2018). In relation to this matter, the act of sending money from abroad, commonly known as overseas remittance, has been recognized as a crucial factor contributing to economic growth, the real effective exchange rate, and household consumption expenditures in various countries. These countries include Nigeria (Oladipo, 2020), Honduras, Gambia, Moldova, Comoros, Liberia, Haiti, Nepal, Tajikistan, and Kyrgyzstan (Abduvaliev & Bustillo, 2020), as well as Tonga, Pakistan (Khan, Teng, & Khan, 2019), Sri Lanka (Das & Sethi, 2020), and India. As per the scholarly works of Kathuria (2018), Nguyen and Nguyen (2019), Hossain (2020), and Titumir (2021), it has been observed that several impoverished and

developing nations, namely Vietnam, Bangladesh, Pakistan, and Nigeria, have made significant strides in the realms of poverty alleviation and economic advancement. These commendable outcomes can be predominantly attributed to the inflow of international remittances. Hence, it is a prevalent practice among individuals residing in developing nations to embark on international journeys for the purpose of engaging in employment activities in order to acquire foreign remittances. As an example, it is noteworthy to observe that a considerable number exceeding one million individuals have embarked upon international labour migration from Bangladesh, a nation categorized as a developing country that boasts a substantial population of remittance recipients (Ara, 2021). The observed pattern exhibits a high degree of similarity across numerous nations, such as India, China, in addition to the Philippines, Egypt, Nigeria, Pakistan, Ukraine, and Vietnam, as documented by Torkington (2019) and Qutb (2021).

According to the data presented in Figure 1.1, it is evident that India stands as the foremost recipient of remittances in the year 2022, with a substantial amount of US \$100 billion. Following closely behind is Mexico, with remittances amounting to US \$60.3 billion. China, with a total of US\$51 billion, and the Philippines, with a sum of US\$38 billion, occupied the esteemed positions of third and fourth place, respectively. Among the countries that receive substantial remittances, Egypt stands out with an approximate amount of US \$32.3 billion. Following closely is Pakistan, which receives approximately US \$29 billion. Bangladesh receives around US \$21 billion, while Nigeria receives about US \$20.9 billion. Lastly, Vietnam secures the ninth position with an estimated amount of US \$19 billion. Lastly, it is worth noting that Ukraine has also been the recipient of a substantial sum of US\$18.4 billion in remittances during the year 2022.

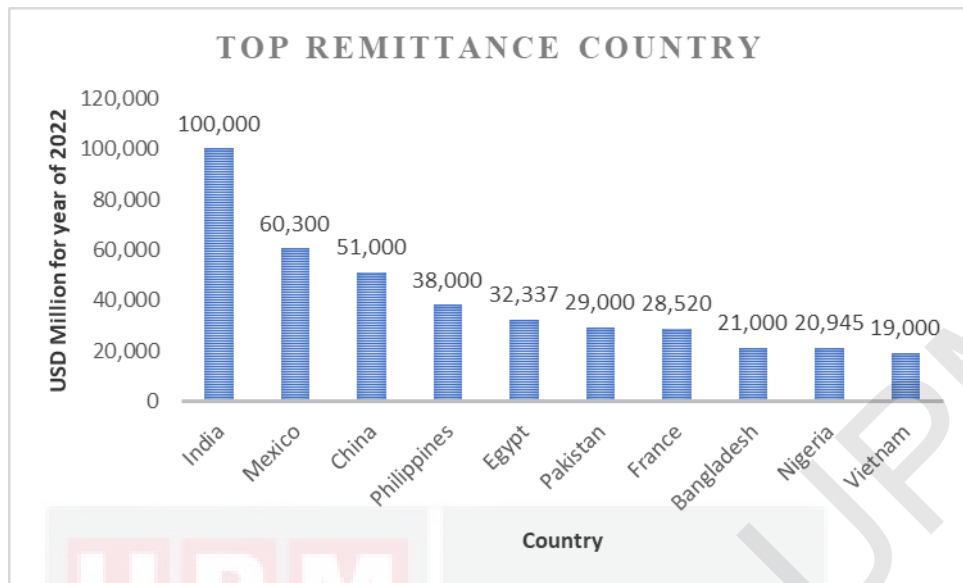


Figure 1.1 : Top Remittance Receivers in 2022
(Source: World Bank, 2022)

Clemens and McKenzie (2018) discussed the matter that revolves around the potential positive impact of remittance on a country's Gross Domestic Product (GDP). Furthermore, Meyer and Shera (2017) asserted that remittance served as a noteworthy source of income for the recipient countries. Nevertheless, the effects of international remittance on nations exhibit considerable variation. It has been duly noted by Das and Sethi (2020) that remittances exerted a favourable influence on the economic growth of the nation of India. In contrast, Qutb (2021) has observed that the remittance flow from migrants to Egypt exhibits a countercyclical pattern, whereby it exerts a detrimental effect on the country's long-term economic growth. In a comparable manner, Sutradhar (2020) expounded upon the adverse impact of overseas remittances on the economic progress of Bangladesh and Pakistan. Irrespective of the consequential implications, the government of Bangladesh regards overseas remittance as a principal means of revenue generation, in addition to serving as an auxiliary source of income for numerous households within the

nation (Rahim & Alam, 2013; Hasan, 2021). As per the scholarly work of Moniruzzaman (2020), it was observed that the impact of overseas remittance on household food security, a pivotal determinant of household well-being in the context of Bangladesh, was of notable significance. Furthermore, Kumar (2019) has documented that overseas remittance exerted a mitigating effect on the poverty rate within the context of Bangladesh. This is evidenced by the discernible disparity in poverty rates between households that receive remittance and those that do not.

Conversely, a body of extant literature i.e., Glytsos, (1993); Loxley & Sackey, (2008); Stahl & Habib, (1989); and Giuliano & RuizArranz, (2009) has presented divergent findings pertaining to the potential impact of remittances on an economy. The existing body of economic literature suggests that remittances exert a favourable impact on investment and domestic consumption growth within the recipient country (Glytsos, 1993; Loxley & Sackey, 2008; Stahl & Habib, 1989; Giuliano & RuizArranz, 2009). According to Adams and Page (2005) delved into a comprehensive analysis of the ramifications of remittance, encompassing both its favourable and unfavourable consequences.

The extant body of literature reveals divergent findings regarding the impact of international remittances. However, it is worth noting that the current body of literature lacks an adequate number of studies that comprehensively examine the relationship between economic growth, real effective exchange rate, and household consumption expenditures. An incorporated and contemporized practical investigation has the potential to mitigate the ongoing debate surrounding the impact of international remittance on economic growth, the real effective

exchange rate, and household consumption expenditures. Hence, this research possesses a valid justification for its undertaking within the specific context of Bangladesh, given its status as one of the prominent nations in terms of receiving remittances, with the government acknowledging overseas remittance as a major contributor to its overall income.

1.3 The Effects of Remittance

The socioeconomic, cultural, and political effects of international migration are numerous. The increasing volume of remittances has piqued the interest of academics and policymakers. Consequently, a thorough comprehension of their impact on a nation's long-term economic growth, exchange rate, and consumption is required.

1.3.1 The Effects of Remittance on Economic Growth

Numerous research studies i.e. Chimhown, Piesse, & Pinder, (2005), De & Ratha, (2012) Zerihun, (2020), Asafo (2021), Iordache, Matei, & Țițan, (2023). have demonstrated that remittances engender a multifaceted impact on the trajectory of economic growth, encompassing both advantageous and detrimental consequences. Furthermore, it has been posited by various research that remittance exhibits a negligible impact on the trajectory of economic growth. Consequently, a definitive response to the inquiry regarding the impact on economic growth remains elusive. The presence of contradictory findings may be attributed to the multifarious mechanisms through which remittance can exert its influence on the trajectory of economic growth. The influence exerted by remittance on the expansion of a nation's economy is contingent upon the prevailing socioeconomic circumstances of said

country. Moreover, the intricate mechanisms through which this impact manifests itself are multifaceted and potentially unique to each specific nation. It is of utmost importance to ascertain the various elements that exert influence on this effect to modify the procedure appropriately. Traditionally, considerable importance is accorded to the economic advancement of the nation. Given the absence of a universally accepted theory or model elucidating the intricate dynamics between remittance and economic growth, the present study endeavours to illuminate the conceivable pathways by which remittance influences long-term growth. Moreover, it seeks to scrutinise how the level of development and the prevalence of remittance within the economy, as two pivotal socioeconomic factors, configure the impact of remittance on long-term growth. In addition, the positive co-trend of remittances and economic growth shown in Figure 1.2 is consistent with this theory. This means that as remittances increase, so does economic growth.

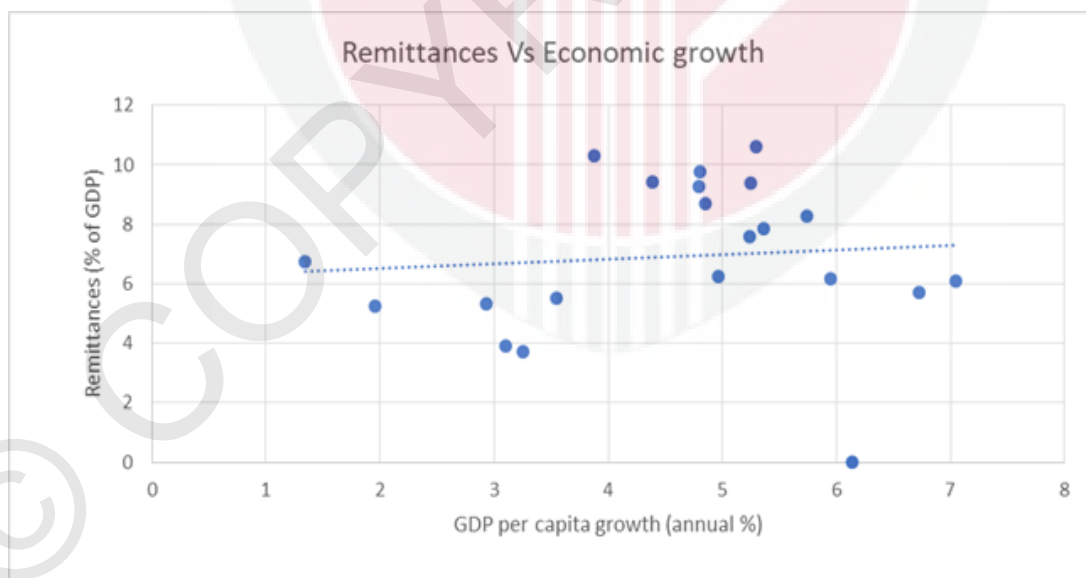


Figure 1.2 : Remittance and Economic Growth

Figure 1.2 depicted the macroeconomic impact of remittance on economic growth.

The scientific literature has elucidated numerous mechanisms by which remittance

has influenced economic growth. By virtue of augmenting the aggregate household income, remittances have been known to make a substantial contribution towards the advancement of economic growth. At the macroeconomic level, the impact of remittances was discerned by means of the multiplier effect stemming from a household's consumption of goods and services. Furthermore, the influence of remittances was observed in the investment in human capital, which in turn augmented labour productivity. The provision of remittance additionally presented an opportunity for the augmentation of asset accumulation, the promotion of self-employment, and the investment in small enterprises.

Remittances, which refer to the transfer of money or goods by migrants to their home countries, can have several mechanisms through which they affect economic growth. Here are some key mechanisms:

Increased household income: Remittances provide recipient households with additional income, which can increase their purchasing power and standard of living (De & Ratha, 2012). This increased income can lead to increased consumption, which stimulates the demand for products and services and drives economic growth.

Poverty reduction: Frequently, remittances flow to lower-income households, assisting in alleviating poverty (Chimhown, Piesse, & Pinder, 2005). As recipient households' incomes increase, they are able to invest in education, healthcare, and productive assets, thereby enhancing their long-term prospects and decreasing the poverty rate. Reducing destitution contributes to economic growth by fostering a more robust and inclusive economy.

Investment and entrepreneurship: Remittances can be a source of capital for beneficiaries, allowing them to invest in entrepreneurial endeavours or establish modest enterprises (Kakhkharov, 2019). This infusion of funds can create employment opportunities, generate income, and contribute to the expansion of the economy.

Financial sector development: The influx of remittances has been observed to have the potential to stimulate the development of financial institutions and services in recipient countries (Giuliano & Ruiz-Arranz, 2009). Banks, microfinance institutions, and other financial intermediaries may emerge or expand in order to facilitate remittance transfers and offer a range of financial products to recipients. A robust financial sector is essential for supporting economic growth, investment, and savings.

Infrastructure development: Remittances may contribute to the financing of infrastructure initiatives in recipient countries. Migrants frequently contribute to community development by investing in infrastructure such as housing, schools, and healthcare facilities. Infrastructure improvements can boost productivity, attract investment, and stimulate economic growth.

Human capital investment: Remittances can support investment in human capital, such as education and skills development (Brown & Poirine, 2005). With additional financial resources, households can send their children to school or gain access to improved educational opportunities. A competent labour force is essential for economic growth because it boosts labour productivity and encourages innovation.

Macroeconomic stability: By providing a consistent and reliable source of foreign exchange, remittances can contribute to macroeconomic stability (Diaz Gonzalez, 2009). This can assist in balancing trade deficits, accumulating foreign exchange reserves, and stabilising the local currency. The presence of macroeconomic stability fosters investment, trade, and economic growth.

Technological diffusion and knowledge transfer: In their host countries, migrants frequently acquire new skills, knowledge, and technologies. When they return to their native countries or maintain close ties, they are able to transmit these skills and knowledge, thereby promoting technological diffusion and innovation. This may result in increased productivity and economic growth. It is essential to recognise that the effects of remittances on economic growth can vary depending on factors such as the magnitude of remittance flows, the efficacy of their use, the economic structure of the recipient country, and the policy environment.

Despite their positive effects, it must be acknowledged that remittances were unable to ensure long-term economic growth or address the structural economic challenges prevalent in underdeveloped nations. These challenges encompassed an unpredictable political climate, volatile economic policies, and the pervasive issue of corruption. The guarantee of economic growth through remittances is contingent upon the preservation of political and economic stability in the recipient country. It is imperative to note that these funds are not allocated towards personal consumption, but rather directed towards investment in productive activities or enterprises. The impact of remittances on a country's economic growth was found to be contingent upon the state of the financial system and the development of financial

markets, in conjunction with the unique economic circumstances prevailing in the recipient nation. Remittances have been found to have the potential to contribute to economic growth by mitigating volatility, as they have demonstrated a relatively low sensitivity to fluctuations in the economy. In their study, Giuliano and Ruiz-Arranz (2005) demonstrated that remittances exhibited a tendency to be procyclical for the recipient nation. Conversely, Frankel (2011) and Bettin et al. (2014) demonstrated that remittances typically displayed an anticyclical nature.

Remittances have served as a catalyst for bolstering domestic expenditure, thereby imposing constraints on the government's capacity to engage in further investment. Furthermore, it should be noted that remittances have served as a significant source of foreign currency, thereby fostering a climate conducive to heightened savings and subsequent economic expansion. If remittances were to generate more demand than the economy could meet, they would also have increased imports, resulting in the production of a wide array of goods and services. In this particular circumstance, the absence of remittances had a detrimental impact on the affluence of households. The impact of remittances on economic growth was found to be somewhat influenced by country-specific factors. The impact of remittances was found to be significantly contingent upon public policy, the regulation of remittance flows, the expansion of the financial market, and the establishment of an environment that fostered the utilization of remittances for productive investment.

1.3.2 Remittance and Financial Development

The relationship between remittances and economic development has been extensively investigated through numerous studies, with the aim of ascertaining the

potential advantages of remittances for the economic development of recipient nations. According to the prevailing convictions, it was posited that remittances could potentially facilitate economic growth. This viewpoint is predicated on the premise that money transmitted through financial institutions may enable recipients to request and acquire additional financial products and services. Due to the irregular nature of remittances, beneficiaries may require financial solutions that permit the secure preservation of these funds, even if the majority are not received through banks. Even greater opportunities exist for households that receive remittances through banks to learn about and pursue additional bank products. However, financial services are inefficient when there is an abundance of asymmetric data, financial market externalities, and imperfect competition, resulting in undesirable outcomes such as bank runs, credit restrictions, and fraud (Stiglitz and Weiss, 1991, 1992). Thus, institutional factors, including legal infrastructure, insolvency, disclosure rules, accounting standards, and prudential regulations, are essential for guaranteeing the success of financial liberalisation and fostering the efficient operation of financial markets (Aivazian, 1998).

If banks are more inclined to lend credit to recipients as a result of the perceived stability of the transfers received from overseas, remittances may improve banking credit. In contrast, while remittances can help recipients overcome liquidity constraints, they may result in a decline in credit demand, thereby impeding the development of the credit market. Furthermore, in the event that banks exhibited hesitancy in extending loans to private entities and instead favoured financing the government or maintaining liquid assets, it is plausible that an augmentation in remittances would not have yielded an upsurge in banking credit allocated to the

private sector. Lastly, it should be noted that remittances might not have yielded an augmentation in bank deposits, particularly in cases where they were expeditiously utilised or when recipients harboured a sense of apprehension towards financial establishments, prompting them to opt for alternative means of preserving their earnings. Henceforth, the theoretical impact of remittances on the proliferation of the financial sector becomes enigmatic, as it may have manifested as either positive, negative, or insignificant.

1.3.3 Remittance and Exchange Rate

The remittances provided by immigrant workers have emerged as a significant and burgeoning source of financial resources for numerous developing nations. These inflows have experienced a notable and swift expansion. The countries that precede Bangladesh as the foremost recipients of remittances are India, Mexico (which has ascended to the second position, displacing China), China, the Philippines, Egypt, and Pakistan. Among the eight nations comprising South Asia, Bangladesh asserts its position as the recipient of the third highest influx of remittances, following India and Pakistan. The remittance inflow to Bangladesh experienced modest growth of merely 2.2 per cent in the year 2021, resulting in a total sum of \$22 billion. In light of the prevailing global economic circumstances, particularly the anticipated deceleration in worldwide growth, it is projected that remittances to Bangladesh will experience a modest increase of 2 per cent in the year 2023, as reported by The Daily Star on Friday, May 13, 2022. A considerable portion of these incoming funds can be attributed to altruistic motives aimed at sustaining the consumption patterns and overall well-being of family members. However, it is worth noting that a portion of these inflows is also driven by pecuniary interests, as individuals exploit the

incentives provided by the recipient nations. As an illustration, it is noteworthy to mention that in the context of India, deposits made by non-residents are subject to elevated interest rates and are granted exemption from income tax obligations. In a similar vein, it is noteworthy to mention that both Pakistan and Bangladesh have implemented various measures aimed at providing incentives to foster the augmentation of remittance inflows.

Adjusted for inflation, the real effective exchange rate (REER) represents the value of a country's currency relative to a portfolio of other currencies. A decline in REER indicates a depreciation in the exchange rate, whereas an increase indicates an appreciation. Based on the information in Table 1.1, Bangladesh's REER declined from 185.50 in 2000 to 104.40 in 2018. The REER decreased significantly from 2018 to 2019 and reached an all-time low of 80.95 in 2020. The Bangladeshi Taka experienced a progressive depreciation from 2000 to 2020, as shown in Figure 1.3. It is essential to note that exchange rates are affected by a number of factors, including international remittances. In the case of Bangladesh, remittances contribute to the country's foreign exchange reserves and support the livelihoods of numerous families. In order to comprehend the relationship between exchange rates and remittance trends, Figure 1.3 was created. It suggests a correlation between increasing remittances and the depreciation of the exchange rate. The observed relationship contradicts the common perception that an increase in remittance inflows enhances the supply of foreign currency, such as U.S. dollars, on the foreign exchange market, leading directly to an appreciation of the recipient countries' exchange rates. Total remittances have gradually increased over the past two decades, reaching a record high of USD 24.7 billion in 2020, despite the Taka REER

not appreciating as predicted by the theory. This observation provides a strong incentive to examine this effect in greater detail.

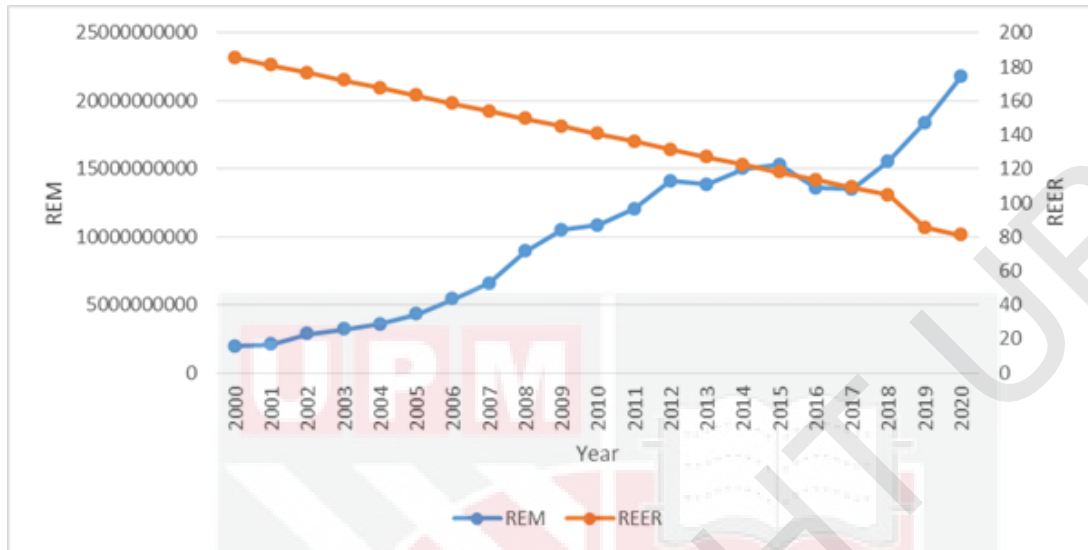


Figure 1.3 : Remittance (US \$ Billion) and Real Effective Exchange Rate (REER)

While the inflow of remittances has the potential to contribute to economic development, it is important to acknowledge that there may be associated costs. There exist, at minimum, two positive aspects of remittance flow that can be deemed non-controversial. These aspects are as follows: To begin with, it is worth noting that a consistent influx of remittances has the potential to mitigate fluctuations in economic output. This observation is supported by several notable studies that have established an inverse relationship between volatility and growth, including Ramey and Ramey (1995), Kroft and Lloyd-Ellis (2002), Hnatkovska and Loayza (2003), IMF (2005), World Bank (2006), and Chami et al (2008). Furthermore, it is worth noting that there exists empirical evidence supporting the notion that remittances play a pivotal role in enhancing the development of the financial sector. This is primarily achieved through the alleviation of credit constraints, thereby facilitating

investments. This assertion is supported by Aggarwal et al. (2006), Gupta, Pattillo, and Wagh (2007), as well as Giuliano and Ruiz-Arranz (2009). This study, however, examined the adverse ramifications that remittances could engender by virtue of their impact on the real exchange rate. It has been observed that the actual exchange rate has the potential to appreciate in response to an increase in remittance inflows. This finding is supported by Acosta, Lartey, and Mandelman (2007), Amuedo-Dorantes and Pozo (2004), Lopez, Molina, and Bussolo (2007), as well as Lartey, Mandelman, and Acosta (2008).

The remittances that were transmitted by migrant labourers to their countries of origin could be likened to a capital inflow that resembled the phenomenon that was examined in the Dutch Disease theory. This theory assessed the influence of the discovery of novel resources, akin to an inflow of capital, on the real exchange rate and the international competitiveness of a nation (Corden and Neary, 1982). The receipt of a significant influx of remittances in relation to the scale of the recipient economy could have led to certain unfavourable consequences, including the possibility of an appreciation of the real exchange rate and a decrease in competitiveness within the tradable sector of the economy.

In the context of a small open economy, where an increase in remittances resembles a sustained increase in household non-labour income, the resulting impact is observed as expenditure effects in both the tradable and non-tradable goods sectors. The phenomenon known as the spending effect can be comprehended as a direct outcome of the increase in disposable income that followed the influx of remittances. This, in turn, resulted in a boost in aggregate demand within the economy, assuming

a positive income elasticity. The price of non-tradable goods was influenced by the limited resources within the economy, resulting in an increase in price when there was excess demand. Conversely, the price of tradable goods, which was determined by the international market, remained unaffected by the increased demand. The aforementioned discrepancy resulted in an increase in the real exchange rate. The phenomenon of an augmented influx of remittances has also engendered a consequential effect on the allocation of resources. The relative price of non-tradable goods experienced an increase, resulting in a heightened level of profitability in the production of these goods in comparison to the tradable sector. As a result, the expansion of production in the non-tradable sector resulted in a corresponding increase in the demand for factors of production. In view of the heightened factor prices that were observed in the non-tradable sector, a significant reassignment of resources from the tradable goods sector to the non-tradable goods sector took place, resulting in an increase in real wages and other factor costs within the tradable sector. As a result of the aforementioned implications on expenditure and resource allocation, it was found that the influx of workers' remittances had the potential to undermine the competitiveness of the sector engaged in the trade of goods, thereby leading to an appreciation of the real exchange rate.

The long-term ramifications of remittance inflows and real exchange rates could manifest disparities when juxtaposed with their short-term consequences. The potential impact of remittance flows on the real exchange rate and a nation's competitiveness was contingent upon the extent to which these flows contributed to capital accumulation, thereby bolstering long-term savings and investments. This phenomenon, in its turn, had the potential to enhance the production of both tradable

and non-tradable goods, albeit with varying degrees of relative increase across different countries, contingent upon the specific economic structures in place. Despite the existence of a substantial corpus of contemporary empirical literature, the examination of the immediate effects of remittances on the real exchange rate has been the primary focus. However, a scarcity of studies is evident in the investigation of the long-term association between these variables. The aim of this study was to investigate the persistent correlation between the inflow of remittances and the real exchange rate within a panel of economies that have received substantial remittance inflows.

The potential for an appreciation in the real exchange rate, commonly known as the 'Dutch disease' phenomenon, was present due to the influx of inward remittances, similar to other forms of international transfer. According to Lundahl (1985), the arrival of remittances led to an increase in expenditure and the creation of an excess demand in the non-tradable goods sector. As a result, the prices of non-tradable goods experienced an upward trend. The appreciation of the real exchange rate was observed when the domestic currency price index of non-tradable goods underwent an increase, while the prices of tradable goods were determined in the global market. The aforementioned phenomenon resulted in a reduction in the real effective exchange rate (REER). The utilization of the tradable-to-non-tradable output ratio and sectorial output shares (agricultural, manufacturing, and services) as dependent variables offered an alternative methodology for the empirical examination of the Dutch disease effects of remittances. This approach sought to investigate whether the impacts of remittances on spending and resource movement differed (Lartey, 2012).

1.3.4 Remittance and Consumption Expenditures

The rate of rural poverty reduction experienced an accelerated trend during the previous decade, aligning with the concurrent occurrence of a vigorous economic expansion and a stable distribution of consumer expenditure (Osmani and Latif, 2013). Remittances, as evidenced by Masuduzzaman (2014), exerted a statistically significant impact not only on poverty but also on financial development. Haider et al. (2016) attributed the influence of remittances to various aspects, including food and total consumer expenditure, as well as savings. Khan and Islam (2013) have demonstrated that an augmentation of one percentage point in the inflow of remittances resulted in a subsequent increase in inflation by 2.48 percentage points over a period of time, while exhibiting minimal impact in the immediate term. In conjunction with these effects, it is noteworthy to mention that remittances have exerted a substantial influence on the overall welfare of households in Bangladesh, as evidenced by the studies conducted by Ahmed et al. (2018) and Wadood & Hossain (2016).

The purpose of remittance utilisation has been a subject of diverse viewpoints within the literature. The first perspective posited that remittances were perceived in a manner akin to other sources of income, thus predominantly allocated towards consumption. Conversely, the second perspective contended that remittances were treated distinctively, often being channelled towards household savings. Nevertheless, it was observed by Lowell and Garza (2000) that the utilisation of remittances was subject to the hierarchy of needs. In the event that the fundamental requirements of the household were not met, remittances would have been allocated towards day-to-day expenses. Henceforth, it can be postulated that households would

persist in the consumption of remittances until such time as developing nations attained a specific threshold of prosperity (Straubhaar & Vadean, 2006).

Based on the evidence derived from impoverished nations that have received remittances, it can be observed that a significant portion of said remittances was commonly allocated towards the acquisition of essential consumption goods. In their seminal study on the impact of remittances on Asian economies, Stahl and Arnold (1986) discovered that a significant portion of remittances was allocated towards immediate consumption. This encompassed essential as well as discretionary expenditures, with the latter often being directed towards imported commodities, housing development, real estate acquisitions, and the settlement of debts. Stahl and Habib (1989) reported analogous findings in their investigation of the Bangladesh economy, wherein they demonstrated that such expenditure exhibited a favourable multiplier effect on development. As per the findings of Oberai and Singh (1980), it was observed that Indian Punjabi families expended over three-quarters of their remittance on sustenance and attire. Durand et al. (1996) discerned a comparable pattern in the case of Mexico. In his work, Glytsos (1993) unveiled findings that were akin in nature to those observed in Greece. Despite the fact that remittances were utilised for consumption, it is noteworthy that all of these studies have indicated their indirect facilitation of economic growth. The heightened consumption engendered a heightened demand for goods and services, consequently augmenting output and thereby fostering economic growth.

In his analysis of the macroeconomic consequences of international migration, Saith (1989) observed that the national data records of several nations indicated a

negligible impact of remittances on the macroeconomic savings and investment rate. In economies that are less established, the nature of investment differs from that observed in prosperous nations. In a multitude of developing nations, the acquisition of land and housing constituted a substantial portion of overall investment. In certain scholarly investigations, the classification of land and real estate acquisitions has been delineated as capital investments, while alternative perspectives have designated them as non-traded consumption. Hence, it has been observed through cross-national research that the vast majority of remittances received by impoverished nations were either promptly expended or allocated towards real estate investments.

Nevertheless, it should be noted that the predominant allocation of remittances was directed towards the acquisition of sustenance and garments, with a subsequent focus on the enhancement of residential infrastructure and property amelioration. A notable proportion of remittances was also allocated towards debt settlement and other societal obligations, whereas more than 4% was directly channelled into entrepreneurial endeavours.

1.4 The People's Republic of Bangladesh

Bangladesh was identified as the seventh most populous country, boasting a population of approximately 165 million individuals. It was observed that the entity in question ranked among the most prominent beneficiaries of remittances on a global scale (IOM, 2020). The contribution of remittances to Bangladesh's GDP experienced a notable surge in recent years, culminating in an approximate value of \$15.5 billion in 2018. This figure represents a substantial 14.79 percent escalation

compared to the preceding year of 2017 (Rooney, 2020). Similarly, the 2019 fiscal year (FY) generated a record \$16.4 billion in foreign remittances, a 9.8 per cent increase over FY 2018. (World Bank, 2019). Contrary to the forecasts of many analysts, foreign remittances increased by 18.4% to \$21.7 billion in 2020 due to the COVID-19 epidemic (Financial Express, 2020). According to the World Bank (2019), Bangladesh's rising inflow of remittances is anticipated to persist over the coming years. As a consequence, the government of Bangladesh has designated remittances as one of the country's most important economic growth generators (Financial Express, 2021).

Table 1.1 and Figure 1.2 illustrate a number of macroeconomic indicators for Bangladesh, including economic growth, poverty, remittance, financial development, exchange rate, and consumption expenditure from 2000 to 2020. According to Table 1.1, Bangladesh experienced moderate economic growth between 2000 and 2004. Nevertheless, the nation experienced swift economic growth from 2005 to 2019, with the exception of a decline in 2009. This 2009 downturn is related to the US subprime mortgage crisis, which precipitated a global economic recession. Thus, the contribution of the remittances on the economic growth, exchange rate, household consumption expenditure remains inconclusive.

Table 1.1 : Macroeconomic Indicators of Bangladesh

Year	Economic Growth (%)	Poverty Headcount Ratio	Remittance (% of GDP)	Financial Development (% of GDP)	Real effective exchange rate	Consumption Expenditure (% of GDP)
2000	3.26	91.50	3.69	21.78	185.50	79.98
2001	3.11	91.04	3.90	24.18	181.00	79.37
2002	1.96	90.58	5.22	26.21	176.50	79.16
2003	2.94	90.12	5.31	26.04	172.00	79.81
2004	3.55	89.66	5.50	27.91	167.50	78.81
2005	4.97	89.20	6.21	29.34	163.00	78.94
2006	5.24	88.88	7.56	31.17	158.50	78.56
2007	5.75	88.56	8.24	32.04	154.00	79.25
2008	4.81	88.24	9.76	34.04	149.50	80.81
2009	3.88	87.92	10.27	36.19	145.00	79.67
2010	4.39	87.60	9.41	40.96	140.50	79.19
2011	5.25	87.03	9.38	42.47	136.00	79.38
2012	5.30	86.47	10.59	43.00	131.50	78.78
2013	4.80	85.90	9.25	41.79	127.00	77.96
2014	4.86	85.33	8.67	43.74	122.50	77.91
2015	5.37	84.77	7.84	44.41	118.00	77.84
2016	5.95	84.20	6.13	45.28	113.50	75.02
2017	6.14	83.63	5.41	47.58	109.00	74.67
2018	6.73	83.07	5.68	46.94	104.50	77.17
2019	7.05	82.50	6.07	45.31	85.32	75.25
2020	1.35	81.93	6.71	45.22	80.95	74.87

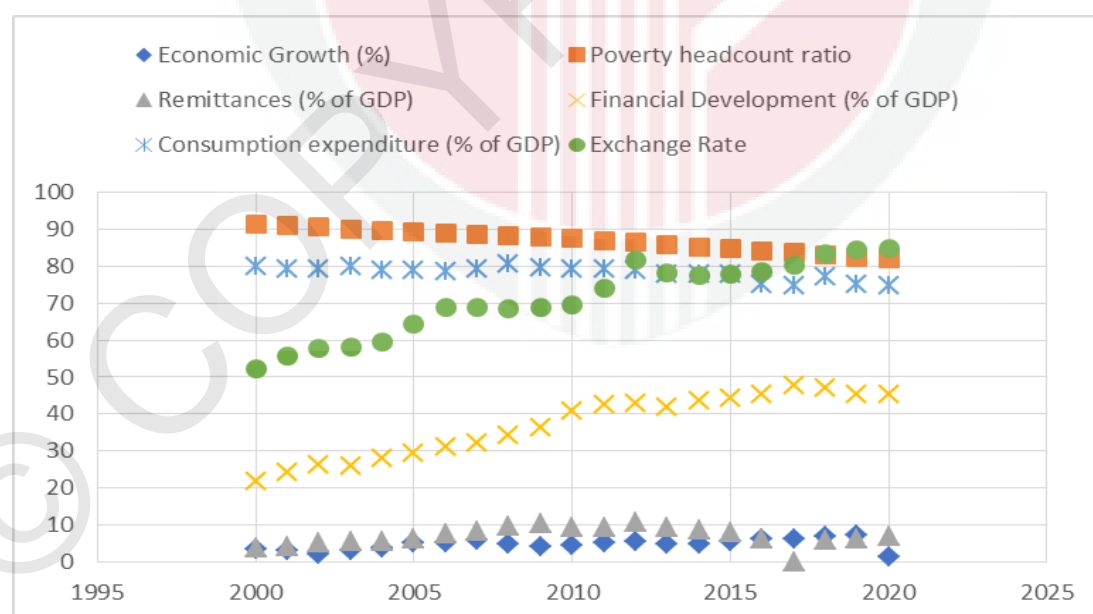


Figure 1.4 : Some Economic Indicators of Bangladesh
(Source: World Bank Database 2020)

Regarding remittance in Table 1.1, the remittance inflow as a proportion of GDP increased steadily from 2000 to 2009. It began at 3.69 per cent in 2000 and rose to 10.29 per cent in 2009. This significant increase indicated an increase in remittance inflows during this period. In 2010, the remittance inflow peaked at 10.59% of the gross domestic product. However, the percentage of remittances fluctuated after 2010 but remained relatively high compared to earlier years. These fluctuations may be influenced by global economic conditions, economic slowdowns in recipient nations, and alterations in remittance policies. From 2015 to 2020, the proportion of remittances to the gross domestic product decreased. It fell from 7.84 per cent in 2015 to 6.71 per cent in 2020. This decline could be attributed to factors including economic difficulties in the Gulf countries (primary remittance sources for Bangladesh) as a result of declining crude prices, employment losses during the pandemic, and a global economic downturn. Overall, the table reveals a fluctuating trend over the period under consideration.

Numerous studies have indicated that the expansion of the financial sector played a pivotal role in fostering economic growth. The aforementioned phenomenon facilitated economic development through the accumulation of capital and progress in technology. This was achieved by mobilizing and aggregating funds, providing investment information, facilitating and encouraging the inflow of foreign capital, and improving the allocation of capital resources. Over extended periods of time, it has been observed that nations endowed with more sophisticated financial systems have undergone accelerated economic growth. A substantial body of evidence has indicated a causal relationship between these two phenomena, thereby refuting the notion that financial development is merely an outcome of economic progress;

rather, it emerges as a catalyst for such advancement. Furthermore, poverty and inequality were diminished through the augmentation of impoverished and vulnerable individuals' access to financial resources. This was achieved by facilitating risk management, thereby mitigating their susceptibility to disruptions. Additionally, investment and productivity were enhanced, leading to the generation of augmented revenue. As shown in Table 1.1, Bangladesh's financial development accelerated during the research period. This demonstrates the dynamic evolution and adaptation of the financial sector over time.

Since the early 1970s, Bangladesh has maintained an adjustable fixed exchange rate system. The exchange rate of the taka, which supplanted the Pakistani rupee as Bangladesh's currency in January 1972, was set at $\text{£}1 = 18.9677$ taka per pound sterling. In 1979, the government-linked the taka to a basket of real currencies and used the British Pound as an intermediary currency. Since 1983, the US dollar has supplanted the British Pound as the inter-banking currency. This exchange rate arrangement lasted through May of 2003. From the end of May 2003 to the present day, Bangladesh has utilized a floating exchange rate system in an effort to increase the efficacy of monetary policy and enhance its integration into the global capital market. Under this system, banks are free to set their own rates for inter-bank and customer transactions, and the Bangladesh Bank may buy and sell US dollars as needed to maintain market stability.

According to Table 1.1, consumer expenditure accounts for roughly three-quarters of Bangladesh's gross domestic product. It ranged between 74% and 80% of GDP between 2000 and 2020, making it the largest component of GDP. In Table 1.1,

consumption spending as a percentage of GDP increased until 2008 when it began to decline. As shown in Table 1.1, the trajectory of consumption and remittances in Bangladesh for the period 2000-2020 was essentially identical. This indicates that an increase in remittances leads to a rise in consumption. Regarding the variables, a period-to-period variation has been observed in remittances and consumer expenditure. The most plausible explanation was the fluctuating expenditure pattern over the past two decades. Theoretically, there should be a positive relationship between remittances and consumption due to the fact that the greater the inflow of money as remittances, the higher the level of domestic income, thus, the higher the rate of consumption, and vice versa (Sutradhar, 2020).

1.5 Problem Statement

Bangladesh ranks among the top three recipients of remittances in terms of gross domestic product (Rooney, 2019). Numerous researchers have emphasized the importance of remittances to socioeconomic growth. Numerous studies have independently examined the effects of international remittances on economic growth, the real effective exchange rate, and household consumption expenditures. Consequently, the results of these investigations diverge.

In Bangladesh, remittances play a dual role in economic growth, both directly and indirectly through financial development. On one hand, remittances can stimulate economic growth by increasing household income, reducing poverty, and fuelling consumption and investment. On the other hand, they can also pose challenges such as inflationary pressures from increased demand for non-tradable commodities and potential decreases in labour incentives. Financial development is crucial for

harnessing the potential benefits of remittances. When recipient households deposit remittances in formal financial institutions and access loanable funds for private sector investment, remittances can contribute to economic growth (Chowdhury, 2011). Moreover, the widespread adoption of mobile financial services, such as bKash, has revolutionized financial inclusion in Bangladesh. These services provide easy and affordable access to financial services, enabling more efficient remittance transfers and utilization. The convenience and accessibility of mobile financial services can enhance the effective utilization of remittances by facilitating better financial intermediation and investment opportunities. However, the effective utilization of remittances for productive investments depends on the financial literacy and awareness of investment opportunities among recipients. Thus, considering the moderating role of financial development in the nexus of remittances on economic growth in Bangladesh is crucial for policy formulation and sustainable economic growth.

Secondly, Remittances significantly influence the exchange rate dynamics in recipient countries like Bangladesh. While remittances can stabilize foreign exchange reserves and improve exchange rate, they can also introduce volatility due to fluctuating inflows and policy environments. In Bangladesh, a rise in remittance inflows, reaching \$21.61 billion in FY2023 (TBS Report, 2024), has shown a mixed impact on exchange rates. This influx increases the supply of dollars, leading to exchange rate appreciation. Consequently, the appreciation makes imported goods cheaper and domestically produced goods more expensive. This shift affects the balance between the tradable and non-tradable sectors of the economy. Tradable goods, which face international competition and are subject to exchange rate

fluctuations, include manufactured products and agricultural exports. The appreciation of the exchange rate due to remittance inflows makes these goods less competitive, potentially hampering their growth and contribution to gross output.

However, empirical studies on this impact yield conflicting findings. Some studies, like Bakardzhieva et al. (2010), suggest a real appreciation of the exchange rate due to remittances, while others like Barajas et al. (2011) present evidence of depreciation. The prevailing methodologies using only the real effective exchange rate as an indicator have limitations. They often overlook factors like volatility in commodity export prices, which are crucial for accurate assessment. Moreover, the Bangladesh case highlights discrepancies in sectoral performance between tradable manufacturing and less tradable services sectors, raising questions about the adherence to the behavioral equilibrium exchange rate theory. Thus, understanding the nuanced impact of remittances on exchange rates in Bangladesh, considering both supply and demand channels and sectoral dynamics, becomes crucial for policy formulation and sustainable economic growth.

Finally, the role of remittances in shaping household consumption patterns in Bangladesh has garnered considerable attention, but the discourse remains fragmented due to conflicting perspectives in the literature. One school of thought, as highlighted by Adams & Cuecuecha (2008) and Edwards and Ureta (2003), subscribes to the Permanent Income Hypothesis. This viewpoint posits that remittances are transient income streams primarily directed towards long-term investments like education and healthcare. In contrast, the Compensatory Income Perspective, endorsed by studies such as Castaldo and Reilly (2007) and Raihan et

al. (2009), contends that remittances are predominantly channeled into consumption goods and asset acquisition. Further complicating the landscape is the perspective presented by Chami et al. (2005), which treats remittances as an ordinary income source. According to this view, remittance inflows do not significantly alter household spending behaviors, making their economic impact akin to any other income source.

While existing literature offers insights into the broad expenditure trends associated with remittances, a detailed exploration of marginal expenditure patterns is conspicuously absent, particularly when comparing households that receive remittances to those that don't. This gap is particularly pertinent in the context of Bangladesh, where household consumption plays a pivotal role in driving economic growth, influencing investor confidence, and shaping consumption and savings behaviors. Understanding these nuances is crucial for policymakers aiming to formulate effective strategies to harness the potential benefits of remittances for sustainable economic development in Bangladesh.

1.6 Research Questions

The research questions of the study have been outlined below:

- (i) Does financial development moderate the relationship between remittances and economic growth?
- (ii) Is there any relationship between remittances, exchange rate and tradable goods production.
- (iii) Is there any relationship between remittances and household consumption expenditures.

1.7 Research Objectives

The primary aims of this study were to examine the potential impact of remittances on economic growth, the real effective exchange rate, and household consumption expenditures within the time frame spanning from 1976 to 2020 in the context of Bangladesh. The sub-objectives were as follows:

- (i) To examine whether financial development is moderating the relationship between remittances and economic growth.
- (ii) To determine the impact of remittances on exchange rate and tradable goods production.
- (iii) To examine whether there is any effect of remittances on household consumption expenditures.

1.8 Research Hypotheses

Hypothesis 1:

H₀: Financial development does not moderate the relationship between remittances and economic growth.

H₁: Financial development moderates the relationship between remittances and economic growth.

Hypothesis 2:

H₀: Remittances have no impact on exchange rate and tradable goods production.

H₁: Remittances have impact on exchange rate and tradable goods production.

Hypothesis 3:

H₀: Remittances have no effect on household consumption expenditures.

H₁: Remittances have effect on household consumption expenditures.

1.9 Significance of the Study

This study was deemed significant due to its industrial, practical, and theoretical contributions. The study aimed to enhance the existing comprehension pertaining to the impact of overseas remittance on economic growth, exchange rate, and household consumption expenditures, thereby mitigating the existing contradictions surrounding this subject matter. Previous studies have duly recognised the substantial and enduring nature of international remittance as a vital income stream for developing nations. However, divergent viewpoints exist concerning the significance of remittance. Hence, this study would have been of great significance in further investigating the impact of overseas remittances on the economic growth, real effective exchange rate, and household consumption expenditures of a developing nation, specifically Bangladesh. The existing body of literature shall be augmented, and subsequent investigations may be undertaken by scholars and researchers to corroborate the obtained results.

This study aimed to garner increased attention from researchers and policymakers regarding the short-term and long-term impacts of overseas remittances on the economic growth of the country. This shall ultimately contribute to the advancement of significant determinations.

Furthermore, this study has significance in shedding light to the limited empirical evidence in the existing literature regarding the relationship between workers' remittances and exchange rates in South Asian countries, specifically Bangladesh. The aim is to revisit and further investigate this issue. In contrast to previous studies, this particular investigation incorporates the utilisation of an external real effective

exchange rate metric. Additionally, it delves into the categorization of the production sector in Bangladesh, distinguishing between entities engaged in the production of traded and non-traded goods. Traditionally, the real exchange rate has been employed as it functions as a comprehensive indicator for the existence of Dutch disease effects. Nevertheless, the impact of remittances on both tradable and non-tradable output could potentially exhibit dissimilarities. The introduction of sectorial output can be regarded as a more precise method to capture the exclusively "real" effects of the Dutch disease Phenomenon subsequent to an influx of remittances.

The study's findings also hold significance for policymakers at both local (Bangladesh) and international levels, including organisations such as the United Nations (UN), as they inform decision-making regarding remittance and migration. Previous studies primarily focused on elucidating the influence of remittances on households' overall expenditure patterns while offering limited insights into the specific nuances of marginal spending patterns. Hence, an aspect frequently overlooked within the context of Bangladesh pertains to the utilisation of remittances and the potential disparities in spending patterns between households receiving remittances and those that do not. The distinction or resemblance necessitates further scrutiny. In this regard, the present study would have constituted a substantial contribution to policymakers' comprehension of the impact of overseas remittance on spending patterns. Seshan et al. (2017) have posited that the spending behaviour of households exerts a substantial impact on the economy through various channels. These include the stimulation of economic growth, the cultivation of investor confidence, and the determination of consumption and savings patterns. Hence, a comprehensive analysis of the impact of international remittances on household

consumption expenditures in Bangladesh would furnish contemporary policymakers with enhanced insights to facilitate more informed decision-making.

1.10 Structure of the Thesis

The present dissertation has been divided into five distinct chapters. In Chapter One, the scholarly discourse revolved around the contextualization of the study, the meticulous delineation of the issue at hand, the elucidation of the research objectives, the explication of the study's significance, and culminated with a comprehensive summary of the chapter's contents. The second chapter of the thesis was dedicated to a meticulous analysis of the theoretical and practical literature concerning the influence of remittance on economic growth, real effective exchange rate, and household consumption expenditures. In Chapter Three, the mathematical derivations and discussion of three distinct theoretical frameworks were presented, which served as the foundation for the practical estimations conducted in this study. The proceedings commenced with a scholarly exposition and subsequent discourse on the econometric model specifications, accompanied by a comprehensive elucidation of the data sources and their inherent attributes that were employed in the analytical estimation of the study. Chapter Four was dedicated to the provision and examination of the study's conclusions and findings. In this chapter, a thorough analysis was conducted to shed light on the outcomes derived from the study. On the other hand, Chapter Five served the purpose of summarising, concluding, and engaging in a comprehensive discussion regarding the policy implications that emerged from the study. This chapter aimed to encapsulate the essence of the study's implications for policy-making and decision-making processes. The limitations of

the study were duly deliberated upon, and the chapter culminated with a proposition outlining potential avenues for future research endeavours.

1.11 Definition of the Key Terms

Remittances: The amount of cash transfers made by overseas working migrants to their country of origin, known as worker's remittances, constituted a substantial source of foreign exchange and exerted a notable influence on the long-term economic performance of the receiving nation.

Economic Growth: It is defined that economic growth is an indispensable indicator of the entire economic performance and progress of a country.

Exchange Rate: An exchange rate is a rate at which one currency will be exchanged for another currency and affects trade and the movement of money between countries.

Household Consumption Expenditures: Household consumption expenditures encompass the expenditure for food, housing, consumer goods and durables, education, health, nutritional status, and various others.

Financial Development: Financial development encompasses the enhancement of the mobilization and pooling of savings to facilitate the exchange of goods and services. It also involves the augmentation of information pertaining to potential investments, as well as the monitoring of said investments through the

implementation of corporate governance. Additionally, the management of risk is achieved through trading and diversification (Levine, 2005).

1.12 Chapter Summary

The present chapter encompassed a discussion of the background of the research, subsequently followed by the articulation of the problem statement. Subsequently, the chapter expounded upon the research objectives, which were subsequently followed by an elucidation of the study's significance. This entailed a meticulous articulation of the rationales that underscored the imperative nature of conducting this study. Furthermore, the chapter was concluded with a succinct exposition concerning the proposed framework of the thesis.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter has provided a comprehensive review of the pertinent literature pertaining to the impact of overseas remittance on economic growth, exchange rate, and household consumption expenditures. As per Black's (1994) assertion, it was deemed necessary for researchers to incorporate arguments derived from contemporary literature pertaining to their respective research areas or topics. This approach aimed to facilitate a more comprehensive comprehension of the research domain and guide readers in understanding the existing body of work on the subject matter (Hart, 2001; Webster & Watson, 2002). Hence, this chapter encompassed discussions pertaining to the extant theoretical and practical literature concerning the impact of remittance on economic growth, exchange rate, and household consumption expenditures within the context of Bangladesh. The chapter was meticulously arranged in a specific sequence. Section 2.2 expounded upon the existing body of literature pertaining to the enduring impact of workers' remittance on the trajectory of economic growth. Section 2.3 encompassed the scholarly discourse pertaining to the impact of remittance on exchange rates. Section 2.4 provided valuable insights into the existing literature pertaining to household consumption expenditures. Section 2.5 expounded upon the gaps present within the existing body of scholarly work.

2.2 The Impact of Remittances on Economic Growth

2.2.1 Theoretical Literature Review

The neoclassical migration theory, rooted in economic principles, seeks to explain labour migration's patterns and impacts on economic development. The foundational works in this theory, such as Hicks, J.R. (1963), Lewis, W.A. (1954), Harris, J.R. & Todaro, M.P (1970), Stark, O., & Bloom, D.E. (1985), emphasize wage disparities as the primary motivator for migration. Hicks (1963) conceptualized migration as a rational choice based on full labour market information, without considering unemployment or relocation costs. Similarly, Lewis (1954) highlighted migration as a response to differences in wage levels between rural and urban areas, suggesting migration as a natural part of the development process. Harris and Todaro (1970) extended this by introducing the idea of expected wages, accounting for the probability of employment in destination countries. These theories collectively underscore the role of economic factors, especially wage differentials, in driving migration decisions. Stark and Bloom (1985) further this discussion by introducing the concept that remittances can act as an incentive for migration, essentially serving as an investment in human capital. Their work suggests that remittances can enhance the well-being and productivity of migrants and their families, thereby potentially influencing economic growth both at the micro and macro levels.

The phenomenon of labour migration can be understood as the movement of individuals from nations characterised by lower wages to those characterised by relatively higher wages, primarily driven by the existence of wage disparities between countries (Kurekova, 2011; Grigorescu, 2024). The assistance provided by

remittances in reducing poverty and promoting economic growth has been acknowledged by the World Bank and the Asian Development Bank in 2018 (World Bank, 2019) and many recent studies such as (Adeseye, 2021), (Oladipo, 2020), Khan, (2024), Chowdhury, Dhar & Gazi, (2023).

On the contrary, a heightened inclination to acquire remittances from far-flung nations posed a potential threat to growth, as it engendered the loss of numerous skilled personnel, a phenomenon commonly known as brain drain (Topxhiu & Krasniqi, 2017) that requires significant attention to understand whether it applies in the developing countries contexts or not specially in the context of Bangladesh. According to the neoclassical growth theory, it has been posited that the occurrence of human capital losses could potentially exert an adverse impact on the trajectory of economic growth (Dutta & Saikia, 2024). Furthermore, in the case of nations that had already attained economic and financial progress alongside a stable credit market, it was observed that remittance exhibited a positive correlation with the advancement of their financial sector (Chowdhury, et al., 2023; Khan, 2024; Dutta & Saikia, 2024). Therefore, the neoclassical migration theory has been most suitable theories to explore the impact of remittances on the economic growth.

Although, international migration and workers' remittances are a twin phenomenon, there seem to be a few theoretical analyses conducted, particularly on the impact of workers' remittances on economic growth in migrants' source countries when compared to the existing, massive theoretical literature on growth effect of international migration. However, some studies have incorporated remittances as a feedback effect in analysing the link between migration and economic growth and

proposed many channels through which workers' remittances might have an impact on economic performance of the receiving countries.

Along this line of thought Lundahl (1985) employed a model of two factor - labour and capital - and two commodity - traded and non-traded goods - to investigate the impact of international migration and remittances on real income of the migrants' source countries. The model assumed migration and remittances take place and movement of capital is fixed. In addition, wages are assumed to be higher abroad than what is obtainable in migrants' home country and immigration is controlled.

Lundahl (1985) showed that emigration of labour will increase the output of traded goods at the expense of non-traded goods if the former is capital intensive. Owing to excess demand for non-traded goods which is further reinforced by the inflows of remittances there will be a rise in the relative price of non-traded goods. Consequently, this increases the real income of non-migrants as wages increase, but reduces the real income of capitalists. Therefore, the net effect on economic growth will depend on the extent of emigration, remittances and marginal propensity to consume non-traded goods, the increase of which might negate the external competitiveness as production in traded goods declines.

In the same way, a classic work by Djajic (1986) examined the role of remittances in determining the effect of migration on welfare of non-migrants in a small open economy producing both traded and non-traded goods. He demonstrated that large inflows of remittances could give rise to increased demand for non-traded output that results in an increase in the relative prices and wages accruing to labour, thereby

leading to improvement in the welfare of both remittance and non-remittance receiving households. He further noted that when the inflows of workers' remittances surpass certain threshold level equivalent to the value of output the emigrants would have produced in their country of origin, migration that generates remittances improve terms of trade and growth performance in source countries.

Similarly, Quibria (1997) in a simple two-factor, two-commodity, general equilibrium model with traded and non-traded goods showed that when inflows of remittances per migrant exceed the minimum wage rate available for labour in the source-country, emigration will lead to an increase in the level of economic growth in the remittance receiving countries.

In a general equilibrium framework, Kugler (2006) investigated the impact of workers' remittances on economic growth by looking at their effects on human capital formation and labour market performance of the receiving countries. His model assumed imperfect labour and credit markets that respectively gave rise to intense job search and credit constraints. Within the outline of his model, he argued that when human capital is supposed to be the engine of economic growth, under certain conditions workers' remittances have the potential to relax households' liquidity constraints and enhance investment in education that boost the overall supply of human capital and generate spill-over effects of job opportunities that reduces unemployment rate in remittance receiving countries.

By the same token, in a general equilibrium framework Guha (2013) derived a model of macroeconomic effects of remittances. His model employed both static and

dynamic components to explore the various micro-level transmission mechanisms through which remittances impact on the economy and link them up with a macro-level adjustment. The model hypothesises a small open economy with two sectors: tradable and non-tradable. While production in the tradable sector uses both labour and capital, the non-tradable sector employs labour as the only factor of production. Moreover, households are assumed to receive wages, rental from capital and remittances and also decide consumption level and trade-off labour with leisure.

In this framework, Guha (2013) demonstrated that inflows of exogenous remittances increase consumption demands in both sectors of the economy, which raises the relative price of non-tradable sector and reduce aggregate labour supply as remittance recipients substitute labour with leisure. The increase in the relative price of non-tradable sector further creates factor reallocation that drains labour away from the tradable sector leading to its contraction. Consequently, a diminution of the tradable sector leads to loss of external competitiveness and lower economic growth.

Nonetheless, a study by Drinkwater et al. (2006) developed a dynamic labour matching model with capital and credit constraints to analyse the connection between international remittances and deficiencies in the labour and capital markets of migrants' origin countries. Their model assumed migration of certain workers who remit their earnings to relatives back home for consumption, savings and investment reasons. In addition, investors are assumed to face certain limitations in raising optimal capital. The authors opined that in this scenario, remittances have two conflicting effects on labour market performance of the remittance-receiving countries. On the one hand, inflows of remittances have the potential to reinforce

unemployment among non-migrants' by prolonging job-search particularly when employers' bargaining power is lower compared to the migrants' wage limit. On the other hand, international remittances made available for investment can ease credit constraints encountered by firms and generate capital stocks and employment opportunities that reduces unemployment rate in migrants' origin countries.

In a two-period model, Naiditch and Vranceanu (2009) examined the impact of remittances on recipients' work efforts. In their model, migrants are altruistic and information between migrants and remittance-recipients on economic conditions is asymmetric. The authors showed that when optimal labour supply depends on labour wages, remittances and trade-off between leisure and consumption occur, transfer of remittances can lead to moral hazard problems. Remittance-recipients who are economically better-off might pretend to be in poor economic conditions by decreasing their hours of work to increase leisure in order to manoeuvre the migrants' expectations and obtain more remittances. This may result in a reduction in the aggregate labour supply of the remittance-receiving developing countries and hinders economic growth.

While these adjustments might cause growth enhancing activities through their impact on level of investments and output growth, they are also accompanied by growth destabilising effects when price adjustments in favour of non-traded sector through real appreciation erodes the competitiveness of the economy leading to higher importation and lower exports. This growth depressing impact might be further reinforced if inflows of workers' remittances fuel inflation and increase households' desire for leisure. By and large, inflows of workers remittance are

theoretically associated with both growth enhancing and negating effects. Whether the growth enhancing impacts outweigh the growth depressing effects remain crucially an empirical question. Therefore, in the following section global empirical evidences on the direct effects of workers' remittances on economic growth have been reviewed and presented.

2.2.2 Empirical Literature Review

In numerous nations, remittances have exceeded foreign direct investment as the predominant source of inflow, while government assistance has been propelled by the movement of funds between developing and affluent nations (Hassan, Chowdhury, & Bhuyan, 2016; McKenzie, 2018). Furthermore, the reduction in transaction costs and the facilitation of money transfers resulting from technological advancements have engendered a surge in remittance flows originating from affluent nations (Ratha, 2017). The burgeoning phenomenon of remittance was anticipated to retain its significant presence in the forthcoming years. However, extant scholarly investigations pertaining to the influence of remittance on gross domestic product (GDP) have yielded conflicting outcomes in relation to particular countries (Meyer & Shera, 2017; Ratha, 2017).

In their scholarly discourse, Clemens and McKenzie (2018) presented a compelling argument refuting the purported beneficial impact of remittance on a nation's Gross Domestic Product (GDP). In a comparative analysis, Ratha (2017) discovered that remittance had a positive impact on the economic growth of a nation. This was achieved through the augmentation of foreign exchange reserves, the fulfilment of external debt obligations, and the utilisation of remittance as a safeguard against

capital flight. Meyer and Shera (2017) acknowledged remittance as a significant source of income and a novel financial phenomenon, given its global economic impact.

The utilization of expatriates' remittances was observed to encompass five principal objectives: the repayment of debts, the acquisition of land, the procurement of food and clothing, the construction of residences, and the accumulation of savings (IOM, 2005). In their study, Njangang, Noubissi, and Nkengfack (2018) made a significant discovery regarding the impact of remittance on the local economies of receiving nations. They found that remittance had a positive effect on these economies, as it resulted in an increase in their size. This conclusion was further substantiated by the investigation conducted by Adams and Page in 2005. Furthermore, Siddique, Shehzadi, Manzoor, and Majeed (2016) unveiled that remittance played a significant role in the percentage of GDP and the mitigation of poverty. According to Ratha (2003), remittances exerted a substantial influence on the local purchasing power and levels of consumption, resulting in a rational and advantageous impact across various domains. This assertion is further substantiated by recent research, which demonstrated the pivotal significance of remittance in various nations that receive remittances (Adams & Cuecuecha, 2013; Abadi, Techane, Tesfay, Maxwell, & Vaitla, 2018; Kumar, 2019). Furthermore, the study conducted by Arif Raza, Friemann, and Suleman (2019) showcased the substantial impact of remittance on the realm of higher education within the nations receiving such funds. Arif et al. (2019) further revealed that the funds provided by expatriates were utilised for the purpose of educating their offspring and other members of their kin, thereby making a significant contribution to the sustained progress of the overall economy.

Furthermore, it should be noted that remittance has played a crucial role in establishing a solid groundwork for the advancement of financial markets and the evolution of monetary policy in emerging economies. This has facilitated their ability to devise and execute timely policies, as evidenced by the research conducted by Giuliano and Ruiz-Arranz in 2009. In their study, Giuliano and Ruiz-Arranz (2009) posited that remittances exerted constraints on the credit capacity of individuals belonging to lower-income brackets. Simultaneously, they facilitated the allocation of capital and served as substitutes for the dearth of financial development. Henceforth, the economic progress of a nation is duly ensured. The aforementioned assertion is bolstered by the scholarly investigations conducted by Fayissa and Nsiah in 2010 and 2013. Their academic research unearthed a significant correlation between remittance and the advancement of economies across sixty-four nations.

However, it should be noted that the provision of family remittances has the potential to restrict the engagement of individuals in the labour force. Furthermore, it can have adverse effects on the tradable products sector, primarily through the amplification of real exchange rates (Amuedo-Dorantes & Pozo, 2004; Chami et al., 2008; Hassan & Holmes, 2013). In this regard, it was asserted by Rodrik (2008) that the overvaluation of the real exchange rate primarily impeded economic development in the long term. As posited by Rodrik (2008), the production of tradable goods was observed to have been disproportionately impacted by market failures. Furthermore, it becomes evident that remittances impede growth and productivity in nations that receive them, as they are allocated towards the consumption of imported commodities readily available in the market rather than

being directed towards productive investments (Lipton, 1980; Brown & Ahlburg, 1999; Nyasha, 2019). According to Nyasha (2019), it was observed that the adverse impact of remittance on economic growth could potentially be attributed to the allocation of remittance towards the consumption of nondurable goods, as opposed to durable goods consumption and productive economic endeavours. Barguelli, Zaiem, and Zmami (2013) also encountered incongruous outcomes regarding the influence of remittance on economic growth in their research. The inquiry revolved around the potential direct and indirect advantages of remittance to specific nations that receive such funds. However, it was posited that these effects would dissipate in numerous other countries.

As per Polat's (2018) findings, the intricate nature of a nation's economic growth, regardless of its developmental status, poverty level, or level of development, necessitates a comprehensive examination of the impact of remittance on economic growth. This impact is contingent upon the influence of remittance on diverse macroeconomic indicators, including the real exchange rate, investments (capital accumulations), labour supply within recipient households, and the financial development of recipient countries. In the present context, it was observed that conflicting studies suggested the possibility of remittance exerting a negative impact on the economic growth of the recipient country. This was attributed to two main factors: the distortion of labour incentives within recipient families and the potential appreciation of the real currency rate. Furthermore, it should be noted that remittance has been utilised to finance both physical capital and human capital investments, thereby making significant contributions to overall economic growth. Furthermore, in the event that remittances were allocated predominantly towards consumption

rather than investment, it is plausible that such a phenomenon would have aided in the mitigation of consumption fluctuations and facilitated economic stability by bolstering the Gross Domestic Product (GDP). Furthermore, a considerable body of recent research has elucidated the advantageous influence of remittance on the economic growth of the nation that receives such remittance. However, it is worth noting that certain research studies have uncovered adverse effects or an absence of correlation between these two variables or small effect remittances on growth (Cazachevici, Havranek, & Horvath, 2020). Moreover, it is also observed that remittances have different impact as these enhance economic growth in Asia but not in Africa (Cazachevici, et al., 2020).

In this regard, the studies conducted by Chami et al. (2005), Barajas et al. (2009), and Roa and Hassan (2011) revealed that remittances had either a negative impact on economic growth or no discernible effect (Ambrosius, Campos-Vázquez, & Esquivel, 2023). This assertion is corroborated by the research conducted by Ruiz et al. (2009), wherein inconsistent findings were unearthed during the examination of the correlation between growth rates and remittance. This was achieved by adopting a non-linear perspective, as opposed to a linear one, in assessing the relationship between remittance and growth. Furthermore, a positive and significant correlation was established between remittance and economic growth under the assumption that the impact of remittance on growth followed a linear pattern. Nevertheless, upon the consideration of non-linearity, the aforementioned link becomes nullified. The current literature contains various inconclusive studies that have presented evidence regarding the potential impact of remittance on economic growth (Senbeta 2013; Cazachevici, et al., 2020; Ambrosius, et al., 2023). In the study conducted by

Senbeta (2013), the focus was placed on investigating the origins of growth by means of transmission mechanisms, as opposed to analysing the impact of remittance on growth. In the study conducted by Senbeta (2013), it was observed that remittance, despite its beneficial impact on capital accumulation, was accompanied by inefficient investments that ultimately resulted in a reduction in total factor productivity. Consequently, the veritable impact of remittance on economic development remained uncertain. These arguments have been further supported from the study conducted by Anwar, Mang, & Plaza, (2024), who argued that remittances increase inequality in the South Asian region. In this regard, Adams and Page (2005) outlined the positive and negative effects of remittances that have been outlined below:

Table 2.1 : Positive and Negative Effects of Remittance

	Positive Effects	Negative Effects
Macro level	• Augmentation of the recipient nation's ability to engage in foreign exchange operations • Stable and countercyclical	• The decline in trade was observed due to the increase in the value of the local currency and the influx of imports • A decline in the social balance within the community • Highly-skilled employees tended to migrate to more developed nations, seeking better opportunities and prospects • High dependency on remittance
Household-level	• Allow households to satisfy core needs • Brings opportunities to invest in education and health care • Reduction in limitations in budget • Considers emergency resources • Improves social security	• Decline in workplaces for employment • Limited remittance in potential investment
Regional and community-level	• Local economy • Improved local economy • Investment in local development projects	• High inequality among family members and relatives • Increased inflation rate

(Source: Adams and Page 2005)

On the contrary, a significant and robust correlation was discovered between economic growth and remittance. In the aforementioned study, Mundaca (2005) examined the advantageous impact of remittance on the economic growth of the recipient nation. The author posited that the development of financial markets could potentially enhance the enduring contribution of remittance to economic growth. This assertion is further substantiated by the study conducted by Dahal (2014), wherein a positive correlation was discovered between remittance and the accumulation of human capital as well as the development of financial institutions. Furthermore, it was discovered by Williams (2018) that remittance exerted a deleterious impact on the proliferation of democratic institutions characterised by substandard quality. However, as the democratic system underwent enhancements and achieved greater transparency, the aforementioned effect transitioned into a positive one. As per Williams (2018), when a nation's democracy is fortified, families that stand to gain from such advancements exhibit a greater propensity to allocate their resources towards the development of small enterprises and the cultivation of human capital. This, in turn, facilitates an augmentation of the growth rate within the economy. Moreover, a study conducted by Feeny et al. (2014) revealed that remittance had minimal influence on the development or transformation of the economies of industrialised nations.

Lartey (2013, p. 1038) underscored the significance of global remittance, asserting that it "constituted nearly one-third of the total cash inflows to impoverished nations." Consequently, a multitude of studies scrutinised the ramifications and influence of remittances dispatched by labourers on the economic advancement of their respective nations, primarily through capital accumulation and other associated

mechanisms. Furthermore, it was discovered by certain scholars that an elevated level of remittance was correlated with a reduction in poverty and a surge in growth rates (Adams and Page, 2005; Acosta et al., 2008). In their study, Gupta, Patillo, and Wagh (2009) posited that the presence of significant remittance inflows engendered the advancement of human capital investment, concurrently mitigating consumer volatility and fostering economic stability. Nevertheless, it was contended by other scholarly investigations that the augmentation of remittance could potentially contribute to the establishment of nascent financial systems in developing countries. This would be achieved through the mitigation of credit limitations, thereby facilitating a favourable enhancement of capital accumulation and subsequent economic growth (Lartey, 2013; Woodruff & Zenteno, 2007). In contrast, previous studies have posited that augmented inflows of remittances could potentially have adverse effects on recipient nations in the long run, as they have the potential to diminish the labour pool of the households receiving such remittances (Amuedo-Dorantes & Pozo, 2006b; Hanson, 2005). The aforementioned argument could be substantiated by invoking the Dutch disease apprehension previously addressed in the present investigation. It is worth noting, however, that a limited number of studies have explored the direct correlation between remittance and economic development. Furthermore, it must be noted that these studies have yielded inconclusive results regarding the influence of remittance on a nation's economic development and performance.

A comprehensive examination of the recent research pertaining to the correlation between economic growth and remittance reveals that the precise influence of remittance on the economic growth of nations remains uncertain, thereby leading to

inconclusive findings. Nevertheless, a segment of the scholarly inquiry pertaining to the influence of remittance on economic growth has furnished corroborative findings and contended for a favourable correlation between remittance and economic growth. However, there are no previous studies that support the moderating effect of financial development that creates a significant gap in the current literature. Therefore, the study has been conducted to fill this gap by incorporating financial development as a moderator in the relationship between remittances and economic growth.

2.3 The Impact of Remittances on Exchange Rate

2.3.1 Theories of Exchange Rate

The Purchasing Power Parity (PPP) Index is an approach that originated from the law of one price. The aforementioned law posited the notion that identical products or services, specifically goods, were to be vented at an equal price, irrespective of geographical boundaries and impediments such as capital control and trade barriers (Siregar, 2011; Itskhoki & Mukhin, 2021). The alignment of the law of one price is expounded upon by the theory of purchasing power parity (PPP), which posits that, in its robust manifestation, the price levels of identical assortments of commodities would be equalized when assessed utilizing a common currency (Driver & Westway, 2005; Bae, Li & Shi, 2009; Shair & Anwar, 2023). Thus, it can be inferred that the exchange is influenced by the ratio of the price level.

In this regard, E^{PPP} is the exchange rate, and P and P^* outline the foreign and domestic price levels, respectively. This approach outlines that an exchange rate can be undervalued or overvalued if the ratio of the actual exchange rate over the

PPP, especially when the exchange rate is higher or less than 1. Hence, the PPP index theory outlines a static equilibrium exchange rate that is equal to 1 (Siregar, 2011; Jacobo & Sosvilla-Rivero, 2021).

In accordance with the findings of Samuelson (1964) and Balassa (1964), it was observed that the PPP principle may not be applicable to the variations in productivity between non-tradable and tradable goods on an international scale. However, it has been recognized by Coudert (2004) that there were primarily two forms of Balassa-Samuelson. In this regard, the initial aspect encompasses a level form that prognosticates that a nation exhibiting diminished productivity in the tradable sector relative to the non-tradable sector would exhibit reduced price levels in comparison to varying levels. This phenomenon is observed in both developing and emerging countries (Fisera & Workie Tiruneh, 2023). On the contrary, the second perspective incorporates evolutionary concepts that predicted the fluctuation of exchange rate values in diverse nations as they underwent distinct catch-up processes (Khan, Ghorbani, Shabani & Band, 2024). This phenomenon can be attributed to the relative gains in productivity. Indeed, within the realm of the tradable goods industry, it can be observed that a productivity shock occurring in accordance with the law of one price did not exert any discernible influence on the pricing of said tradeable goods. However, it was necessary to ensure the long-term viability of overall labour productivity, so wages in the tradeable sector rose. According to Couharde & Sallenave (2013), it was suggested that such a phenomenon could potentially result in upward pressure on prices and wages within the non-tradeable goods sector.

In his study, Rodrik (2008) conducted an examination of the impact of undervaluation on economic growth within a comprehensive range of developed and developing nations. The examination was conducted using the PPP-based index. In this regard, it was observed that in cases where the cost of non-tradable goods or services was significantly lower in impoverished nations, the exchange rate could be modified to account for the Balassa-Samuelson effect. This adjustment was achieved through the regression analysis of real exchange rates and real GDP per capita. Consequently, the equilibrium exchange rate was determined by fitting values obtained from the regression analysis.

Nevertheless, it is important to note that PPP based on the index did possess certain limitations. The approach encompassed the utilization of diverse long-run measures of equilibrium, as expounded by Rogoff (1996). In the context of the long run and the need for extensive information or data, the concept of PPP was incorporated. Nevertheless, the aforementioned task posed a considerable challenge for nations in the process of development as well as those in the early stages of emergence. Secondly, Bereau et al. (2012) discovered that the index based on PPP predominantly disregarded numerous fundamental factors, thereby failing to offer any discernment into the exchange rate adjustment that aligns with the resolution of global imbalances. The overall equilibrium exchange rate under the PPP framework was considered to be static, with a focus on abstracting any disturbances caused by external shocks. These disturbances had they occurred, would have provided justification for the utilization of alternative approaches.

The overall normative approach, known as the **Fundamental Equilibrium Exchange Rate (FEER)**, was formulated by Williamson in 1994. It can be traced back to its origins in the general equilibrium theory (Prabheesh, Prakash & Vuniivi, 2023). Therefore, the term employed to designate this phenomenon is the real effective exchange rate, which guarantees the attainment of both external and internal equilibriums across diverse nations concurrently. In this regard, the attainment of internal balance is observed when the nation as a whole operates at the stage of full employment or when it operates at the non-accelerating inflation rate. Nevertheless, the external balance encompassed a sustainable contemporary account that delineated the anticipated net capital flow, as expounded by McDonal and Clark in 1998(Clark & MacDonald, 1999; Khomo & Aziakpono, 2020). In a certain sense, the FEER delineated foreign trade relations and encompassed the fluctuation of exchange rates in relation to external and internal imbalances (Jeong et al., 2010; Fraj, Hamdaoui & Maktouf, 2018). In contrast to the approach employed by Rodrik (2008), which relied on the PPP-based indexed approach, the FEER allowed adjustments to be made to the equilibrium exchange rate. According to Driver and Westway (2005), it was observed that asset stock had the potential to undergo changes irrespective of external and internal balances. Therefore, the FEER approach, as proposed by Siregar (2011), was referred to as the exchange rate that aligned with the optimal macroeconomic equilibrium. Therefore, Siregar (2011) posited that the FEER represented the exchange rate that conformed to the ideal economic conditions pertaining to macroeconomic equilibria. According to McDonal and Clark (1998), it was posited that the concept encompasses economic fundamentals or variables that were identified to disregard short-run cyclical

patterns and withstand occasional temporary factors over the medium-run. Nevertheless, when estimating the equilibrium exchange rates, various distinct processes were employed within the framework of the FEER approach. In this regard, it was outlined by McDonal and Clark (1998) that the starting or initial point was the CA identity.

Here, CA means current accounts, and KA means capital accounts. In this regard, FEER mainly concentrates on CA determinants. However, the latter is interpreted based on REER, which is called foreign and domestic potential outputs.

Here, q , $\bar{y}_d$ and $\bar{y}_f$ present REER, both domestic and foreign possible outputs because KA is called an equilibrium capital account, but it is important to note that some difficulties would remain there in calculating the FEER. Hence, Siregar (2011) argued that difficulties in recognizing potential output are correlated with growth with the sustainable account, low inflation and static trajectories to gain balances. However, in simplifying the first issue, the internal balance is thought to be contented when the external balance is gained. Clark & MacDonald (1999) put importance on challenges in achieving the equilibrium capital mainly account over the medium-run.

In the calculation of the FEER, two distinct approaches were employed. The first approach is characterised as model-based, wherein an econometric model was employed to derive the FEER. This was achieved by simulating a multi-equation macroeconomic model, which incorporated both external and internal balances. The simulation aimed to ensure that the CA reached its target level and the output gap

was set to zero. As per the findings of B'enassy-Qu'er'e et al. (2008), it was observed that this particular strategy was accountable for various potential channels, including cross-border interactions and supply-side impact. Hence, drawing upon this methodology, it is noteworthy to mention the research conducted by Coudert and Couharde (2003), Bayoumi and Symansky (1994), as well as Williamson (1985). The second approach solely focused on the CA, excluding the broader scope of the entire economy. This approach aligned with equation and resolved to obtain the parameters for a comprehensive trade balance formula. These parameters considered both the domestic and foreign output gaps, as well as the overall relative price of the foreign tradable. In this context, it was deemed appropriate to incorporate supplementary variables into the model. Notably, the terms of trade and a proxy for the Balassa-Samuelson effect were considered for inclusion. The adjusted current account balance was obtained by setting the output gaps to zero. Therefore, the term "adjusted balance" was utilized to refer to the balance that was compared to the exogenously determined overall current account target. In this regard, the FEER was defined as the exchange rate that would have brought the adjusted CA to its target (B'enassy-Qu'er'e et al., 2008).

However, the application of the symmetric matrix inversion method (SMIM) to bring a solution to equilibrium is supported by Cline (2008). Therefore, in accordance with this approach, the impact parameters were utilized to calculate the target set of the CA by considering the trade elasticities. This enabled the attainment of real effective rates. In the context of computing the corresponding set of bilateral exchange rates, the utilization of matrix inversion was employed. In general, the issue of over-determination in a country with multiple models can be resolved

through the contemplation of solely $n - 1$ target, specifically the real effective exchange rates.

The phenomenon of FEER was observed to exhibit variations across different time periods. This concept primarily focused on the development of a PPP-based index. The presence of potential gaps in productivity growth necessitated the application of the Balassa-Samuelson theory, which elucidates the disparities in growth between nations. Therefore, it can be concluded that the FEER experienced a gradual depreciation over a certain period of time. Moreover, the maintenance of a current account at a specific level primarily pertained to the valuation and general devaluation. Thus, it can be observed that the trajectories of the FEER primarily originated from the alterations in the effective exchange rates, which aimed to attain the current account target for both foreign and domestic outcomes (Siregar, 2011; Williamson, 1994). In this regard, it is imperative to consider certain limitations. As per Isard's study in 2007, the FEER approach was referred to as being sensitive to trade elasticity, which was typically regarded as the average value across a broader range of countries. This perspective is primarily endorsed by Siregar (2011), who posited that an excessive dependence on trade elasticity could potentially introduce a bias in the trajectories of the FEER. As per the findings of Coudert (2003), alterations in capital stocks, variations in productivity, and shifts in tastes were identified as contributing factors to the fluctuations observed in trade elasticity. However, it should be noted that the aforementioned issues were not duly considered within the framework of the FEER approach. Hence, Siregar (2011) underscored the inherent challenges associated with gauging internal imbalances through the utilization of output gaps in transition and emerging economies. This is due to the

dynamic nature of economic transformation and the concurrent occurrence of various improvements. In this context, the utilization of a filter could have proven advantageous and potentially resulted in incongruous outcomes. For instance, it has been observed that the utilization of Hodrick Prescott (HP) methodology has yielded inconsistent outcomes, which are devoid of theoretical substantiation. In this discourse, it was contended that the retention of a previous debt level, despite its overall magnitude, is referred to as the preservation of debt sustainability according to the FEER methodology. This practice resulted in the emergence of substantial unexplained disparities among nations. Therefore, notwithstanding its limitations, the FEER approach was employed by the International Monetary Fund (IMF) for the purpose of exchange rate assessments. Nevertheless, the consultative Group on Exchange Rates Issues of the International Monetary Fund (IMF) computed a FEER that mitigated or eliminated the disparity between the projected equilibrium and the current account balance at a prevailing rate within the medium-term timeframe. Therefore, during the initial stage of the exercise, this was primarily undertaken exclusively by the developed nations.

The initial or first step involved the evaluation of the relationship between certain fundamentals and CA through the utilization of techniques for panel data evaluation. However, the second step involved the calculation of the CA norm by utilizing the associations established in the preceding steps, as well as the overall levels of the macro fundamentals that were projected to prevail in each country during the medium-term period. In this regard, the final step was undertaken to compute the exchange rate that effectively reconciled the overall disparity between the current account as derived from the preceding steps (Lee et al., 2008). In contrast, Borowski

and Couharde (2003) conducted an evaluation of the FEER by constructing the IMF approach, which facilitated the incorporation of macroeconomic variables across multiple nations within a multinational framework. The static FEER approach, from which they also emerged, did not necessitate a comprehensive modelling of the global economy for the Pound (UK), Euro (Europe), Yen (Japan), and dollar (US). The aforementioned currencies were discovered to possess a significantly reduced valuation in comparison to the US dollar, with estimates ranging from 15% to 30%.

Moreover, in the study conducted by Cline et al. (2008), a semiannual estimation of the FEER was employed for a broader range of countries that were capable of utilizing the SMIM. In this regard, it is noteworthy to mention that Cline (2016) made an estimation regarding the largest four economies. According to his findings, the US dollar was found to be overvalued by approximately 7%. Conversely, the Yen (Japanese) was observed to be slightly undervalued. Furthermore, it is worth noting that both the Euro area and the Chinese Renminbi were observed to have maintained their levels at the FEER.

BEER, also known as the **Behavioral Equilibrium Exchange Rate**, was derived by MacDonald in 1997 and further expanded upon by Clark and MacDonald in 1998. This approach involves the assessment of an equation for the Real Effective Exchange Rate (REER), which incorporates the utilization of the co-integration technique, relative productivity, and Net Foreign Assets (NFA). In this context, two potentialities were identified: the possibility of detrending certain fundamentals by employing the Hodrick-Prescott (HP) filter and the calculation of equilibrium through the aforementioned method. Additionally, the long-run estimation derived

from the co-integration regression, which pertains more to a long-run or medium-run concept, could be obtained by utilizing the medium-run equilibrium derived from the observed fundamentals. Nevertheless, it is worth noting that certain resemblances between BEER and FEER could indeed be discerned, as these were contingent upon the delicate equilibrium of payments. Nevertheless, it has been posited by Benassy-Quere et al. (2009) that a consistent outcome may be obtained, regardless of the equilibrium status of the explanatory variables, under the influence of several assumptions.

Moreover, despite certain temporal and spatial disparities, which could potentially augment, L'opez-Villavicencio et al. (2012) insinuated that both BEER and FEER could conceivably bear relevance to the long-term trajectory. Therefore, in this study, the researcher employed the use of BEER due to its simplicity and the reduced number of assumptions necessary for its calculation. Conversely, FEER relied on the calculation of a target that may not have been computed. A significant body of literature exists regarding the computation of misalignments and equilibrium utilizing the BEER framework. Noteworthy contributions in this field include the research conducted by Couharde and Sallenave (2013), Benassy-Quere et al. (2009) and Melecky and Komarek (2007, 2008), among numerous other scholars who have delved into this subject matter. Melecky et al. (2007) undertook a series of studies encompassing five countries with the aim of investigating the equilibrium exchange rates. Specifically, the countries examined were Slovenia, Hungary, the Czech Republic, Poland, and the Slovak Republic, and the time period under scrutiny spanned from 1994 to 2004. In their study, Melecky et al. (2008) employed a range of indicators to assess various drawbacks. These indicators encompass NFA,

RPROD, terms of trade, differential in real interest rates, and inflows of foreign direct investment. However, in their study conducted in 1995, Pesaran and Smith employed the Mean Group methodology and discovered that there existed a tendency towards appreciation among the countries under investigation. The mention has been made of the convergence of the diverse fundamentals to those of the countries within the Euro area. Irrespective of prevailing trends, the findings of the study indicate that the establishment of the Euro as the official currency in the five selected countries was not compromised by subsequent appreciation in the equilibrium exchange rate.

2.3.2 Empirical Literature Review

The remittances transmitted by migrants to their respective home countries could potentially yield diverse and distinctive consequences on the real effective exchange rates. The reason for this phenomenon can be attributed to the intensity of trade exchanges as well as the size of these respective countries (Barajas & Al, 2010). Henceforth, it was discerned that certain nations witnessed a depreciation of their currencies as a result of the inflow of foreign currency, whereas others encountered an appreciation in their overall exchange rates. If the abundance or increase of foreign currency contributed to an increase in demand for imported goods, it would have been detrimental to domestic production. The evaluation of the real effective exchange could have been conducted, as suggested by Grabel (2008) and Barajas & Al (2010). The appreciation of the currency in this particular instance could have resulted in a decrease in the competitiveness of domestic organizations, both within the domestic market and on the international stage (Hinkle & Montiel, 1999; Izquierdo & Montiel, 2006; Bourdet & Falck, 2006; Amuedo-Dorantes & Pozo,

2004; Singer, 2010). Furthermore, it can be posited that such a phenomenon may arise in instances where there is a transfer of resources from traded goods or services to non-traded counterparts, which has been commonly referred to as the Dutch disease (Mughal & Makhoulf, 2013; Lartey & al., 2012; Bourdet & Falck, 2006). This particular issue could solely exert a detrimental influence on the balance of payments, potentially affecting the labour market by precipitating an increase in unemployment rates and giving rise to a novel trend of migration. Therefore, several econometric studies have been conducted that have concentrated on the specific assessment of the impact of remittances transmitted by migrants on the real effective exchange rates of their respective home nations. Herein, three distinct groups may be discerned.

Initially, a plethora of literature assessed the direct correlation between the augmented remittance and the appreciation of real effective exchange rates. In this regard, a study was conducted by Bourdet and Falck (2006), which centered on a singular country. The study examined the workers' remittances in Cape Verde from 1980 to 2000, ultimately confirming the veracity of the real exchange rate appreciation as the underlying factor contributing to the rise in remittances. Similar findings were also discovered in a study conducted by Hyder and Mahboob (2006) within the confines of Pakistan, spanning the years 1978 to 2005. The study conducted by Saadi-Sidik and Petri (2006) examined the period from 1964 to 2005 within the context of Jordan. Furthermore, comparable outcomes were derived from a study undertaken in the context of Tunisia by Chnaina and Makhoulf (2015) encompassing the time frame from 1975 to 2009. Furthermore, a study was conducted by Amuedo-Dorantes and Pozo (2004), which encompassed 13 countries

from the Caribbean and Latin America. The study focused on examining the real exchange rate over a specific time period. Henceforth, the extensive assortment derived from various nations or regions, along with additional investigations, has unveiled predominantly congruous patterns characterized by a diminished quantitative impact of remittance flows upon the actual exchange rates (refer to Fuentes & Herrera, 2008; Holzner, 2006; Lopez et al., 2007).

Secondly, it has been observed by certain researchers that remittances have resulted in the depreciation of the real effective exchange rate. This phenomenon has been confirmed by the studies conducted by Li and Rowe (2007) as well as Ozcan (2011). This assertion is substantiated by the research undertaken by Barret (2014) within the Jamaican context, wherein it was demonstrated that remittances have the capacity to induce a devaluation of the real exchange rate. This phenomenon was observed through the utilization of a model that incorporated variables such as public expenditure, terms of trade, and official development. In the present study, the primary focus shall be directed towards the examination of the impact of development aid. Consequently, Li and Rowe (2007) arrived at a comparable conclusion pertaining to the Tanzanian context. In contrast to the Dutch disease theory, the aforementioned results would indicate the financial development in the countries that were encompassed within the study, as they were unable to facilitate substantial investments in the non-tradeable sectors through the utilization of remittances. Therefore, it is of utmost importance to acknowledge that the Dutch disease theory was formulated with regard to developed nations and was discerned as a result of the prodigious gas reserves in the Netherlands during the 1950s. The nation underwent a significant appreciation of its currency as a result of the

extensive exportation of natural resources and the exploitation thereof, which led to an increase in export income at a heightened level. Consequently, the exportation of other commodities experienced a decline, while the manufacturing outputs of the nation also witnessed a substantial decrease. Furthermore, this phenomenon also resulted in a decrease in the exportation of other commodities, thereby establishing a barrier that ultimately impeded the production of goods and services within the nation. Similar phenomena have been acknowledged within the realms of developing nations, albeit disparities have been scrutinized between developed and developing countries. The disparities were attributable to multiple factors, with particular emphasis on the distinctive characteristics of the diverse exchange rate regimes, as noted by Krugman (2009) and Vargas-Silva (2009). Moreover, Barajas and Al (2010) expounded upon the notion that the risks associated with the Dutch disease were neither diminished nor reversed. This was attributed to a multitude of significant factors, such as counter-cyclicalities, the mobility of factors between domestic sectors, the level of international openness, the proportion of consumption, and the susceptibility to the remittance risk premium.

It is of utmost importance to acknowledge that the extant empirical literature pertaining to the impacts of official development assistance on the exchange rate has yielded a diverse array of findings. In this regard, Elbadawi (1999) conducted a study encompassing 62 developing countries, of which 28 were from Africa. The author posited that the influx of aid, which was deemed unsustainable, played a role in the overvaluation of the real exchange rate in both African and non-African nations. Furthermore, African nations that excessively depend on foreign aid have encountered a pervasive and genuine overvaluation. This phenomenon is likewise

observed in the study undertaken by White and Wignaraja (1992), wherein it was ascertained that foreign aid exhibited a strong correlation with the appreciation of the real exchange rate. A parallel observation was made in the research conducted by Quattara and Strobl (2008), wherein they discerned the presence of Dutch disease within the context of Ghana, an African nation.

Ultimately, several studies endeavoured to substantiate the overarching absence of a correlation between the remittances dispatched by migrants and the prevailing equilibrium exchange rates (Vargas-Silva, 2009; Rajan & Subramanian, 2005). Nevertheless, certain studies failed to detect any manifestation of the Dutch disease phenomenon, particularly as evidenced by the investigation undertaken by Sackey (2001) pertaining to the nation of Ghana. Nyoni (1998) conducted a study on Tanzania, while Ogun (1998) conducted a study on Nigeria. Intriguingly, the investigation undertaken by Izquierdo and Montiel (2006) encompassed six Central American nations during the period spanning from 1960 to 2004. This study successfully ascertained that the remittances had no discernible influence on the equilibrium's real exchange rate, particularly in the instances of Nicaragua, Jamaica, and Honduras. Nevertheless, it must be noted that despite the fact that all of these nations experienced an increase in the inflow of remittances, the impact of this heightened influx remained inconsequential within the confines of these three particular countries. The investigation carried out by Mongardini and Rayner (2009) employed the Pool Mean Group method to assess the shared long-term factors influencing the real exchange rate across 29 Sub-Saharan African nations between 1980 and 2006. This approach allowed for the incorporation of heterogeneous short-

term dynamics among the countries. The findings of their study also indicated that no concerns arose in relation to the real effective exchange rates.

In general, a paucity of research exists pertaining to the influence of remittances on the aggregate real exchange rate in nations such as Bangladesh, which concurrently experience substantial inflows of remittances on an annual basis. In this regard, a study was conducted by Moniruzzaman (2021) that differed in terms of the data set pertaining to Bangladesh during the period spanning from 1975 to 2021. Furthermore, the investigation differed in its focus, as it solely examined the potentialities of a sectoral performance in relation to the remittances-exchange rate dynamic.

2.4 The Impact of Remittances on Household Consumption Expenditures

2.4.1 Theoretical Literature Review

Remittances were often the most direct link between migration and the well-being of the households in the host country. According to the New Economics of Labour Migration (NELM) theory (Stark & Bloom, 1985), remittances played a crucial role in migration (Rye & Slettebak, 2020). As per Taylor's (1999) findings based on NELM, families perceived migration as a means to augment their income portfolios, thereby enhancing their overall earnings. The NELM theory argues that the majority of labour migration occurs from countries with low capital and a shortage of labour force to countries with abundant capital and a shortage of labour force (Mannan & Fredericks, 2015; Könönen, 2019). In contrast, capital migration occurs in the other direction, as capital seeks a greater return on investment in nations with low capital (Mannan & Fredericks, 2015; Shah & Lerche, 2020; Poledna, et al., 2024).

Remittances were observed to yield advantageous outcomes for households engaged in migrant-sending activities. Furthermore, drawing on NELM theory Stark (1980) posited that remittance could have been employed as a strategic manoeuvre by households in order to navigate the constraints imposed by the labour market that is also corroborated with the recent studies Basumatary, (2020) and Orekoya & Tijani, 2023; Poledna, et al., 2024). This facilitated the augmentation of households' well-being through the allocation of resources towards productive activities.

According to Randazzo and Piracha (2019), divergent viewpoints have been observed regarding the utilization of remittances, influenced by the recipient family's perception as documented in previous scholarly works. The initial notion, which constituted an integral facet of the permanent income hypothesis, posited that remittances were ephemeral sources of income that were allocated towards ostensibly more "productive" endeavours, namely the augmentation of human and physical capital at the periphery. If veracity is ascertained, it can be posited that remittance would have had a protracted and advantageous impact on the growth and development of the recipient nation. The second perspective posited that remittances constituted compensatory funds intended for expenditure on consumption rather than investment goods. While this phenomenon had the potential to yield augmented local output, it also possessed the capacity to exert an indirect influence on inflation within several emerging nations (Narayan et al., 2011; Shah & Lerche, 2020; Orekoya & Tijani, 2023; Poledna, et al., 2024). The third approach contemplated remittance as akin to any other form of income, thereby obviating any perceptible fluctuations in expenditure patterns predicated upon a household's remittance status.

2.4.2 Empirical Literature Review

The significance of remittances in ensuring the welfare of households has been underscored by Cuecuecha and Adams (2016) as well as Kangmennaang, Bezner-Kerr, and Luginaah (2018). Furthermore, the role played by these payments in the improvement of the living standards of the recipients has been regarded in a favourable light (Chezum, Bansak, & Giri, 2018). Furthermore, it was observed by Quartey, Ackah, and Lambon-Quayefio (2019) that upon receiving remittances, families exhibited a notable surge in their propensity to save. Furthermore, the significant impact of remittance on health indices was established by Amakom and Iheoma (2014), as well as Chezum et al. (2018). López-Cevallos and Chi (2012), conversely, ascertained the absence of any correlation between migrant remittance and preventative health measures. According to Quartey et al. (2019), it was observed that individuals who were recipients of remittances from expatriates exhibited a greater propensity for savings in comparison to those who solely received domestic remittances. Consequently, individuals who receive remittances witnessed an amelioration in their living conditions over time, thereby instilling within them the motivation to establish novel enterprises utilizing the financial resources at their disposal (Black, King, & Tiemoko, 2003). In their study, Adaawen and Owusu (2013) discovered that remittances were commonly employed for the purpose of financing productive expenditures. These expenditures encompassed various activities, such as agricultural investments, land acquisitions, and the establishment of fresh small enterprises. Furthermore, the extensive support for remittance as a means of augmenting human and physical capital investment in nations that receive remittances was uncovered by Adams Jr. and Cuecuecha (2010). This assertion is substantiated by the study conducted by Hines and Simpson (2019),

wherein it was ascertained that upon the receipt of remittances, households allocated a comparatively greater proportion of their budgets towards investment endeavours.

In their study, Abubakar and Folawewo (2019) discovered that the collective impact of food, cash, and other remittances on household investments exhibited variations across Nigeria's rural and urban areas, as well as geopolitical zones. In their study, Kamal and Rana (2019) discovered that remittance, although having a limited impact on household expenditure, consistently yielded positive effects on household well-being when derived from foreign sources. Consequently, it was postulated that the acquisition of enhanced remittance income ought to have been safeguarded through the implementation of suitable policies and methodologies, particularly within the domestic economic milieu and various institutions.

Ahmed (2020) conducted a recent examination on the influence of foreign migration on household welfare in Bangladesh. The study utilized data derived from the 2010 Household Income and Expenditure Survey. By utilizing principal component analysis, an asset index was constructed with the aim of quantifying the enduring welfare impact of migration. The investigation ascertained that households harbouring a migrant member exhibited a significantly superior asset score in comparison to those lacking a migrant member. Furthermore, it was observed that migrant households exhibited a diminished proportion of their total expenditure allocated towards sustenance, coupled with an augmented per capita calorie intake. This observation serves as an indication that migrant households were comparatively less afflicted by impoverishment when juxtaposed with their non-migrant counterparts. Furthermore, the study unearthed compelling evidence indicating that

families harbouring a migrant in a lucrative destination experienced greater prosperity compared to families hosting a migrant in a less alluring destination. The comprehensive findings ascertained that the welfare of families was contingent not only upon their migration status but also upon their predilections regarding their destination.

In a recent investigation, Raihan, Uddin, and Ahmmed (2021) undertook a study to scrutinize the impact of overseas remittance on the spending patterns of households in Bangladesh. The researchers employed the 2016 Household Income and Expenditure Survey (HIES) as their primary data source. The entirety of the household expenditure was partitioned into seven distinct categories, namely education, health, sustenance, consumable and durable goods, housing and land, and investment. The study employed the propensity score matching approach in order to address the issue of self-selection bias. Furthermore, the study employed the Working-Leser (WL) model to scrutinize the impact of remittance on marginal spending behaviour. The findings of the study revealed that remittance exerted a favourable and significant impact on nearly all categories of expenditure, with the exception of education and investment. In relation to the allocation of budgetary proportions for diverse spending categories, it was observed that individuals who received remittances allocated a comparatively lesser proportion of their overall expenditure towards sustenance and investment. The impact of remittance on the allocation of budgetary resources towards health, housing, and land was found to be favourable and significant, whereas its influence on education, as well as consumable and durable goods, was deemed negligible.

In accordance with the aforementioned research, conflicting findings and divergent perspectives have been observed regarding the impact of remittance on household levels in Bangladesh, a nation that annually receives a substantial influx of remittance. Henceforth, the present study shall endeavour to rectify the aforementioned void by furnishing contemporaneous empirical evidence, thereby equipping scholars and policymakers alike with the requisite information to undertake suitable measures aimed at enhancing the efficacy of remittance utilization at the household level.

2.5 Gaps in the Literature

2.5.1 Remittances on Economic Growth

In the realm of economic development, remittances have historically functioned as a viable alternative to foster financial progress. The impact of remittance on economic development may have been less pronounced as the financial sector of the nation receiving the remittance increased, and conversely, the impact may have been more pronounced as the financial sector of the nation receiving the remittance decreased. Henceforth, contingent upon their respective circumstances, emerging nations ought to have relied upon either domestic or foreign funding sources in order to finance their economic growth programmes. To the best of the authors' knowledge, this study represented the inaugural attempt to investigate the potential interplay between financial development and remittance in shaping the economic development landscape of impoverished nations such as Bangladesh. According to contemporary scholarly investigations, the examination of the influence exerted by remittances on gross domestic product (GDP) has yielded inconclusive findings within the context

of specific countries (Meyer & Shera, 2017; Ratha, 2017). In this regard, it must be noted that there existed a dearth of scholarly literature pertaining to the impact of remittance on Bangladesh's GDP in recent years, thereby rendering the availability of updated information regarding the positive or negative effects thereof quite limited. The question at hand is similarly unanswerable in the context of Bangladesh, a nation that has contributed significantly to the overall volume of global remittance transfers. Henceforth, the objective of this study was to ascertain whether remittance exerted a favourable or unfavourable influence on the growth of GDP per capita in Bangladesh.

2.5.2 Remittances on Exchange Rate

Several studies were conducted to empirically examine the influence of workers' remittances on real exchange rates within different countries, utilizing diverse methodologies or formulas. In this regard, it is imperative to acknowledge that the majority of these studies primarily concentrated on examining the contemporaneous impact of workers' remittances inflows on the fluctuations of the aggregate real exchange rates. Nevertheless, several studies conducted by Berajas et al. (2011), Mongardini and Rayner (2009), Ball et al. (2012), and Hassan and Holmes (2013) have successfully discerned the enduring impact of workers' remittances on the aggregate real exchange rate. Therefore, one could posit that these studies exclusively captured the fleeting effects of remittances transmitted by laborers on the actual exchange rates within their estimations, thereby potentially neglecting the enduring consequences. Moreover, scant research has been conducted to examine the enduring impact of workers' remittances on the equilibrium of the real exchange rate, particularly in the context of Bangladesh, a highly populous nation in South Asia.

Furthermore, the outcomes of the preceding investigations exhibited a contradictory nature owing to the methodologies employed and the datasets utilized for data analysis. Prior investigations have unearthed compelling evidence suggesting that the appreciation of the real exchange rate could be attributed to the augmented inflow of remittances originating from East and South Asia. Numerous studies have substantiated the existence of inflows of remittances dispatched by labourers, which could potentially engender the devaluation of the exchange rate within the South Asian or broader Asian domain. Hence, the presence of such contradictory evidence necessitated further empirical and contemporary investigations within this region in order to attain a comprehensive comprehension of their interrelationship. Furthermore, it should be noted that prior investigations have encountered shortcomings in employing suitable methodologies to evaluate the remittances transmitted by labourers with regard to the real effective exchange rates. Specifically, the utilization of indicators such as the proportion of traded goods and services to non-traded ones in nations receiving remittances has been inadequately addressed in past research.

2.5.3 Remittances on Household Consumption Expenditures

It has been ascertained through various anecdotal studies that the impact of remittance on household spending behaviour is predominantly contingent upon the specific country in question. The significant divergence of in-country experiences could be traced back to various factors, including but not limited to cultural disparities, socioeconomic circumstances prevailing in the recipient country, and the magnitude of remittance inflows to households, among others. The preceding investigations within the framework of Bangladesh primarily addressed the impact

of remittance on poverty, as well as the aggregate household expenditures on consumption, healthcare, education, and other related aspects. The area of the marginal spending behaviour of households receiving international remittances has remained unexplored. Consequently, this research sought to address this gap.

Nevertheless, a scarcity of empirical evidence has been observed regarding the practical implications of remittance on household welfare within the contemporary era. The issue of remittance receipts in Bangladesh, which attained the seventh position globally in 2019, according to the World Bank (2019), also warrants attention.

Furthermore, the nation has established training centres with the aim of preparing its citizens for employment opportunities abroad, thereby enhancing the flow of remittances (Hasan, 2018). Henceforth, the investigation of the microeconomic impact of remittance on household welfare in Bangladesh was deemed imperative, with the objective of bridging the existing knowledge deficit in this domain and proffering pragmatic recommendations to diverse governing bodies.

In the pursuit of ascertaining a definitive conclusion regarding the impact of remittance on household levels in Bangladesh, a nation that consistently ranks among the highest recipients of remittance annually, a multitude of incongruous findings and divergent perspectives have emerged. Consequently, the present study shall address an existing gap by providing contemporary empirical data to scholars and policymakers, enabling them to undertake suitable measures aimed at ensuring the efficient utilization of remittances at the household level.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter was meticulously prepared by employing econometric methods to investigate the impact of remittance on various economic indicators such as economic growth, real effective exchange rate, and household consumption expenditures at the individual household level. The study focuses on Bangladesh, which is recognized as one of the leading recipients of remittance globally. Every section was comprised of several parts that discussed the theoretical framework, described the model specification employed in the study, elucidated the sources of data for all the variables, and furnished intricate details regarding the method of estimation, all in accordance with the stated objectives of the study. In Section 3.4, a comprehensive summary of the chapter was presented.

3.2 The Impact of Remittances on Economic Growth

3.2.1 Theoretical Framework

As per the principles of neoclassical migration theory, the movement of labour is observed to have occurred historically from nations with lower wages to those with relatively higher remuneration, primarily due to the existence of wage disparities across countries (Kurekova, 2011). According to Carrasco et al. (2018), the act of immigrants sending remittances to their home country was found to have contributed to economic progress. On the contrary, it is noteworthy that such a movement had the potential to hinder growth as it resulted in the displacement of highly educated

and talented employees, a phenomenon commonly referred to as brain drain (Topxhiu & Krasniqi, 2017). Henceforth, in accordance with the principles of neoclassical growth theory, it was postulated that the diminishment of human capital could engender adverse consequences for the trajectory of economic growth.

Todaro and Smith (2015) have discerned domestic and international savings as the two principal catalysts of an economy's economic growth. This phenomenon arises due to the imperative nature of amassing sufficient savings in order to actualize the requisite investment for the purpose of instigating economic growth. In light of the disparity between saving and investment in developing nations, such as Bangladesh, the utilization of remittance emerges as a potential avenue for the mobilization of resources in order to attain economic growth. In a similar vein, Solow (1956) underscored three pivotal constituents of economic growth within the neoclassical growth model: the accumulation of capital, the augmentation of population, and the progression of technological advancements.

3.2.2 Model Specification

In order to scrutinize the influence of remittance on the economic growth of Bangladesh, the present study employed the Solow Neoclassical Cobb-Douglas production function.

$$Y_t = AL_t^{\alpha_1} K_t^{\alpha_2} \quad (3.1)$$

Where Y is aggregate production, which is a proxy for economic growth, L denotes labour as measured by the labour force participation rate, K denotes capital accumulation, and A denotes technical advances and other growth-related factor

inputs. In the context of developing nations, the notion of technological advancement serves as a steadfast element within the model.

Upon log linearization of the aforementioned Cobb-Douglas production function, the resultant equation shall be as follows:

$$eg_t = \alpha + \alpha_1 l_t + \alpha_2 k_t \quad (3.2)$$

Where eg represents economic growth, l represents labour, and k represents capital. Additionally, Kumar (2013) and Qutb (2021) suggest that remittance supports growth in recipient nations through technical diffusion. This phenomenon can be attributed to the fact that remittance has augmented the influence of various factor inputs in bolstering economic growth within the domicile of the migrant population. Henceforth, through the incorporation of the remittance variable (REM) into the aforementioned equation, the following result is derived:

$$eg_t = \alpha + \alpha_1 l_t + \alpha_2 k_t + \alpha_3 rem_t \quad (3.3)$$

The incorporation of an additional variable, namely financial development, which has been acknowledged as a determinant impacting economic growth, was undertaken in accordance with the works of Chowdhury (2016), Das et al. (2019), Kumar (2013), and Olayungbo & Quadri (2019). The efficiency of financial development could have served as a moderator in the relationship between remittance and economic growth in developing nations, including Bangladesh. In accordance with the scholarly works of Inoue (2018) and Kumar (2013), it has been posited that the aforementioned equation may be formed as follows:

$$EG_t = \alpha + \alpha_1 LF_t + \alpha_2 GFC_t + \alpha_3 REM_t + \alpha_4 FD_t + \alpha_5 REM_t * FD_t \quad (3.4)$$

Where Where EG denotes economic growth, LF denotes labour force participation, GFC denotes gross fixed capital formation, REM denotes remittance received from abroad, FD denotes financial development, and REM*FD denotes the interaction term introduced in this study.

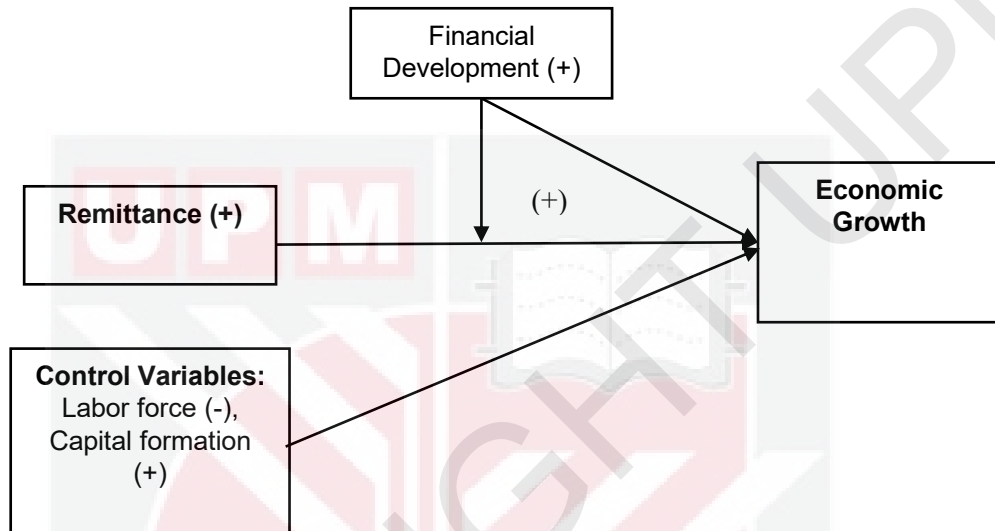


Figure 3.1 : Research Framework

The research framework, as depicted in Figure 3.1, illustrated the relationship between financial development, remittance, and economic growth. Based on the conducted study, it was postulated that the remittance provided by migrants could potentially contribute to the enhancement of economic development within the recipient economy. According to Issabayev, Saydaliyev, Avsar, and Chin (2020), as well as McKenzie and Rapoport (2010), it has been observed that remittance had a direct positive impact on the beneficiaries and also had an indirect positive effect on others. Indirectly, the alteration of supply occurred as remittances alleviated the fiscal limitations of receivers and enhanced their consumption expenditures. The aforementioned phenomenon exhibited a positive multiplier effect on the economy.

Furthermore, remittance resulted in an augmentation of both human and physical investment. The availability of cash for investment was ensured by the increased savings from remittance inflows, thereby leading to the expansion of the financial sector and consequently exerting a direct impact on economic growth (Aggarwal, Demirgüç-Kunt, & Pera, 2011; Chiodi, Jaimovich, & Montes-Rojas, 2012). The dependent and independent variables were further discussed as follows:

Economic Growth: The dependent variable in this study was the Gross Domestic Product (GDP). The GDP represents the total output produced within a given economy over the course of a year (Comes, Bunduchi, Vasile, & Stefan, 2018).

Remittances: The amount of cash transfers made by overseas working migrants to their country of origin, known as worker's remittances, constituted a substantial source of foreign exchange and exerted a notable influence on the long-term economic performance of the receiving nation (Mundaca, 2009). It can be argued that workers' remittances had the potential to foster investment in both physical and human capital by alleviating the liquidity constraints faced by recipients. This, in turn, would have contributed to the adjustment of the long-term GDP per capita output of the country receiving the remittances (Rapoport, 2002).

On the contrary, it has been observed that workers' remittances may have had detrimental implications for economic growth over an extended period, particularly when employed to support private consumption endeavours. This is primarily due to the resultant escalation in the prices of non-traded commodities, which subsequently hampers labour provision and work exertion among the recipients, thereby

promoting leisure activities (Chami et al., 2005). Henceforth, it can be posited that the remittances of labourers had the potential to exert either a favourable or unfavourable influence upon the enduring expansion of per capita income, contingent upon the nature of the economic endeavour (be it investment or consumption) that said remittances were allocated towards.

Capital formation: Capital formation was defined as the portion of a country's current output and imports that was not consumed or exported during the accounting period but rather reserved as an augmentation to its stock of capital goods. Total capital formation could be categorically classified as gross fixed capital formation. The gross fixed capital formation was denominated in US dollars. Capital formation was deemed crucial to the economy of a nation, as it had the potential to augment output and stimulate economic growth. Furthermore, it is worth noting that the impact of capital production on a nation's economy is undeniable, as the allocation of resources towards capital formation has been observed to exert a significant influence on the overall trajectory of economic growth. Consequently, it was predicted that the capital creation coefficient would exhibit a positive value. Remittances have been observed to mitigate credit limitations, bolster capital allocation, and foster economic growth within nations characterized by less developed financial systems. On the contrary, it has been asserted that the growth benefit of remittance through financial sector channels may be constrained if said remittances fail to mitigate liquidity constraints within the financial system or are not utilized for productive investments (Nyamongo et al., 2012).

Labour force: The participation of the labour force was proxied by the population aged 15-64 years. The phenomenon of remittance has been observed to exert two distinct effects on the labour force. To commence, in the event that the immigrants transmitting remittance were proficient employees, the home nation could have encountered a deficit in human resources (Rao & Hassan, 2012). The aforementioned circumstance would have had a deleterious impact on the economic advancement of developing nations. Secondly, should family members residing in the receiving nations perceive remittances as a source of effortless financial gain, it is plausible that they would have disengaged themselves from the labour force. Concurrently, owing to the presence of moral hazard, the aforementioned beneficiaries were unable to perceive that their conduct ultimately exerted an adverse impact on production (Chami, Fullenkamp, & Jahjah, 2005). It is postulated that the labour force's anticipated contribution may have engendered a favourable influence on the trajectory of economic growth.

Financial Development: Financial development encompasses the enhancement of the mobilization and pooling of savings to facilitate the exchange of goods and services. It also involves the augmentation of information pertaining to potential investments, as well as the monitoring of said investments through the implementation of corporate governance. Additionally, the management of risk is achieved through trading and diversification (Levine, 2005). A proficiently operating financial system had the capacity to exert influence over saving rates, investment decisions, and technological innovation. This, in turn, led to the long-term growth of the per capita income level in the domestic country. Furthermore, it has been posited by scholars such as Aghion et al. (2005) and Khan (2001) that the augmentation of

financial development has the potential to facilitate enduring economic growth. This is achieved through the mitigation of information costs pertaining to external finance and the amplification of financial intermediation. The latter enables transactions to be executed by means of credit extensions.

In this context, the measurement of financial development pertained to the quantification of domestic credit allocated to the private sector expressed as a percentage of the Gross Domestic Product (GDP). The present study assumed that nations characterized by substantial remittance inflows would experience successful economic growth through the effective utilization of comparatively superior financial mechanisms. The proliferation of financial services has been observed to facilitate the dispersion of risk, thereby engendering a consequential impetus for investment in both tangible and intangible assets, thereby leading to a commensurate augmentation in output growth (Olayungbo & Quadri, 2019; Sutradhar, 2020). Furthermore, it was predicted that the development of financial intermediaries would contribute to the enhancement of the quality of life for the impoverished population in emerging nations through various means. For instance, it was anticipated that a well-functioning financial system would alleviate funding limitations on economic activity, stimulate the build-up of physical and human capital, and enhance financial investments. Furthermore, the attainment of financial growth facilitated individuals in the accumulation of funds for unforeseen circumstances through the consistent allocation of monetary resources into deposit-taking institutions. Consequently, it can be postulated that the interaction term was anticipated to exhibit a positive orientation.

3.2.3 Variables, Measurement and Data Sources

The practical study for Objective 1 was centred on examining the impact of remittance on the economic growth of Bangladesh. The time series data spanning from 1976 to 2021 were retrieved from the World Bank's World Development Indicator (WDI) database. Table 3.1 encompassed elucidations pertaining to the variables.

Table 3.1 : List of Variables

Variable	Proxy	Data Source
<i>Panel A: Dependent Variable</i>		
Economic growth	Gross domestic product (in million US\$)	WDI
<i>Panel B: Explanatory Variables</i>		
Remittance inflows	The remittance as a GDP percentage	WDI
Labour	Labour force participation is proxy by population 15–64 years of age	WDI
Capital formation	Gross fixed capital formation in US\$.	WDI
Financial Development	Domestic credit in the private sector as a GDP percentage	WDI

Note: WDI = World Development Indicators

3.2.4 Method of Estimation

In order to assess the influence of remittance on economic growth, the study constructed an econometric model that was predicated upon the time series character of the data. The variables utilized in the research were either I (0), I (1), or a combination of both. Consequently, the utilization of the ARDL cointegration approach was employed. ARDL has been used in various such as Kumar (2013), Das et al. (2019), Chowdhury (2016), and Olayungbo & Quadri (2019). It has been one of the best models in investigating the role of remittances on various outcomes. Therefore, this study employed ARDL cointegration approach developed by Pesaran

et al. (2001) to explore the relationship between remittance, exchange rate, and the tradable sector.

The initial stage of this study was to ascertain the stationarity of each time series variable, whether it was stationary at the level, first difference, or second difference. The subsequent methodological selection was influenced by the order of the variables. The Augmented Dickey-Fuller (ADF) test, which was developed by Dickey and Fuller (1979), has been extensively employed as the predominant unit root test for assessing the stationarity of variables. Furthermore, two supplementary unit root tests were identified: the Phillips and Perron unit root test (Phillips and Perron, 1988) and the KPSS unit root test (Kwiatkowski et al., 1992). The validation of the findings from the ADF test and PP test was undertaken through the utilization of the KPSS unit root test.

The Autoregressive Distributed Lag (ARDL) bound testing model, as proposed by Pesaran et al. (2001) and Pesaran and Shin (1999), has been widely referenced in previous studies. For instance, Danish et al. (2018), Rahman (2017), Rahman and Kashem (2017), and Shahbaz et al. (2013) have all made use of this model in their research. The ARDL model has frequently been rendered invariant to OLS, VECM, and VAR models through the incorporation of a self-defined lag length structure, owing to its tender short and long-run estimates.

The primary objective of this study was to ascertain the stationarity of each time series variable, specifically whether it exhibited stationarity at the level, first difference, or second difference. The order of the variables dictated the subsequent

selection of methodology. The Augmented Dickey-Fuller (ADF) test, which was developed by Dickey and Fuller (1979), has been extensively employed as the predominant unit root test for assessing the stationarity of variables. Furthermore, two supplementary unit root tests were identified: the Phillips and Perron unit root test (Phillips and Perron, 1988) and the KPSS unit root test (Kwiatkowski et al., 1992). The KPSS unit root test was employed in order to corroborate the findings of the ADF test and PP test.

There existed several advantages to the utilization of an ARDL model in contrast to other models, as it was not approached in the customary manner of cointegration. The primary advantage of the ARDL model was its flexibility in scrutinizing associations, regardless of whether the order of integration was $I(0)$, $I(1)$, or a combination of both. In a singular equation, it was imperative to efficaciously portray all conceivable outcomes. It was found that dissimilar lag structures could be employed for both forecasted and forecasting variables. This approach was particularly suitable for the measurement of small groups of variables and short time spans. Furthermore, it facilitated the unbiased estimation of long-term memory and its coefficients. Additionally, this method effectively addressed issues such as endogeneity, multicollinearity, heteroscedasticity, and autocorrelation within the model.

3.2.4.1 Unit Root Test

If the statistical characteristics of a time series Y_t ($t = 1, 2, \dots$) did not change over time, it would have been regarded as stationary (in the broad sense) in terms of its expectation, variance, and autocorrelation. White noise can be regarded as an

instance of a stationary time series, wherein Y_t adheres to the normal distribution $N(\mu, \sigma^2)$ irrespective of temporal considerations. The identification of non-stationarity in a series facilitated subsequent investigations into the underlying source of said non-stationarity. As an illustration, it is worth noting that a series that lacks stationarity can, in certain cases, attain stationarity through differencing, which is occasionally referred to as being integrated of order 1.

Specifically, Y_t , being non-stationary, does not possess the desired property, whereas the $Y_t - Y_{(t-1)}$ difference does. This occurrence exemplifies the concept of a random walk. Furthermore, it is worth noting that a series could exhibit a state of stagnation in its overall trajectory.

Stationarity tests were employed to ascertain whether a series exhibited stationarity or not. There existed a plethora of methods for the verification of stationarity. Among these was the enhanced Dickey-Fuller test (ADF). The concept of testing for a unit root in time series was pioneered by Dickey and Fuller (Dickey & Fuller, 1979). Unit root tests were employed to compare the null hypothesis, which posited the absence of a unit root in a series, with the alternative hypothesis, which suggested that the series exhibited trend stationarity. The initial unit root test employed in the study was the Augmented Dickey-Fuller (ADF) test. The ADF test was founded upon the principles of regression analysis, as follows:

$$\Delta y_t = \beta D_t + (\rho - 1)y_{t-1} + \sum_j^p \psi_j \Delta y_{t-j} + \epsilon_t \quad (3.5)$$

In this context, D_T represents a vector comprising deterministic components, wherein one of these components could potentially be a constant or a trend. The ADF test

was utilized to compare the null hypothesis, which posited that the series was I(1) or possessed a unit root, with the alternative hypothesis, which suggested that it was I(0). The ADF test eliminated serial correlation in the residuals by including lagged dependent variables, denoted as Δy_{t-j} , in the specification. The variable y_t is a vector that denotes the time series data. The order of the deterministic component, denoted as P , is a scalar. ρ is the estimated autoregressive coefficient deemed a valid choice.

3.2.4.2 Lag Length Selection

In order to determine the optimal lag length (k) for the underlying equation in the long run, it was necessary to employ suitable model order selection criteria, such as the Akaike Information Criterion (AIC), the Schwarz Bayesian Criterion (SC), or the Hannan-Quinn Criterion (HQ). The model exhibiting the lowest AIC and SC values, or characterized by modest standard errors and a high R^2 , demonstrated commendable performance when conventional Vector Auto Regression (VAR) was employed.

3.2.4.3 ARDL Bound test for Co-integration equations

$$\Delta Y_t = \beta_0 + \sum_{i=1}^p \lambda_i \Delta Y_{t-i} + \sum_{i=0}^q \delta_i \Delta X_{t-i} + \varphi_1 Y_{t-1} + \varphi_2 X_{t-1} + v_t$$

ARDL Short run terms

Long run

(3.6)

3.2.4.4 Autoregressive Distributed Lag (ARDL) Model

ARDL was an ordinary least square (OLS) model that comprised lags for both the dependent variable, Y_t , and the explanatory variables, X_{it} . The ARDL (p,q) model is characterized by the inclusion of p lags of Y and q lags of X. The baseline ARDL equation was as follows:

ARDL (p,q):

$$Y_t = \beta_0 + \beta_1 Y_{t-1} + \beta_2 Y_{t-2} + \dots + \beta_p Y_{t-p} + \delta_1 X_t + \delta_2 X_{t-1} + \dots + \delta_q X_{t-q} + \varepsilon_t \quad (3.7)$$

In compact form: ARDL (p,q): $Y_t = \beta_0 + \sum_{i=1}^p \beta_i Y_{t-i} + \sum_{i=0}^q \delta_i X_{t-i} + \varepsilon_t \quad (3.8)$

ARDL Model Equation:

$$\Delta \ln(EG) = \alpha + \beta_1 \ln(LF) + \beta_2 \ln(GFC) + \beta_3 \ln(REM) + \beta_4 \ln(FD) + \beta_5 \ln(REM*FD) + \varepsilon$$

In this equation:

- $\Delta \ln(EG)$ represents the first-difference of the natural logarithm of the dependent variable (e.g., Economic growth rate).
- $\ln(LF)$ represents the natural logarithm of the Labor force variable.
- $\ln(GFC)$ represents the natural logarithm of the gross fixed capital formation variable.
- $\ln(REM)$ represents the natural logarithm of the remittance's variable.
- $\ln(FD)$ represents the natural logarithm of the financial development variable.
- $\ln(REM*FD)$ represents the natural logarithm of the interaction term variable.
- α is the intercept term.

- $\beta_1, \beta_2, \beta_3, \beta_4,$ and β_5 are the coefficients that represent the long-run impact of each variable on GDP.
- ε represents the error term capturing the short-run dynamics and unexplained variation.

3.2.4.5 Error Correction Mechanism: The equation of the Error Correction Mechanism (ECM) in an Autoregressive Distributed Lag (ARDL) model is:

$$\Delta y_t = \alpha_0 + \sum_{i=1}^p \beta_i \Delta y_{t-i} + \sum_{j=1}^q \gamma_j \Delta x_{t-j} + \delta_1 ECM_{t-1} + \varepsilon_t \quad \dots \quad (3.9)$$

Where:

- Δy_t is the differenced value of the dependent variable at time t
- α_0 is the constant term
- β_i are the coefficients of the lagged differenced values of the dependent variable
- γ_j are the coefficients of the lagged differenced values of the independent variable
- δ_1 is the coefficient of the ECM term
- ε_t is the error term

3.2.4.6 Diagnostic Tests

Furthermore, the study scrutinized diagnostic tests, including residual normality, heteroskedasticity, and serial autocorrelation, to ascertain the presence of misspecification and validate the parameter estimation results of the estimated model. The Breusch-Godfrey test was employed to ascertain whether the errors within a regression model exhibited autocorrelation. The utilization of residuals from

the regression model under consideration is employed, and a test statistic is computed from these residuals. The null hypothesis posited that there was no presence of serial correlation up to order p . The nomenclature of the LM test for serial correlation occasionally arises from its foundation in the Lagrange multiplier concept. Furthermore, the CUSUM test was employed to ascertain the stability of the model. The CUSUM test, developed by Brown, Durbin, and Evans in 1975, was rooted in the cumulative sum of the recursive residuals. This option depicted the cumulative sum alongside the key 5 per cent lines. If the cumulative total of the parameters exceeded the region between the two critical lines, the test would have indicated parameter instability.

3.3 The Impact of Remittances on the Exchange Rate

3.3.1 Theoretical Framework

The research conducted by Clark and Macdonald (1999) examined the BEER approach, which involved evaluating the misalignment of the currency through the assessment of the behavioural equilibrium exchange rate. In the present study, the researcher shall employ the behavioural equilibrium exchange rate (BEER) approach, utilizing a condensed iteration of the original model as posited by Wang, Hui, and Soofi (2007) to establish the Equilibrium Exchange Rate. Henceforth, the reduced form shall be expounded upon as follows: The Bangladesh Currency-Taka (BDT) real effective exchange rate, the tradable sector, the terms of trade, the relative price of trade goods to non-trade goods (commonly referred to as the Balassa-Samuelson impact), the foreign exchange reserve, the real interest rate, and the alteration of the money supply as a gauge of the monetary policy shall be the

focal points of examination. Therefore, the present study aimed to establish the BDT behavioural equilibrium exchange rate model within the boundaries of the following research framework:

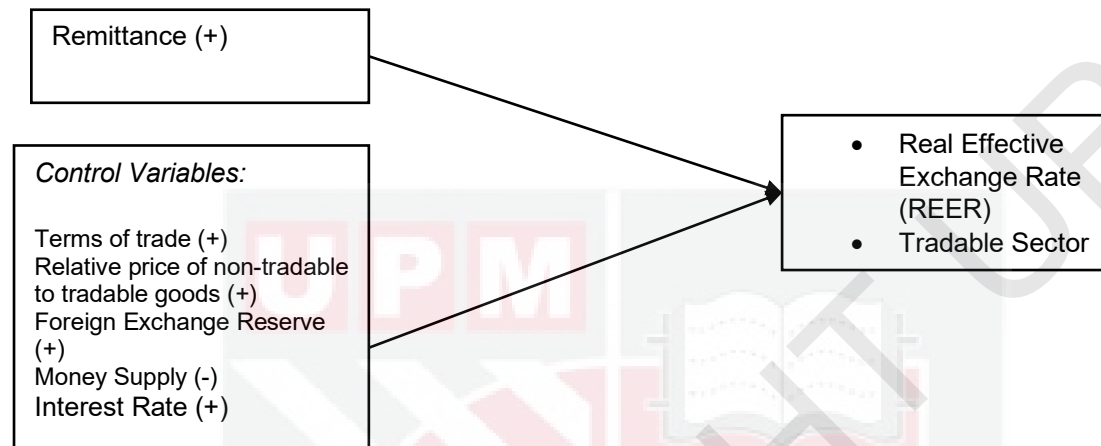


Figure 3.2 : Research Framework

Figure 3.2 presents the research framework employed in the investigation of potential associations between remittances and the equilibrium real effective exchange rate in the long run. Furthermore, this framework explores the effects of currency spending on resource movement, specifically favouring the non-tradable sector while potentially compromising the production of tradable goods. In accordance with the investigation conducted by Lartey et al. (2012), the present thesis undertakes an examination of the Dutch disease ramifications of remittances.

This is achieved through the estimation of an equation that delineates the ratio of tradable-to-non-tradable output as the dependent variable, in conjunction with a standard equation that incorporates the real exchange rate as the regression. This study aimed to capture the effect of resource movement, specifically the impact of remittances on the productive sector of the economy. In accordance with the research

conducted by Lartey et al. (2012), the present study delineated the concept of "tradable output" as the sum of agricultural and manufacturing output, while "non-tradable output" was defined as services. The dependent and independent variables were further discussed as follows:

The Real Effective Exchange Rate (REER) is commonly denoted as the nominal effective exchange rate divided by the price index. The process of valuing the currency of a country against a weighted average of some other countries is referred to as the nominal effective exchange rate. As per Darvas (2012), the assessment of the historical progression of a nation's currency's real value is conducted through the evaluation of its real effective exchange rate in relation to a designated group of currencies, namely its trading partners. In this regard, real appreciation would be discerned when there was an augmentation in the real effective exchange rate within the nation that received the remittances. The REER, conversely, was derived from the NEER, also known as the nominal effective exchange rate, which served as a measurement of the relative value between the nation in question and its various trading counterparts. The calculation of the REER was as follows:

$$REER_t = \frac{NEER_t \cdot CPI_t}{CPI_t^{(foreign)}} \quad (3.10)$$

In this context, the $REER_t$ presents the real effective exchange rate of the domestic country against the overall basket of the currencies of all the trading partners. In this respect, the CPI_t is referred to as the consumer price index of the domestic country.

Remittances (REM) were denoted as the aggregate sum of officially documented monetary transfers executed by individuals residing abroad for the purpose of

employment. The impact of unrequited private transfer inflows, whether they were inspired by exogenous or endogenous factors, was found to be substantial in terms of long-term movements in the real effective exchange rate. The possibility of this occurrence can be observed in countries that receive higher remittances, such as Bangladesh. The remittances dispatched by labourers, akin to other forms of private transfers, augmented the disposable income at hand, thereby engendering an elevated aggregate demand for both non-traded and traded commodities within remittance-receiving nations, such as Bangladesh. However, as a result of the exogenous nature of the business goods' prices, the internal equilibrium pertaining to non-traded goods experienced an increase. Consequently, a spending effect emerged, specifically the appreciation of the real effective exchange rate. The resource movement effect could be identified as a consequence of the reallocation of assets from the business to non-business sectors of the economy, which was caused by the rise in the relative price of non-traded products and services resulting from the inflows of remittances sent by workers. Therefore, it can be inferred that the inflow of remittances may not have led to an appreciation of the equilibrium real effective exchange rate, consequently affecting the allocation of resources among the productive sectors of the economy, particularly in the case of Bangladesh, a recipient of substantial remittances. Therefore, it was anticipated that the remittance would bear a positive indication.

Term of trade (TOT) was commonly known as the ratio between the export price index and the import price index. In the event that the prices of exports were to surpass those of imports, a nation would have experienced a positive term of trade, thereby enabling it to procure a greater quantity of imports for an equivalent volume of exports. In this regard, a development occurred in the case of trade, which led to

an increase in the price of exports and subsequent rising revenue. This, in turn, necessitated a demand for non-traded products, potentially resulting in a real exchange rate appreciation. Furthermore, the higher relative price of imported goods resulted in a decrease in the terms of the business, which, in turn, led to an increase in the demand for non-traded goods. Consequently, such an outcome would have contributed to the appreciation of the real exchange rate, provided that the substitution impact had prevailed over the overall income impact. Moreover, in instances where a negative impact prevailed, a decline in terms of trade led to a decrease in the demand for non-traded goods, consequently leading to a depreciation in the real exchange rate, as posited by Ostry (1988). Therefore, it was anticipated that the TOT would exhibit a positive indication.

The **Relative Price of Non-tradable to Tradable goods (TNT)** is called the internal price ratio. This is grounded in the Balassa-Samuelson model, which is predicated upon the divergence observed in productivity levels between tradable and non-tradable goods. Consequently, there was an increase observed in the incidence of wages in both sectors. However, it should be noted that the prices of non-tradable goods experienced an increase, albeit modest, as a result of the relatively stable or less fluctuating prices observed in the tradable sector. Hence, the escalation of wages in the non-tradable sector could have occurred without any corresponding recompense stemming from heightened productivity within said sector. Consequently, the internal price ratio experienced an increase. Nevertheless, in the event that the internal price ratio of the country experienced a decline, it would result in the country's Real Effective Exchange Rate (REER) remaining undervalued. On the contrary, in the event that the price ratio experiences an internal increase, the

resultant effect would be an overvaluation of the overall real effective exchange rate. In customary practice, the prices of non-tradeable goods were predominantly conveyed through the valuation of said goods, while the prices of tradable products or services were delineated by the wholesale price, as observed in the majority of empirical studies. Thus, the determination of the internal price ratio can be attributed to the ratio between the domestic price index and the domestic producer price, as posited by Clark and MacDonald in 1999. However, the utilization of these proxies posed challenges and difficulties, given the multitude of tradable products and services that constituted the foundation for the construction of the consumer price index number. Moreover, in the context of Bangladesh, the application of the Balassa-Samuelson impact may have been hindered by the implementation of price controls and certain limitations imposed on labour mobility across sectors. Therefore, the researcher employed per capita output as a rudimentary gauge to assess the alterations in productivity within the context of Bangladesh. Consequently, it was anticipated that the TNT would exhibit a positive indication.

The augmentation of the **Money Supply (MON)** within the realm of monetary circulation has been observed to engender a consequential devaluation of the real exchange rate. Conversely, a reduction in the money supply has been noted to exert a compelling influence on the exchange rate, prompting its adjustment to a more fitting level. Therefore, it is plausible that MON could have exhibited a negative indication. If all factors remain constant, it can be posited that an augmentation in the money supply may engender inflationary tendencies, as a surplus of currency would be compelled to pursue the same limited pool of products or services. Consequently, enterprises would find themselves compelled to raise prices in order

to maintain equilibrium. Alternatively, in the event of an expansionary monetary policy encompassing interest rate reductions, a propensity towards elevated aggregate demand would arise, thereby potentially instigating inflationary pressures. It is plausible that domestic inflation could have engendered a diminution in the competitiveness of products and services, thereby resulting in a concomitant reduction in the aggregate export volume. Consequently, a diminished demand for the currency would have led to a decline in the exchange rate markets.

Furthermore, if an individual augments the money supply, the interest rate could be diminished, albeit necessitating the central bank's involvement in the process of generating additional currency. However, it is imperative to acknowledge that an augmentation in the supply of money exerted a downward influence on the aggregate interest rates. Hence, the decrease in interest rates would have also inclined to diminish the worth of the prevailing currency. In the event that the interest rate in the United Kingdom experienced a decline in comparison to other regions, the allure of depositing funds in UK financial institutions would have been diminished. Henceforth, an outflow may be observed as investors would have relocated their funds to nations where the interest rates were comparatively elevated. Consequently, such circumstances exerted pressure on the currency as investors opted to divest from it in favour of acquiring alternative currencies. Therefore, it was anticipated that MON would exhibit a negative polarity.

The concept of **Foreign Exchange Reserve (RES)** can be elucidated as the comprehensive accumulation of net foreign assets which has been acquired by the central banks of a given nation. The Central Bank of Bangladesh is known as

Bangladesh Bank (BB). In the event of an augmentation in the foreign reserve, the demand for the domestic currency would have been heightened, potentially leading to an appreciation of the real exchange rate. Hence, it is plausible that the RES could have exhibited a positive indication.

Nevertheless, it should be noted that an increase in the value of the currency had the potential to negatively impact export valuations, while the subsequent depreciation could have significantly distorted import bills. Hence, the appreciation of the currency could have potentially resulted in a mitigating scenario for exporters. In the contemporary era, the prevailing global tendency pertaining to the management of currencies facilitated the possibility of both appreciation and depreciation, thereby constraining the interpretation of export-oriented economies. However, the maintenance of a higher foreign reserve primarily served the purpose of mitigating financial instability on a global scale in the eventuality of a potential global predicament that could have posed challenges. In this regard, it was argued by Stieglitz (2006) that the South Asian crisis in 1997 could serve as a compelling testament. Therefore, the foreign reserve was referred to as an efficacious instrument that would uphold the lower real exchange rate, thereby fostering trade and enhancing overall international competitiveness in accordance with the mercantilist motive (Aizenmann & Lee, 2005). Moreover, it can be observed that there was an augmentation in confidence regarding the investment, which subsequently led to the expansion of the business due to the increased reserves. The assertion that a higher reserve fosters exports and safeguards the currency from appreciation against the dollar is substantiated by the research conducted by Dooley et al. (2004).

As per the findings of Bacchante et al. (2006), it was determined that the volatility of the real exchange rate had an adverse impact on a country's growth prospects. This adverse impact primarily manifested in the form of reduced growth rates. Furthermore, in the event of heightened volatility, the financial development of the country could potentially find itself in a precarious situation. However, it was argued by Dooley et al. (2003) that the augmentation of reserves could have facilitated economic growth and maintained an undervalued real exchange rate, as exemplified in the case of China. Therefore, it could be anticipated that RES may have exhibited a positive indication.

Services (% GDP) refers to the value-added of the service sector expressed as a share of the GDP (WDI=World Development Indicators).

Agriculture (% GDP) is determined by evaluating the value added from the agricultural sector in relation to the share of GDP (International Standard Industrial Classification= ISIC divisions 1–5). Agriculture encompassed the value added derived from the cultivation of crops, hunting, forestry, fishing, and the production of livestock (WDI).

Manufacturing (% GDP): Value added by the manufacturing sector as a share of GDP (WDI) (ISIC divisions 15–37).

3.3.2 Model Specification

Wang et al. (2007) posited that the Behavioural Equilibrium Exchange Rate was determined by various factors, including the Money Supply (MON), Foreign

Exchange Reserve (RES), relative Price of Non-Tradable to Tradable Goods (TNT), Terms of Trade (TOT), and Real Interest Rate (R). In accordance with the research conducted by Lartey et al. (2012), this thesis undertook a subsequent examination of the impact of remittances on resource movement. This was achieved by estimating an equation that delineates the ratio of tradable-to-non-tradable output as the dependent variable. Additionally, the standard equation, which considers the real exchange rate as the regressed variable, is as follows:

$$\text{REER/ Tradable Sector} = f(\text{TOT, TNT, RES, MON, R}) \quad (3.11)$$

In addition, Woodruff & Zanteno (2007) and Keynes (1929) presented as:

$$\text{REER/ Tradable Sector} = f(\text{REM}) \quad (3.12)$$

Thus, in an integrated process, it can be presented as below (3.11):

$$\text{REER/ Tradable Sector} = f(\text{REM, TOT, TNT, RES, MON, R}) \quad (3.13)$$

Drawing upon the contemporary studies conducted by Kumar (2013), Das et al. (2019), Chowdhury (2016), and Olayungbo & Quadri (2019), the present study employed the widely recognized approach developed by Pesaran et al. (2001), known as the Autoregressive Distributed Lag (ARDL) approach, to investigate the association between remittance, exchange rate, and the tradable sector. The model was presented as follows:

$$REER_t = \alpha REER_{t-1} + \beta_0 + \beta_1 REM_t + \beta_2 TOT_t + \beta_3 TNT_t + \beta_4 RES_t + \beta_5 MON_t + \beta_6 R_t + \mu_t. \quad (3.14)$$

$$(\text{Tradable Sector})_t = \alpha(\text{Tradable Sector})_{t-1} + \beta_0 + \beta_1 REM_t + \beta_2 TOT_t + \beta_3 TNT_t + \beta_4 RES_t + \beta_5 MON_t + \beta_6 R_t + \mu_t \quad (3.15)$$

In this regard, $REER_t$ is called the real effective exchange rate in a country at a specific time t , while REM_t is remittance inflow to a specific country at a time t . The control variables encompassed Terms of Trade (TOT), Money Supply (MON), Real Interest Rate (R), Relative price of non-tradeable to tradeable goods (TNT), Foreign Exchange Reserve (RES) at time t . Furthermore, the μ_t is called the error term in a country at a time t in which t means a number of series, i.e., $t=(1,2,3,...,T)$. Moreover, α denotes the coefficient of the lag-dependent variable. In this regard, coefficients for independent variables are mainly the measurement of $\beta_0, \beta_1, \beta_2, \text{ and } \beta_3$ in the equation of (3.14) & (3.15).

3.3.3 Variables, Measurement and Data Sources

This section presents data derived from an investigation conducted to examine the impact of remittances on the Real Effective Exchange Rate in Bangladesh. Thus, the present study presents the annual time series data of Bangladesh for the period spanning from 1972 to 2021.

Table 3.2 : List of Variables

Variable	Measurement	Data Source
<i>Panel A: Dependent Variable</i>		
Real Effective Exchange Rate	CPI-based real effective exchange rate	WDI
Tradable Sector	Agriculture, manufacturing and services output as a share of GDP	WDI
<i>Panel B: Explanatory Variables</i>		
Remittance inflows	REM represents the remittance as a GDP percentage/ Per capita Personal received (current US \$)	WDI
Terms of Trade	The ratio of the export price index to the import price index	WDI
Relative Price of Non-tradable to Tradable goods	Per capita output as a measure of change in the productivity in Bangladesh	WDI
Foreign Exchange Reserve	The total stock of net foreign assets accumulated by the Central Bank of Bangladesh	WDI
Money Supply	MON, Money supply (% of GDP).	WDI
Real Interest Rate	United States real lending interest rate (%)	

Note: WDI = World Development Indicators

3.3.4 Method of Estimation

In order to assess the influence of remittance on the Real Effective Exchange Rate (REER), a research endeavour was undertaken to construct an econometric model that relied upon the temporal nature of the data. The variables utilized in the research were classified as either $I(0)$, $I(1)$, or a combination of both. Consequently, the utilization of the ARDL co-integration approach is employed. The technique in question was thoroughly examined and deliberated upon in Section 3.1.3 of the present chapter.

3.4 The Impact of Remittances on Household Consumption Expenditures

3.4.1 Theoretical Framework

The theoretical underpinnings that constituted the foundation of the practical estimations in this study were derived from various theoretical models. The third objective of the study was to elucidate the factors that examined the microeconomic impact of remittances in Bangladesh.

Based on the perspectives of New Economics and Labour Migrations (NELM) and the livelihood approaches, the prevailing body of literature espouses the notion that labour migration has had an impact on the household level by alleviating destitution and absolute poverty (Stark and Taylor, 1989; Quinn, 2006). According to Quinn (2006), remittances served as the central elements that supported households in overcoming local development constraints.

In a broader sense, remittances manifest as a consequence of migration, as expounded upon by Massey et al. (1993). The authors delve into the economic rationales behind migration, commencing with neoclassical economic theory, which ascribes migration to disparities in wages. This theory posits that the net influx of migrants ought to transpire from regions with lower wages to those with higher wages. The concept of migration has been expanded to the household level in the field of economics, wherein it has been observed that migration can be employed as a means to mitigate risk by diversifying sources of income. Specifically, migration has the potential to serve as a form of insurance against local shocks, particularly in cases where market failures prevent the availability of such insurance. Remittances could have played a pivotal role in this theory, as they were made at the household

level, and migration could have taken place even in the absence of income differentials. Another perspective, known as the dual labour-market hypothesis, posited a connection between migration and the persistent demand for foreign workers in recipient nations. According to the tenets of global systems theory, it can be posited that foreign investment exerted a significant influence on the phenomenon of outward migration, primarily by eroding the conventional peasant economies of developing nations.

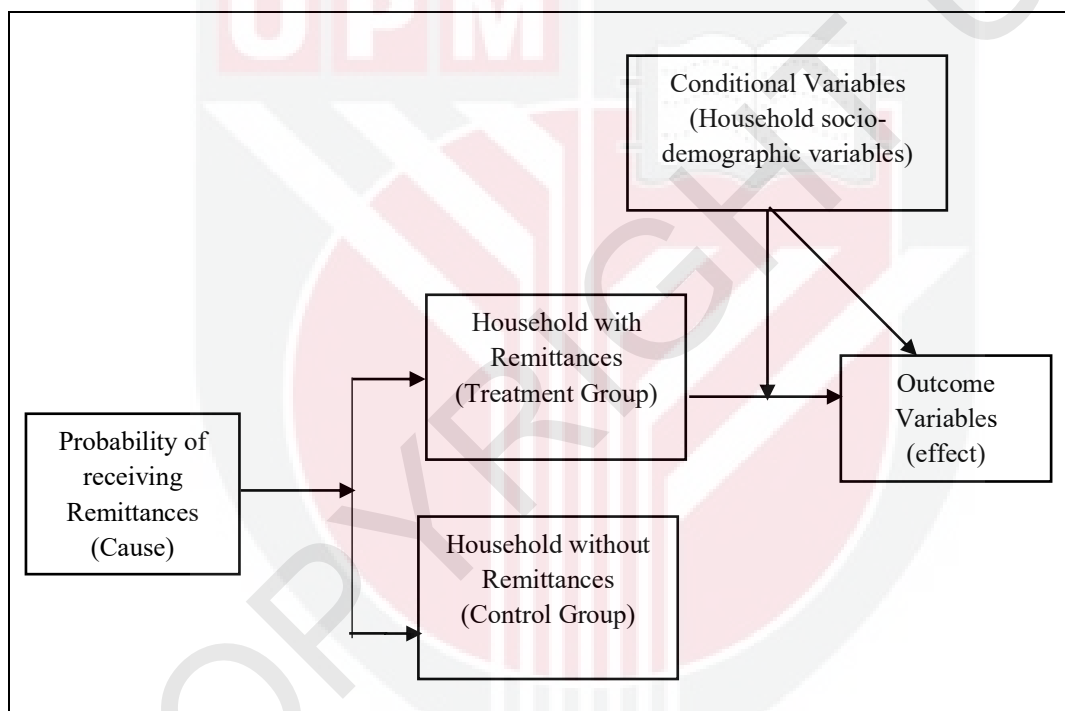


Figure 3.3 : Research Framework

The present study examined the proportion of per capita expenditure allocated to different bundles of products and services, utilizing household consumption expenditure as the primary outcome variable. The treatment group was characterized by the receipt of remittances, while the control group was characterized by the non-receipt of remittances. In this regard, it is pertinent to note that the households were

divided into two distinct groups, namely those that possessed remittances and those that did not possess remittances. Thus, the allocation of per capita expenditure share among households was primarily distributed across six distinct categories, namely food, housing, consumer goods and durables, health, nutritional status, and other miscellaneous expenses. In this regard, Figure 3.3 depicts the treatment and control groups alongside the conditional variables and outcome variables of the study. However, the set of conditional variables comprised six distinct variables. In this regard, the initial phase aimed to ascertain the variables that exerted a significant influence on the likelihood of households receiving remittances. Previous studies have indicated that the receipt of remittances is influenced by socio-demographic factors within the household, including but not limited to household size, possession of mobile phones and telephones, access to electricity, age of household head, gender/sex, educational attainment, land ownership, loan status, housing structure, presence of latrine facilities, and availability of drinking water at home. These variables were identified as potential determinants that could impact the probability of remittance receipt in Bangladeshi households.

Furthermore, it is worth noting that the conditional variables that were established had the potential to exert an influence on the outcome variable, encompassing various aspects such as food, housing, consumer goods and durables, education, health, nutritional status, and other related factors. Subsequently, the study endeavoured to ascertain the impact of remittance reception on various domains, including but not limited to food, housing, consumer goods and durables, education, health, nutritional status, and other pertinent factors. Consequently, the ultimate impact of remittances in the country of origin was contingent upon various other

factors, including the size of the migrant population, the income distribution among households in the source country, and the cessation of remittance utilization. The study aimed to calculate the average impact of remittances on household expenditure behaviour across different categories of goods. Various other variables were taken into account, such as household size, ownership of mobile phones and telephones, access to electricity, gender, age of household head, level of education, land ownership, loan status, housing structure, presence of latrine, and availability of drinking water.

Thirdly, after controlling for all other conditional variables, the study computed the average impact of remittances on household consumption expenditures, encompassing categories such as food, housing, consumer goods and durables, education, health, nutritional status, and various others.

Figure 3.3 depicts the diagrammatic representation of the factors that exerted influence on the receipt of remittances and their subsequent impact on the behaviour of household consumption expenditure. In light of the meticulous management of all other conditional variables, this study ultimately computed the influence of remittance on the outcome variables, specifically, the allocation of expenditure across different bundles of products or services. In this regard, mathematically, the concept of the empirical model can be demonstrated as follows:

Probability of receiving remittance =f (household size, mobile phone, telephone, electricity, sex, age of head, education, land, loan, housing structure, latrine, drinking water) (3.16)

Proportion household consumption expenditures on food, housing, consumer goods and durables, education, health, nutritional status and others = f (household size, mobile phone, telephone, electricity, sex, age of head, education, land, loan, housing structure, latrine, drinking water) ... (3.17)

The independent/conditional variables in the expenditure function have been presented below:

The concept of **Household Size** denotes the numerical representation of the family members comprising a given household. The present study posited that there existed a positive correlation between the size of a household and the gross expenditure of said household over the course of a year.

The term "**Mobile Phone**" was employed to indicate the utilization of a portable telecommunication device within specific geographical regions of a nation. A household was primarily regarded as 1 if it utilized a mobile phone for communication purposes on a permanent basis, while it was considered as 0 if there was no usage of mobile devices.

The term "**Telephone**" was employed to indicate the utilization of a telephonic device within a domestic setting, wherein a value of 1 was assigned to signify active engagement in communicative endeavours. Conversely, a value of 0 was ascribed to instances of non-usage.

The term "**Electricity**" denoted the provision of an electricity connection at the national level for a given household, whereas the dummy variable assumed a value

of 1 to indicate the presence of an electricity connection within the said household and a value of 0 to signify the absence of such a connection.

The **Gender of the household head** in the society of Bangladesh was predominantly male, as males in this society assumed a significant role in the decision-making process pertaining to various household matters. Henceforth, this study incorporated the gender of the head as one of the variables within the model. In this regard, the variable is denoted as dichotomous, wherein a value of 1 is assigned to denote the male gender of the household head, while a value of 0 is assigned to signify the female gender.

The **Age of the household head (years)** is the variable that represents the household head's experience. The inclusion of this factor is predicated upon the assumption that the level of expertise possessed by the head of the household may have exerted a noteworthy influence on the deliberative process pertaining to the allocation of financial resources.

The variable denoted as "**Household head's education**" encompasses the extent of formal education attained by the individual serving as the head of the household, measured in terms of years. Nevertheless, it was encompassed within this study as a surrogate for the aptitude to make decisions. In this regard, the New Economics of Labour Migration (NELM) entailed the active participation of all household members, particularly the adults, in the decision-making process. Henceforth, it is evident that they participated in all activities pertaining to migration. Moreover, individuals of higher education possessed a greater abundance of ideas, skills, and

knowledge pertaining to the various international employment prospects available to their family members, who were deemed eligible to engage in work overseas. Therefore, they were considered to be superior decision-makers. Therefore, the inclusion of the educational attainment of the household head is deemed significant in this study, warranting its incorporation as a variable within the model.

The **Land** was evaluated in hectares as the explanatory variable in the model. Nevertheless, the acquisition of land in a developing nation such as Bangladesh was found to possess significant economic and social worth. The significance of land in Bangladeshi households with regard to the acquisition of remittances and expenditure patterns was of utmost importance.

The variable known as **Housing Type and Structure** was referred to as a categorical variable, encompassing a range of values spanning from 0 to 2. In this regard, it is to be noted that the numerical value of 1 is assigned to the semi-permanent dwelling, while the numerical value of 0 is designated for the temporary home. Furthermore, the numerical value of 2 is allocated to the permanent residence. The aforementioned type of dwelling holds great significance as an indicator of the economic and social standing of households within Bangladeshi society. Nevertheless, this variable was primarily constructed based on the dummy variables derived from questions 2.04, 2.05, and 2.06. The aforementioned items can be located within the dataset that was furnished in Section 6 and part-A of the HIES-2016 survey. These factors encompassed whether the abode possessed a foundation composed of cement, whether the abode possessed walls constructed from cement, and whether the abode possessed a roof made of tin or cement. If such an item were

present, its value would be deemed as 1; conversely, in its absence, the value would be regarded as 0.

The term "**Latrine**" connoted the presence of a sanitary latrine within the context of this study. In Bangladesh, the national scenario was observed to be highly favourable, as a significant proportion of households within the country were discovered to possess sanitary facilities, which were regularly utilized by the inhabitants for their daily needs. In this context, the numerical value of 1 signifies the presence of a permanent toilet facility within a household, whereas the numerical value of 0 indicates the utilization of either a temporary toilet or the utilization of open spaces for the disposal of human waste.

The consumption of **Drinking water** encompassed the utilization of tube well infrastructure. In this regard, the value of 0 was used to indicate whether households utilized canal, pond, or river water for drinking purposes, while the value of 1 denoted the presence of permanent tube well water among the householders.

The dependent/outcome variables in the expenditure function were delineated as follows:

The consumption value of various **Food** items, such as rice, wheat, maize, pulses, cooking oil, vegetables, tea, bread, and dairy products, was considered in determining the proportion of per capita food consumption in a given year.

The concept of **Housing and Land** encompasses the assessment of the per capita annual utilization of housing value, taking into account whether the proprietor primarily utilized it or whether it possessed a rental value during periods of tenancy.

Examples of expenses that were commonly incurred in the past include the payment of house rent, the undertaking of painting projects, the acquisition of residential properties and land, as well as the allocation of funds towards the maintenance and repair of said properties.

The category of **Consumer Goods and Durables** encompassed the allocation of per capita expenditure towards recurrent non-consumer goods or items. The value of durable house goods was also encompassed within the scope of this study.

Education encompassed the allocation of per capita resources towards the educational needs of individuals, such as expenses related to books, tuition fees, transportation fees, registration fees, and charges for stationery.

Health encompassed the proportion of health expenditure per capita, comprising expenses such as medication, physician fees, laboratory testing fees, transportation costs, and hospitalization fees over the course of a single year.

Miscellaneous goods variables comprised non-regular and infrequent items, such as gifts, ceremonies, weddings, recreational activities, funerals, as well as taxes and fines, all assessed based on per capita expenditure within a one-year timeframe.

3.4.2 Model Specification

In order to achieve the objectives outlined in the study, a matching technique was employed to address any potential issues arising from self-selection. In order to attend to these concerns, the researchers employed the utilization of developed

propensity-matching estimators, as outlined by Rosenbaum and Rubin in their seminal works in 1983 and 1985. Households that received remittance and those that did not were likely to exhibit disparities in a multitude of discernible and indiscernible factors that could potentially be linked to the outcome variables. Consequently, investigations pertaining to the impact of remittance are rendered intricate due to the presence of selectivity-related inquiries. The extant body of research predominantly consisted of non-experimental studies characterized by a lack of experimental design. Furthermore, these studies frequently failed to employ an appropriate methodology for effectively addressing the challenges associated with selection biases. While the circumvention of this issue was attempted by certain writers through the utilization of instrumental variables, the identification and evaluation of a suitable instrument proved to be a challenging task. Therefore, in order to address the potential bias that may have arisen from unobserved heterogeneity, the study employed propensity-matching estimators, which were originally formulated by Rosenbaum and Rubin in 1983 and 1985. The utilization of a propensity score was employed to match every treatment observation (i.e., remittance-receiver home) with a designated quantity of control observations (i.e., non-remittance-receiver households). The technique employed by the author enabled the generation of robust estimators, thereby facilitating the ascertainment of the effects of remittance at the household level. The aforementioned technique facilitated the construction of counterfactuals, thereby ascertaining the hypothetical outcome for a household receiving remittances if it were to be deprived of such financial inflows. In the utilization of matching estimators, two pivotal assumptions were made: the Conditional Independence Assumption (CIA), also known as Unconfoundedness and the assumption of Common Support. The study delineated the

variable D as having a value of 1 in the event that a family received remittance, while a value of 0 was assigned when a family did not receive remittance. The term " Y " (1) denoted the outcome experienced by the recipients, while " Y " (0) denoted the outcome observed among those who did not receive any remittance. It is of utmost importance to underscore that the outcome variables were per capita income, per capita consumption, and poverty status. Furthermore, the X is indicative of the assemblage of socio-demographic factors. Consequently, the following assumptions were formulated:

$$Y(0) \perp Y(1) \mid D \mid X \quad (3.18)$$

$$0 < p(D = 1 \mid X) < 1$$

The Conditional Independence Assumption was demonstrated to indicate that in cases where the set of observable variables X remained unaffected by the treatment, the Potential outcomes (P) were found to be entirely orthogonal to the treatment assignment (Khandker et al., 2010), thereby enabling the possibility of observable selection. In order to establish the counterfactual, it was necessary to match the Common Support assumption sets of each household that had received remittances with those households that had not received any. Once these assumptions were made, it became possible to determine the average treatment effect between $D=1$ and $D=0$.

Nevertheless, certain computational challenges emerged due to the presence of dimensionality. In order to surmount these challenges, Rosenbaum and Rubin (1983) proposed the creation of a statistical comparison group through the computation of a propensity score, denoting the probability of observations receiving remittance based

on a given set of variables X . The utilization of the propensity score was employed in order to match the groups of individuals who received remittances with those who did not receive remittances that the premises of conditional independence and mutual assistance implied.

$$Y(0) \perp Y(1) \perp D | P(X) \quad (3.19)$$

$$0 < P(D = 1 | P(X)) < 1$$

In this context, the variable $P(X)$ denotes the propensity score or the likelihood of observations having received remittance in the presence of X . This is commonly denoted as propensity score matching. Essentially, if receiving remittance is independent of the observable factors X , then it must also be independent of $P(X)$. The dimensionality problem was reduced to a singular dimension. Dehejia and Wahba (1999) made a noteworthy discovery pertaining to the absence of matching issues. Specifically, they found that observations possessing identical propensity scores exhibited an equivalent distribution of the vector of variables X .

The derivation of the propensity score is accomplished through the utilization of a Probit model, which has been suitably adjusted to account for all discernible factors that possess the potential to influence the receipt of remittances. The study conducted a calculation to determine the probability of each observation ($T=1$ and $T=0$) receiving remittance. Subsequently, the balancing condition was tested, specifically examining whether $P(X|D = 1)$ is equal to $P(X|D = 0)$. As indicated by Heckman et al. (1998) and Becker & Ichino (2002), certain observations pertaining to the control group, characterized by inadequate common support, were excluded with the intention of deriving causal inferences. In the event that the balancing

property is infringed upon, the Probit model is augmented with additional specifications encompassing higher order terms and covariate interactions, with the aim of reinstating the aforementioned balancing property. After the estimation of propensity scores and the fulfilment of the balancing property, the study employed a univariate nonparametric regression to ascertain the average treatment effect on the treated (ATT) between households that received remittances and those that did not receive remittances, characterised as follows:

$$ATT = E[Y(1) - Y(0) | D = 1] = E[Y(1) | D = 1] - E[Y(0) | D = 1] \quad (3.20)$$

3.4.3 Variables, Measurement and Data Sources

Table 3.3 shows a list of variables pertaining to the primary objective of the study. The dataset utilized in this thesis was obtained from the 2016 Household Income and Expenditure Survey (HIES). The primary objective of employing this dataset was to enhance comprehension of migration patterns and remittance behaviours within the context of household-level questionnaire-based data, which is nationally representative in nature. The HIES 2016 encompassed the data collected from a total of 46,076 households situated across various regions of Bangladesh. Among these households, 32,096 were classified as rural, while the remaining 13,980 were categorized as urban. The survey was conducted utilizing a sample of 2,304 Primary Sampling Units (PSUs), which were distributed across 20 distinct strata. These strata consisted of eight rural areas, eight urban areas, and four statistical metropolitan regions, namely Dhaka, Chittagong, Rajshahi, and Khulna (BBS, 2017). The survey aimed to gather information pertaining to demographics, housing, health, education, employment, and income. Furthermore, the survey was conducted in a cross-sectional manner, a method deemed advantageous for the objectives of this thesis.

This approach facilitated the acquisition of data pertaining to the receipt of remittances by household members, as well as other indicators pertaining to familial impoverishment.

The survey was conducted by the Bangladesh Bureau of Statistics (BBS) at five-year intervals. According to HIES (2016), a total of 46,076 households were encompassed, out of which 3,400 households were identified as recipients of international remittances. While encompassing data on both domestic and international remittances, the present investigation exclusively directs its attention towards the international dimension. The information that was presented in the survey pertaining to internal migration was deemed incomparable to that of international migration, and as a result, it was excluded. Furthermore, it is worth noting that the prevalence of households engaging in internal migration was notably lower in comparison to those partaking in international migrations. A household was deemed as a remittance-receiving household if it received remittances from abroad, irrespective of the sender's familial relationship or lack thereof. On the contrary, a household whose members resided abroad but did not receive any form of remittance was categorized similarly to the household that did not receive remittances.

Table 3.3 : Description of the Variables for Analyzing the Marginal Spending Behaviour

Variable name	Variable Description
Education	The ratio of total education expenditures to total annual household expenditures
Health	The ratio of total health expenditures to the total household annual expenditures
Food	The ratio of total food expenditures to the total household annual expenditures
CD	The ratio of annual household expenditures on consumable and durable products to total annual expenditures.
Housing & land	The ratio of total housing and land expenditures to total annual household expenditures.
Others	The ratio of total annual household expenditures to total expenditures on others.
Foreign Remittance	=1 if the household receives remittance from abroad; = 0 otherwise
Rural	= 1 if the household is in the rural area; =0 otherwise
Household Size	Number of members living in the household
Mobile Phone	= 1 if the household has access to a Mobile Phone connection; = 0 otherwise
Tele Phone	= 1 if the household has access to a phone connection; = 0 otherwise
Electricity	= 1 if the household does have an electricity connection; = 0 otherwise
Male Head	= 1 if the head of the household is male; = 0 otherwise
No. HH working-age member	Number of household members of working age
No. elderly (age>65)	Number of household members over the age of 65
Secondary	= 1 if the head of the household does have Secondary education; = 0 otherwise
Higher Secondary	= 1 if the head of the household does have higher secondary education; = 0 otherwise
University	= 1 if the head of the household does have a university education; = 0 otherwise
Agricultural land-owning	= 1 if the household one's own agricultural land; = 0 otherwise
Mud	= 1 if the wall of the house is built with mud; = 0 otherwise
Bamboo	= 1 if the wall of the house is built with bamboo; = 0 otherwise
Tube well	= 1 if the household does have a tube well for drinking water; = 0 otherwise
Pucca Toilet/ Latrine (Pit)	= 1 if the toilet/Latrine of the house is built with brick; = 0 otherwise

3.4.4 Method of Estimation

The establishment of Propensity Score Matching (PSM) can be attributed to the work of Rosenbaum and Rubin (1983) in their publication titled "The Central Role of the Propensity Score in Observational Studies for Casual Effects".

The PSM technique was employed for the purpose of reconstructing counterfactuals from observational data. The elimination of two types of bias in observational data is achieved: bias arising from a deficiency in distribution overlap and bias arising from uneven density weighting (Heckman, Ichimura, Smith, & Todd, 1998). The concept of a propensity score can be defined as a numerical measure denoting the probability of individuals participating in a study being assigned a particular therapeutic intervention solely based on observable variables. The PSM was a specialized process that calculated the causal effect by utilizing propensity scores and a matching algorithm. Prior to advancing, it is imperative to establish a conceptual differentiation between PSM and Heckman's (1979) "selection model." The selection model employed by him was founded upon instrumental factors and sought to indirectly assess the probability of treatment assignment. Hence, for the purpose of calculating the probability utilizing the selection model, it was imperative that one or more variables were not subjected to censorship or truncation and possessed the ability to predict the selection. For instance, should an individual desire to investigate the impact of training on future earnings, it becomes imperative to address the inherent self-selection problem, given that salaries are only observable for individuals who are actively engaged in employment. The adjustment for selection bias in the wage prediction model can be achieved by computing the inverse Mills ratio using the projected probability obtained in the initial step

(Equation $D=Z+u$). In contrast to the projected probability of the Heckman selection model, the construction of propensity scores is solely based on observable predictors. Furthermore, the utilization of propensity scores and projected probabilities, as determined by Heckman selection, played a pivotal role in the assessment of causal effects. The probabilities generated by the Heckman model give rise to an inverse Mills ratio, which could be employed to rectify the bias resulting from censoring or truncation. On the other hand, the probabilities derived from the Propensity Score Matching (PSM) technique are utilized to modify the distribution of covariates between the treatment and control groups.

The propensity score $e(x)$ for any subject i , represents the probability of assignment to a certain treatment, with observed covariates x_i (see Rosenbaum and Rubin, 1983):

$$e(x_i) = \Pr (z_i = I \mid x_i) \quad (3.21)$$

and

$$\Pr(z_1 \dots z_n \mid x_1 \dots x_n) = \prod_{i=1}^N e(x_i)^{z_i} \{1 - e(x_i)^{1-z_i}\} \quad (3.22)$$

Where:

$z_i = 1$, for treatment in randomized studies, covariates

$z_i = 0$, for control and are variables that are not affected by the allocation of treatments to Subjects.

x_i , the vector of observed covariates for the i^{th} subject

The propensity score is probabilistic and is between 0 to 1.

To expound upon the matter, IF propensity score matching was employed within a randomized experiment aimed at comparing two distinct groups, it was observed that the propensity score assigned to each participant involved in the study was precisely 0.50. This was due to the fact that each participant was allocated to either the treatment or control group at random, with a 50% probability. In instances where randomization is absent, such as in the context of a quasi-experimental design, it becomes necessary to calculate the propensity score. The values of the propensity score were contingent upon a vector of observable factors that were associated with the reception of treatment.

In a general context, when the propensity score of a treatment subject aligns with that of a control subject, the observed variables are inherently controlled for. As a result, any disparities between the treatment and control groups were elucidated and were not attributable to discernible confounding factors.

There are existed numerous methodologies for the estimation of causal effects; hence, it behoved management scholars to inquire as to the significance of propensity score matching (PSM) in their pursuits. One plausible explanation posits that a significant proportion of management papers were predicated upon observational data. While the acquisition of such extensive quantities of data may have been highly affordable, it was predominantly characterized by observational rather than experimental methodologies. The PSM facilitated the recreation of counterfactual scenarios through the manipulation of variables within the treatment and control groups, utilizing observational data. If the assumption that is strongly ignorable, as stated in the subsequent section, was satisfied, the Propensity Score

Matching (PSM) method could produce an unbiased estimation of the causal effect when utilizing observed datasets. Secondly, the erroneous specification of econometric models that utilize observational data could occasionally lead to biased estimators. One potential source of such bias can be attributed to a deficiency in the distribution overlap between the two samples, a phenomenon that eludes detection through regression analysis. Cochran (1957, pp. 265-266) elucidated this predicament by providing the subsequent illustration: "Let us posit that the investigation entailed the adjustment for disparities in parental income when comparing children attending private and public schools. In this scenario, the income bracket for private-school attendees spanned from \$10,000 to \$12,000, while the income range for public-school attendees extended from \$4,000 to \$6,000." The covariance purportedly adjusted the findings to a mean income of \$8,000 in each group despite the absence of any observations with incomes at or near this level in either group. The PSM was capable of detecting and correcting for the absence of covariate distributions between two groups. Thirdly, it should be noted that in previous studies, the utilization of linear or logistic models was observed in order to accommodate the presence of confounding factors. However, it is important to acknowledge that these models were contingent upon certain functional form assumptions. For instance, one of the assumptions that was required for a linear model to provide an unbiased estimate was that it was free of the aforementioned endogeneity problem. The process for calculating propensity scores was traditionally parametric in nature. However, it is noteworthy that in the majority of cases where propensity scores have been employed to ascertain causal effects, a nonparametric approach has been favoured. Hence, the utilization of the Propensity Score Matching (PSM) method for the computation of the causal effect was found to be less

susceptible to the violation of model assumptions. In a general sense, when an individual desires to examine the effectiveness of a specific management technique but encounters limitations in collecting empirical data, it is advisable to employ the Propensity Score Matching (PSM) methodology. This approach should be utilized, at the very least, as a rigorous examination to substantiate the conclusions posited through parametric models.

The study employed logistic regression in order to acquire the propensity scores. The strategy that was most frequently employed to estimate propensity scores is as follows. The aforementioned is a mathematical model that was employed to predict the probability of an event transpiring.

$$\ln \frac{e(x_i)}{1-e(x_i)} = \ln \frac{\Pr(z_i=1|x_i)}{1-\Pr(z_i=1|x_i)} = \alpha + \beta^T x_i \quad (3.23)$$

Where:

$$e(x_i) = \Pr (z_i = 1 \mid x_i)$$

$$e(X_i) = b_0 + b_1 X_1 + b_2 X_2 + b_3 X_3 + \dots + b_i X_i$$

and b_0 = intercept

b_i = regression coefficient

X_i = treatment variables as well as covariates

x_i = observed value of variables

The dependent variable is always a binary value, and $Z_i=1$ is the treatment (or remittance-receiving group). $Z_i =0$ is the control (or the non-remittance receiving group).

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Introduction

The present chapter has been divided into three distinct sections, delineated by the meticulous examination and subsequent revelations pertaining to the three primary objectives of the study. Section 4.2 of the initial segment explicated the organisation of the findings pertaining to objective one. Sections 4.2.1 and 4.2.2 encompassed the examination of descriptive statistics and correlation analysis, respectively. Furthermore, in Section 4.2.3, an exposition was provided encompassing the analysis of data, presentation of results, and subsequent discussions. The findings for objective two were reported in Section 4.3 of the second section. The inclusion of descriptive statistics and correlation analysis was observed in Sections 4.3.1 and 4.3.2. The provision of data analysis was presented in Section 4.3.3. The findings were deliberated upon in Section 4.3.4. Furthermore, the organisation of the findings for objective three was presented in Section 4.4 of the third section. In the preceding discourse, Sections 4.4.1 and 4.4.2 were dedicated to the presentation of descriptive statistics alongside the provision of an estimation pertaining to the Propensity Score. Moreover, Sections 4.4.3 and 4.4.4 encompassed the examination of stratification and balancing techniques for the propensity score, the quantification of the causal impact, and the subsequent deliberation of the outcomes. Section 4.5 comprised a concise summary of the chapter.

4.2 The Impact of Remittances on Economic Growth

This section delineated the successive stages of the analysis and presented the outcomes pertaining to objective one, which entailed an examination of the influence exerted by remittances on the economic growth within the confines of this nation. More specifically, the section scrutinised the manner in which the advancement of a country's local financial sector influenced a nation's ability to derive advantages from remittances. The research employed data spanning 46 years in order to arrive at the conclusion that remittances have contributed to the growth of Bangladesh, particularly in the presence of well-established financial systems. This is achieved by offering an alternative avenue to the financial system and aiding in the mitigation of liquidity constraints. The aforementioned conclusion was derived subsequent to the meticulous analysis of the data. The research further examined the presence of a positive correlation between capital formation and long-term economic growth while concurrently observing a negative correlation between remittances and economic growth. The initial presentation and subsequent discussion revolved around the exposition of descriptive statistics and correlation analysis. The outcomes of the data analysis were presented next, followed by the findings, and finally, the discussion.

4.2.1 Descriptive Statistics

Table 4.1 : Summary of Descriptive Statistics

Statistics	EG	REM	FD	LF	CF	REMXFD
Mean	5.10	4.71	23.56	59.01	21.89	143.12
Median	5.15	3.59	20.78	58.68	22.42	69.51
Maximum	7.88	10.59	44.20	61.82	32.21	452.93
Minimum	0.82	0.19	2.97	58.53	9.91	0.55
Std. Dev.	1.57	2.82	12.98	0.90	6.32	135.73
Skewness	-0.47	0.58	0.14	2.49	-0.07	0.79
Kurtosis	2.82	2.24	1.69	7.36	1.84	2.23
Observations	46	46	46	46	46	46

Note: EG: Economic Growth, REM: Remittances, FD: Financial Development, LF: Labor forces, CF: Capital formation

Table 4.1 presents descriptive statistics. The dependent variable in this study was EG, while REM, FD, LF, and CF assumed the roles of independent variables. The variable of interaction was ascertained to be REMXFD. The years encompassing the period from 1976 to 2021 in Bangladesh were incorporated into the dataset for every respective variable.

The dependent variable of the experimental group (EG) exhibited a mean value of 5.10, with a maximum value of 7.88 and a minimum value of 0.82. A value of 1.57 was obtained for the standard deviation of EG. Furthermore, it is noteworthy to mention that the sample results exhibited a reduced level of variability, as indicated by a standard deviation of 1.57. This observation suggests that the phenomenon under investigation, namely EG, maintained a consistent pattern throughout the various time periods. Furthermore, it is worth noting that the EG exhibited a skewness value of -0.47 and a kurtosis value of 2.82, respectively. It has been ascertained that EG, in all practicality, exhibited a resemblance to a normal distribution.

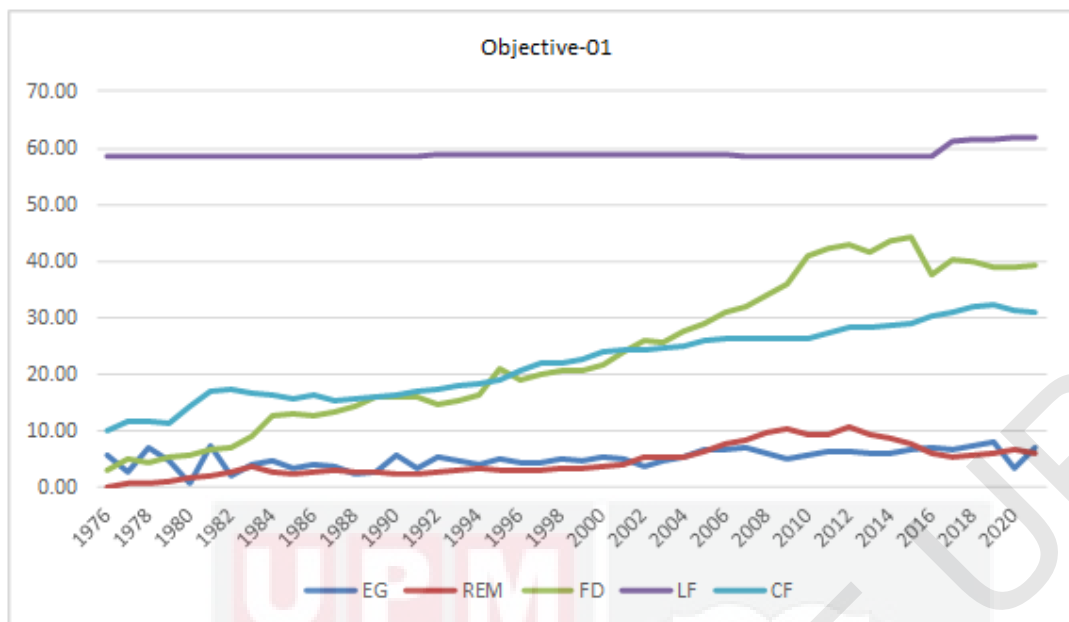


Figure 4.1 : Time Series Plots of the Variables Used in the Analysis

4.2.2 Correlation Analysis

Table 4.2 : Summary of Correlation Statistics

Variables	EG	REM	FD	LF	CF	REMXFD
EG	1.00					
REM	0.47	1.00				
FD	0.57	0.90	1.00			
LF	0.27	0.12	0.39	1.00		
CF	0.57	0.82	0.95	0.51	1.00	
REMXFD	0.53	0.97	0.93	0.18	0.82	1.00

Note: EG: Economic Growth, REM: Remittances, FD: Financial Development, LF: Labor forces, CF: Capital formation

Table 4.2 presents the correlation coefficient that was calculated between all of the variables. The potential range of the correlation coefficient was observed to span from -1 to +1. In instances where a more robust association is observed between the two variables, the magnitude of the coefficient is correspondingly augmented to duly signify this heightened relationship. A perfect linear relationship was denoted by a Pearson correlation with an absolute value of 1, which was considered the maximum

possible score. The indication of the absence of a linear relationship between the variables is denoted by a correlation value that was found to be in close proximity to zero. The sign of the coefficient provided an indication of the direction that the connection would go. When two variables exhibited a propensity to rise or fall in unison, it was observed that the coefficient for the correlation was positive, thereby indicating an upward slope for the correlation line. In instances where one variable exhibited a proclivity for ascent while the other variable demonstrated a propensity for descent, the correlation coefficient assumed a negative value, thereby indicating an inverse relationship. Consequently, the graphical representation of this correlation manifested as a downward-sloping line.

In the aforementioned data, it was observed that the Pearson correlation coefficient between EG and REM approximated 0.47, thereby suggesting a modestly positive correlation between the two variables. The correlation between EG and FD was observed to be approximately 0.57, thereby signifying the presence of a positive association between the aforementioned variables. Furthermore, a discernible correlation between the variables was observed, indicating a somewhat positive relationship. This was substantiated by the correlation analysis conducted on the variables EG and FD. The value of the Pearson correlation between EG and LF was determined to be approximately 0.27. The presence of a positive correlation between these factors engendered the postulation that the variables themselves possessed a tenuous positive interconnection. Furthermore, the correlation coefficient, which approximated 0.57, indicated a moderately positive relationship between EG and CF.

4.2.3 Data Analysis, Result and Discussion

Table 4.3 : Unit Root Test for Stationarity

Variables	Phillips–Perron test				Augmented Dickey-Fuller Test				Remark
	At level		At first difference		At level		At first difference		
	t-Statistic	Prob.	t-Statistic	Prob.	t-Statistic	Prob.	t-Statistic	Prob.	
EG	-0.64	0.43	-15.73	0.00	-0.93	0.77	-4.78	0.00	I(1)
REM	-1.61	0.47	-4.80	0.00	-1.50	0.53	-4.77	0.00	I(1)
FD	-1.07	0.72	-6.97	0.00	-1.06	0.72	-6.69	0.00	I(1)
LF	0.13	0.96	-6.21	0.00	0.18	0.97	-6.94	0.00	I(1)
CF	-1.33	0.61	-4.72	0.00	0.73	0.77	-6.97	0.00	I(1)
REMxFD	0.14	-0.69	-4.91	0.00	0.14	0.69	-4.71	0.00	I(1)

Note: EG: Economic Growth, REM: Remittances, FD: Financial Development, LF: Labor forces, CF: Capital formation

In order to investigate the time series characteristics of the data, both the Phillips–Perron and Augmented Dickey-Fuller tests were carried out. The findings are displayed in Table 4.3, as presented below. Based on the findings, it was determined that none of the variables exhibited stationarity in relation to the level. However, they did demonstrate stationarity when considering the first difference.

Table 4.4 : Co-Integration Relationship’s Bounds Test Results

Calculated F-value: 14.18		
Significance level	Critical bounds	
	Lower bounds	Upper bounds
10%	2.26	3.35
5%	2.62	3.79
1%	3.41	4.68

The results of the bounds test with two lags are presented in Table 4.4. The co-integration bounds test has provided evidence that the variables did, indeed, possess a long-term relationship with each other. The F-test statistic computed in the study exceeded the upper bound of the critical value as determined by Pesaran et al. (2001) at the specified level of significance. Based on the aforementioned findings, it was

ascertained that the assumption negating the presence of co-integration among the variables in the model could be refuted. The outcomes that had successfully passed the diagnostic tests for the long-term model were enumerated in the panel located at the bottom section of Table 4.5.

Table 4.5 : ARDL Model's Estimated Long-Term Coefficients. Dependent Variable: EG

Variable	Coefficient	Std. Error	t-Statistic	Prob.
REM	-0.51	0.29	-1.78	0.08
FD	-0.06	0.07	-0.87	0.39
CF	0.22	0.11	2.06	0.05
LF	-0.16	0.24	-0.67	0.51
REMXFD	0.01	0.01	1.92	0.06
<i>Diagnostic test</i>				
Jarque–Bera normality test			0.5872	0.7456
Breusch–Godfrey serial correlation test			0.7389	0.6872
Heteroskedasticity Test: Harvey			0.2451	0.2321

Note: The selected model is ARDL (1, 0, 0, 0, 0, 0)

In conjunction with the Financial Development (FD), Labour Force (LF), and Capital Formation (CF) in Bangladesh, Table 4.5 provides an estimation of the long-term correlations between Economic growth (EG) and the inflow of workers' remittances (REM). Upon extensive analysis, it was determined that the REM coefficients exhibited both significance and negativity in the long run. There could be many reasons for the negative relationship between EG and REM's in the long run, however, this finding has been similarly to the previous studies conducted by Chami, Fullenkamp, and Jahjah (2005), Le (2009), Singh et al. (2010), Raimi and Ogunjirin (2012), and Nwosa and Akinbobola (2016). The justification on the negative impact of the remittances on the economic growth in long run could be due to a number of factor, for example, dutch disease could be one of the reasons. It is because many Bangladeshi employees failed to expeditiously remit their earnings to

their home country that creates unforeseen negative impact in the long term. Furthermore, the lack of influence of workers' remittances on EG in the short-run findings is apparent that could also be the reason for the negative relationship between EG and REM's in the long run. However, given the positive and significant nature of the capital formation coefficient, it can be inferred that an increase in capital has played a pivotal role in fostering the overall economic growth of the nation. The aforementioned discovery received support from Sutradhar (2020) as well as Xia, Qamruzzaman, and Adow (2022).

Based on the positive and statistically significant interaction term, it was determined that remittances had a beneficial impact on economic growth in cases where financial development was substantial. This observation has demonstrated that remittances alone were insufficient in stimulating economic growth in Bangladesh despite its status as a significant recipient nation relative to its size. The observation, in particular, ascertained that such was indeed the circumstance. Due to the inadequate level of financial inclusion in Bangladesh, the prevalent means of money transfer employed by Bangladeshi individuals was the traditional wire transfer facilitated by money transfer operators, a method that frequently incurred high costs. The nascent stage of financial technology, which facilitates the facilitation of money transfers in a more accessible, convenient, and economical manner, is characterised by a restricted range of available goods and services. Nevertheless, the utilisation of electronic and digital payment methods experienced growth as a result of the ongoing modernization of payment system infrastructure, heightened consciousness, and the substantial rate of mobile phone penetration. The potential for remittances to

stimulate economic growth arises in the presence of heightened financial development.

Table 4.6 : ARDL's Short-Run ECM Results. Dependent Variable: EG

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D (EG (-1))	-0.26	0.13	-1.96	0.06
D (CF (-1))	0.27	0.26	1.03	0.31
D (FD (-1))	0.16	0.18	0.89	0.38
D (LF (-1))	0.34	0.50	0.68	0.50
D (REM (-1))	0.70	0.71	0.98	0.33
D (REMXFD (-1))	-0.02	0.02	-0.76	0.45
ECM (-1)	-1.05	0.22	-4.80	0.00

The Error Correction Model of EG was thoroughly discussed in detail in Table 4.6. The statistical significance of the lagged error correction terms in all equations was observed at the 1% level, indicating their importance in the analysis. Furthermore, the obtained results were deemed satisfactory in terms of their adequacy. The presence of the predicted negative sign served as evidence indicating a co-integrating relationship between the dependent variable and the independent variable.

Suppose that the coefficient of the lagged error correction term fell within the range of -1 to -2. The fluctuations were suppressed in the equilibrium route due to the presence of the lagged error correction term. The lagged error correction term in the short-run model was observed to possess a coefficient of -1.05, signifying that the process of error correction exhibited fluctuations around the long-run value in a manner that mitigated its direct convergence towards the equilibrium trajectory. In alternative terms, the process of error correction was mitigated. Nevertheless, subsequent to the culmination of this process, the rapid progression towards convergence onto the equilibrium trajectory was observed (Narayan and Smyth,

2006; Babazadeh & Farrokhnejad, 2012). Henceforth, it was observed that an error correction coefficient of -1.05 denoted the rectification of 105% of the short- and long-run error over a given duration. In other words, the entirety of the error from the preceding period, along with an additional 5% of the new error, was amended through an opposing adjustment, commonly referred to as the Explosive Equilibrium. It indicates that a coefficient greater than 1 suggests that the system is over-adjusting to the disequilibrium. This means the variable not only corrects the deviation but overshoots the equilibrium, possibly leading to oscillations around the equilibrium point rather than converging smoothly. It was posited that the process of adjusting the real exchange rate from the short-run to the long-run exhibited a general tendency towards instability, characterised by rapid and overshooting movements in both the short-run and long-run equilibria.

The conclusion that can be derived from the data presented in Table 4.6 is that the remittances sent by expatriate workers to their home country in the previous year had a minimal immediate impact on the gross domestic product (GDP) of the nation. The unforeseen insignificance impact in the short term can be elucidated by the observation that a significant proportion of Bangladeshi workers refrained from expeditiously remitting their earnings to their respective households subsequent to their accrual.

However, the presence of a feeble financial sector, distinguished by exorbitant transaction expenses and limited availability of financial products, hindered migrants from transmitting funds to their families through banking institutions. Consequently, for the purpose of augmenting remittances, it was imperative for the government to

undertake measures aimed at bolstering our institutions, thereby mitigating the impact of foreign sanctions to the greatest extent feasible. The utilisation of online banking for the purpose of cash transfer constituted an additional factor that impeded the growth in the number of remittances received within the nation. However, according to the findings, this study proposes that policymakers should implement reforms in the financial sector to address the structural challenges within the country and reduce the expenses associated with remittance transactions. This would have incentivized migrants to utilise the financial channel for their money transfers.

Based on the findings of the diagnostic tests, it was observed that the residuals adhered to a normal distribution, and no indications of serial correlation were detected in the model. This observation furnished additional evidence that instilled trust in the veracity of the outcome. The CUSUM and CUSUMSQ test statistics, as depicted in Figures 4.2 and 4.3, fulfilled the essential constraints imposed by the 5% significance level. Based on the provided statistical data, it is observed that nearly all projected coefficients maintained a consistent state throughout the duration of the estimation period.

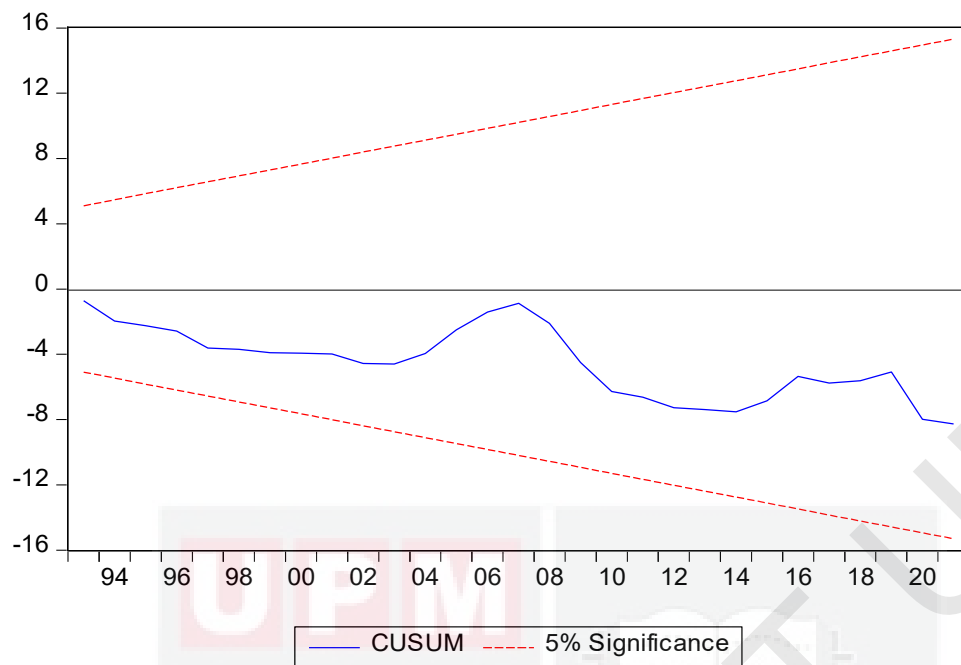


Figure 4.2: CUSUM Test

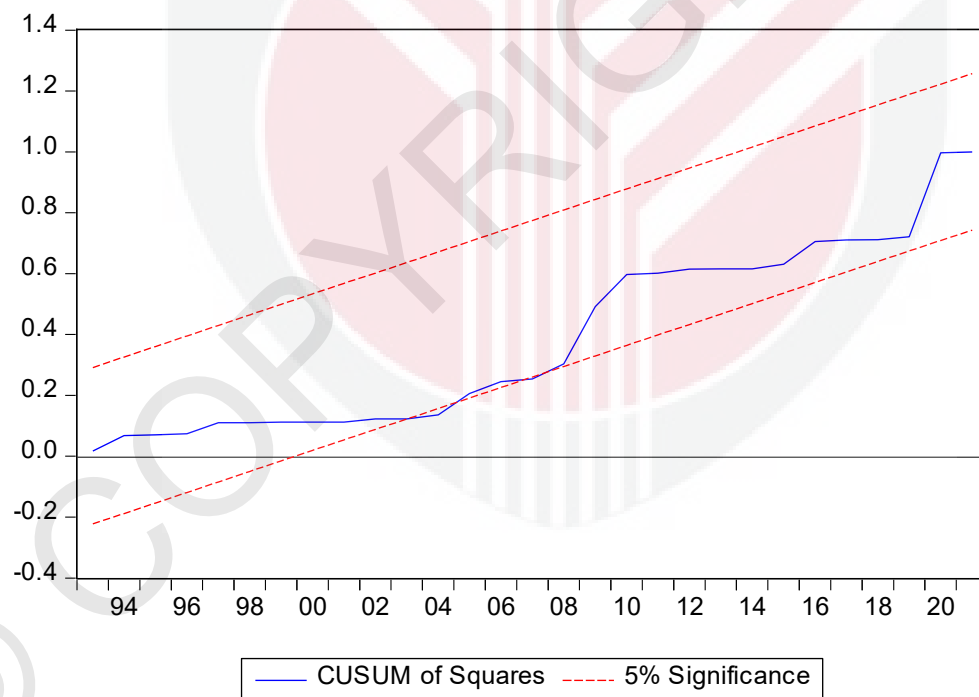


Figure 4.3: CUSUMSQ Test

4.3 The Impact of Remittances on Exchange Rate

This section unveiled the stages of the investigation and the results of objective two, which examined the impact of altering the quantity of remittances on the appreciation or depreciation of the real exchange rate. The data utilised in this particular section were sectorial data that had been disaggregated for a developing nation, such as Bangladesh. It has been deduced that elevated levels of remittances had spending effects that could result in an appreciation of the real currency rate and resource movement effects that favoured the non-tradable sector, albeit at the expense of tradable goods production. The phenomenon known as the Dutch Disease was characterised by two distinct features. The study was initiated by providing an introduction and engaging in a discussion regarding descriptive statistics. Additionally, a correlation matrix was constructed, encompassing the variables that were employed in the estimation analysis. Following this, the presentation and subsequent discussion of the regression findings occurred.

4.3.1 Descriptive Statistics

Table 4.7 : Summary of Descriptive Statistics

Statistics	REER	AGR	MFG	SERS	REM	TNT	TOT	MS	FER
Mean	129.53	22.65	15.70	49.42	4.99	0.79	0.80	38.38	9.12
Median	113.50	22.22	14.95	50.57	3.80	0.72	0.91	35.41	2.41
Maximum	203.50	34.70	21.24	53.71	10.59	1.21	1.09	64.51	46.17
Minimum	76.58	11.63	12.91	41.65	1.87	0.59	0.38	14.06	0.16
Std. Dev.	35.88	7.38	2.29	3.49	2.63	0.18	0.22	16.92	13.04
Skewness	0.63	0.12	1.35	-0.42	0.79	0.57	-0.68	0.10	1.55
Kurtosis	2.13	1.59	3.76	1.78	2.28	1.83	2.02	1.43	4.07
Observations	42	42	42	42	42	42	42	42	42

Note: REER: Real effective exchange rate, AGR: Agriculture sector, MFG: Manufacturing sector, SERS: Services sector, REM: Remittances, TNT: Tradable to Non-tradable sector, TOT: Term of trade, MS: Money supply, FER: Foreign exchange reserves.

Descriptive statistics can be observed in Table 4.7. The independent variables in the study were REM, TNT, TOT, MS, and FER, while the dependent variables consisted of REER, AGR, MFG, and SERS. The data pertaining to each variable encompassed the temporal range from 1980 to 2021.

The dependent variable, REER, exhibited a mean value of 129.53, with a maximum value of 203.50 and a minimum value of 76.58. Furthermore, the REER exhibited inconsistency across all time periods due to the heightened volatility observed in the sample data, as substantiated by the calculated standard deviation of 35.88. The data collection was potentially afflicted by heteroscedasticity. Furthermore, it is noteworthy to mention that the REER exhibited a skewness of 0.63 and a kurtosis of 2.13, indicating its adherence to a predominantly normal distribution.

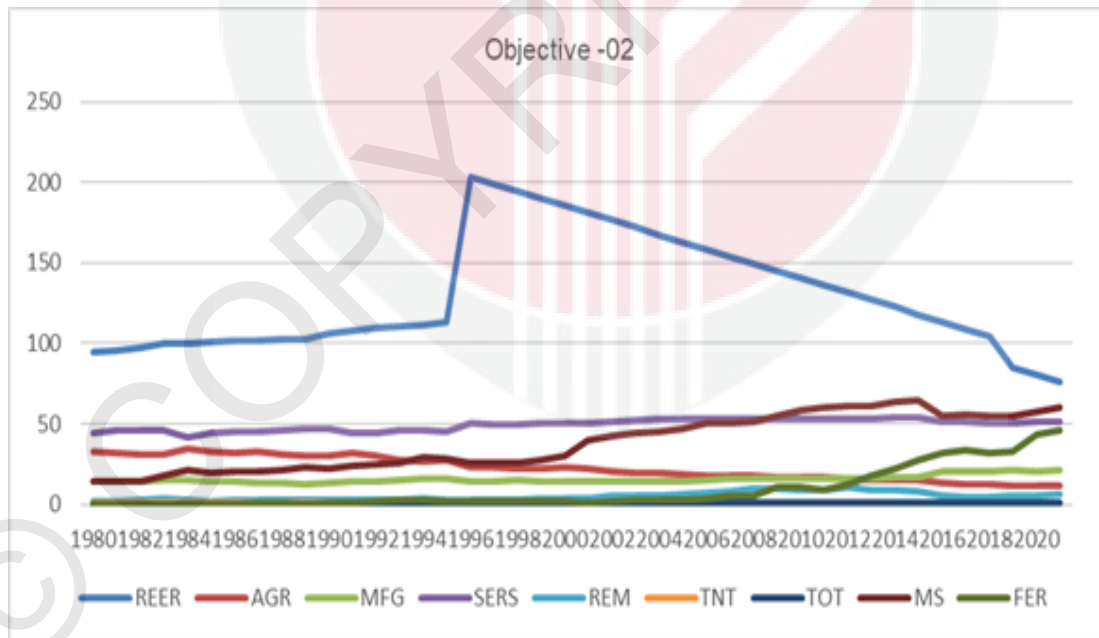


Figure 4.2 : Time Series Plots of the Variables Used in the Analysis

4.3.2 Correlation Statistics

Table 4.8 : Correlation Statistics

Variables	REER	AGR	MFG	SERS	REM	TNT	TOT	MS	FER
REER	1.00								
AGR	-0.21	1.00							
MFG	-0.37	-0.74	1.00						
SERS	0.47	-0.90	0.39	1.00					
REM	0.17	-0.74	0.37	0.82	1.00				
TNT	-0.44	0.95	-0.48	-0.99	-0.78	1.00			
TOT	0.54	-0.87	0.42	0.88	0.69	-0.91	1.00		
MS	0.08	-0.94	0.68	0.87	0.87	-0.89	0.82	1.00	
FER	-0.37	-0.77	0.94	0.47	0.40	-0.55	0.45	0.72	1.00

Note: REER: Real effective exchange rate, AGR: Agriculture sector, MFG: Manufacturing sector, SERS: Services sector, REM: Remittances, TNT: Tradable to Non-tradable sector, TOT: Term of trade, MS: Money supply, FER: Foreign exchange reserves.

Table 4.8 exhibits the correlation coefficient between the variables. The range of potential values for the correlation coefficient extended from -1 to +1. The absolute value of the coefficient that was utilised increased in proportion to the strength of the relationship that existed between the variables. The utilisation of the Pearson correlation test was employed to ascertain the presence or absence of a purely linear relationship, given that the absolute value of the correlation coefficient equalled 1. If the correlation was observed to be in close proximity to zero, it could be concluded that there existed no linear association between the variables under consideration. The indication of the link's orientation was provided by the sign of the coefficient. When both variables exhibited the inclination to concurrently augment or diminish, the coefficient was positive, and the line that depicted the correlation possessed an ascending inclination. If a variable exhibited a proclivity for augmentation while the other variable demonstrated a proclivity for diminution, then the coefficient assumed a negative value, resulting in a downward-sloping line that depicted the correlation.

The data presented in Table 4.8 revealed a weekly positive correlation between the variables, as indicated by the Pearson correlation coefficient of approximately 0.17. Furthermore, it is worth noting that the correlation between the Real Effective Exchange Rate (REER) and the Trade and Non-Trade (TNT) variable was approximately -0.44. This finding suggests the presence of a negative association between these variables, which can be characterised as far from being of moderate magnitude. The Pearson correlation value between the Real Effective Exchange Rate (REER) and the Terms of Trade (TOT) was approximately 0.54. The aforementioned variables were found to be interconnected in a manner that exhibited an inverse proportionality, thereby suggesting the presence of a modest positive correlation between said variables.

4.3.3 Data Analysis, Result and Discussion

Table 4.9 : Unit Root Test for Stationarity

Variables	Phillips–Perron test				Augmented Dickey-Fuller Test				Remark
	At level		At first difference		At level		At first difference		
	t-Statistic	Prob.	t-Statistic	Prob.	t-Statistic	Prob.	t-Statistic	Prob.	
REER	-1.22	0.66	-5.89	0.00	-1.10	0.71	-5.89	0.00	I(1)
AGR	-0.23	0.93	-7.35	0.00	-0.29	0.92	-7.35	0.00	I(1)
MFG	0.21	0.97	-6.18	0.00	0.21	0.97	-6.18	0.00	I(1)
SERS	-1.48	0.53	-7.45	0.00	-1.58	0.49	-7.42	0.00	I(1)
REM	-1.43	0.56	-4.41	0.00	-1.54	0.50	-4.38	0.00	I(1)
TNT	-1.35	0.60	-7.71	0.00	-1.45	0.55	-7.49	0.00	I(1)
TOT	-2.01	0.28	-7.70	0.00	-1.93	0.32	-7.77	0.00	I(1)
MS	-0.68	0.84	-5.22	0.00	-0.65	0.85	-5.22	0.00	I(1)
FER	4.94	1.00	-4.12	0.00	3.70	1.00	-5.45	0.00	I(1)

The examination of the time series characteristics of the data was conducted through the utilisation of both the Phillips-Perron test and the Augmented Dickey-Fuller test. The results of these tests have been succinctly summarised in Table 4.9. Based on the obtained results, it was determined that all of the variables exhibited non-

stationarity in relation to their level, while they demonstrated stationarity upon undergoing the first difference.

Table 4.10 : Bounds Test Results for Co-Integration Relationship

Calculated F-value: 6.20		
Significance level [k= 5, N=1000]	Critical bounds	
	Lower bounds	Upper bounds
10%	2.26	3.35
5%	2.62	3.79
1%	3.41	4.68

The results of the bounds test, which was conducted with the inclusion of two lags, were presented in Table 4.10. The outcomes of the bounds test for co-integration indicated that the variables indeed had a long-term relationship. The F-test statistic that was generated exhibited a value surpassing the upper threshold of the critical value, as provided by Pesaran et al. (2001). This implies that the computed value was deemed significant at the predetermined level of significance. The aforementioned outcome suggests that the hypothesis positing the absence of co-integration among the variables of the model ought to be refuted. The outcomes, which were considered satisfactory according to the diagnostic procedures of the long-term model, are presented in the last section of Table 4.11.

Table 4.11 : ARDL Model's Estimated Long-Term Coefficient. Dependent Variable: Real Effective Exchange Rate

Variable	Coefficient	Std. Error	t-Statistic	Prob.
REM	-0.87	3.21	-0.27	0.79
TNT	-195.79	48.89	-4.00	0.00
TOT	115.98	34.90	3.32	0.00
MS	-2.14	0.91	-2.35	0.02
FER	-1.48	0.50	-2.98	0.01
<i>Diagnostic test</i>				
Jarque–Bera normality test			169.1323	0.0980
Breusch–Godfrey serial correlation test			0.6703	0.5186
Heteroskedasticity Test: ARCH			0.1974	0.6593

Note: The selected model is ARDL (1, 0, 0, 0, 0)

Table 4.11 provides an estimation of the long-term correlations between the real effective exchange rate (REER) and the inflow of workers' remittances (REM), alongside the term of trade (TOT), the ratio of tradable to the non-tradable sector (TNT), money supply (MS), and foreign exchange reserve (FER) in Bangladesh. The computed results reveal that the coefficients pertaining to TNT, MS, and FER were all found to be significant and negative. Conversely, the coefficient pertaining to workers' remittances was found to be negative, with a statistically insignificant impact on the REER. The negative association between workers' remittances and the real effective exchange rate (REER) is attributable to the following rationale. The aforementioned data lends support to the study conducted by Joof and Touray (2021) as well as Lopez et al. (2007), as it showcases that the lack of long-term significance may have been attributable to an insufficiency in effective demand from foreign labourers. It is noteworthy that a statistically significant and negative coefficient was observed in relation to the money supply. The findings of Wang, Hui, and Soofi (2007) were found to be in agreement with the present study. The observation can be made that due to the negative coefficient assigned to the money supply, it can be inferred that an augmentation in the money supply would result in a reduction in the

real effective exchange rate of the nation. The occurrence of a declining real effective exchange rate (REER) within a nation is suggestive of a currency that underwent depreciation, as the REER represents the weighted mean of a country's currency in relation to an index or assortment of other prominent currencies. It is demonstrated that the prices of both the imports and exports of the country were rising. The occurrence of a rise in the relative price of exports in comparison to imports resulted in a contraction within the non-traded goods sector and prompted the movement of labour towards the export sector, along with an appreciation of the real exchange rate. Consequently, the positive term of trade (TOT) aligns with our previous estimation.

In contrast to the observed phenomenon, wherein an appreciation of the rate was noted, the arrival of remittances had the effect of depreciating the real exchange rate. It ought not to have been a matter of astonishment that Bangladesh emerged as a notable net importer of goods, concurrently exhibiting a substantial trade imbalance with various nations. The proportion of a household's disposable income that could be allocated towards imported goods experienced an increase as a direct result of the reception of remittances. On the contrary, the burgeoning demand for imports propelled the escalation of prices, thereby culminating in a diminution of the real exchange rate's worth. The influence exerted by remittances on the value of a country's currency was examined by Barajas et al. (2010), Izquierdo and Montiel (2006), and Kemegue et al. (2011).

It is conceivable that the substantial influx of foreign currency was associated with both a genuine appreciation of the exchange rate and a decline in international

competitiveness. The decline in international competitiveness, consequently, led to a reduction in the production of manufactured products and other traded items. Furthermore, it was posited by Kemegue et al. (2011) that the augmentation of remittances would primarily bestow upon the recipient economy an amplification of foreign currency reservoirs, thereby engendering the appreciation of both nominal and real exchange rates. Secondly, an augmentation in remittances would have resulted in an augmentation in the population's disposable income, thereby engendering a surge in the demand for non-tradable goods, consequently culminating in an appreciation of the real exchange rate. This circumstance would have resulted in an augmentation of the currency's value. Izquierdo and Montei (2006), however, observed that in cases where income derived from remittances was allocated towards tradable goods within economies characterised by limited domestic production, an increase in demand for imports would exert upward pressure on prices, consequently leading to a devaluation of the real exchange rate.

Table 4.12 : ARDL's Short-Run ECM results. Dependent Variable: Real Effective Exchange Rate

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D (REER (-1))	0.66	0.35	1.87	0.07
D (REM (-1))	-1.60	3.84	-0.42	0.68
D (TNT (-1))	93.62	57.16	1.64	0.11
D (TOT (-1))	-42.27	43.90	-0.96	0.34
D (MS (-1))	0.35	1.15	0.31	0.76
D (FER (-1))	-0.87	1.11	-0.78	0.44
ECT (-1)	-0.80	0.42	-1.91	0.07

The utilisation of the short-run Error Correction Model by REER is explicated in Table 4.12. The results were satisfactory, and the lagged error correction component exhibited the expected negative polarity. This observation signifies the existence of a

correlation between the dependent and independent variables, indicating their potential for co-integration. Based on the observed short-run error correction coefficient value of 0.80, it can be inferred that, over the duration of the time period, approximately 80% of the error was rectified. Based on the data presented in Table 4.12, it is observed that the inflow of workers' remittances received in the preceding year had a negligible and adverse impact on the real effective exchange rate (REER) of the nation within the short-term duration. It is plausible that such a circumstance arose due to an insufficiency in the effective demand stemming from the earnings of foreign employees, as a significant proportion of Bangladeshi labourers refrained from promptly repatriating their funds to their respective homelands. Consequently, this factor could be deemed as the principal determinant.

Figures 4.5 and 4.6 present plots of the CUSUM and CUSUMSQ test statistics correspondingly. The aforementioned statistics resided within the confines of the critical bounds at a significance level of 5%. This observation has provided support for the hypothesis that nearly all of the estimated coefficients remained constant throughout the duration of the estimating phase.

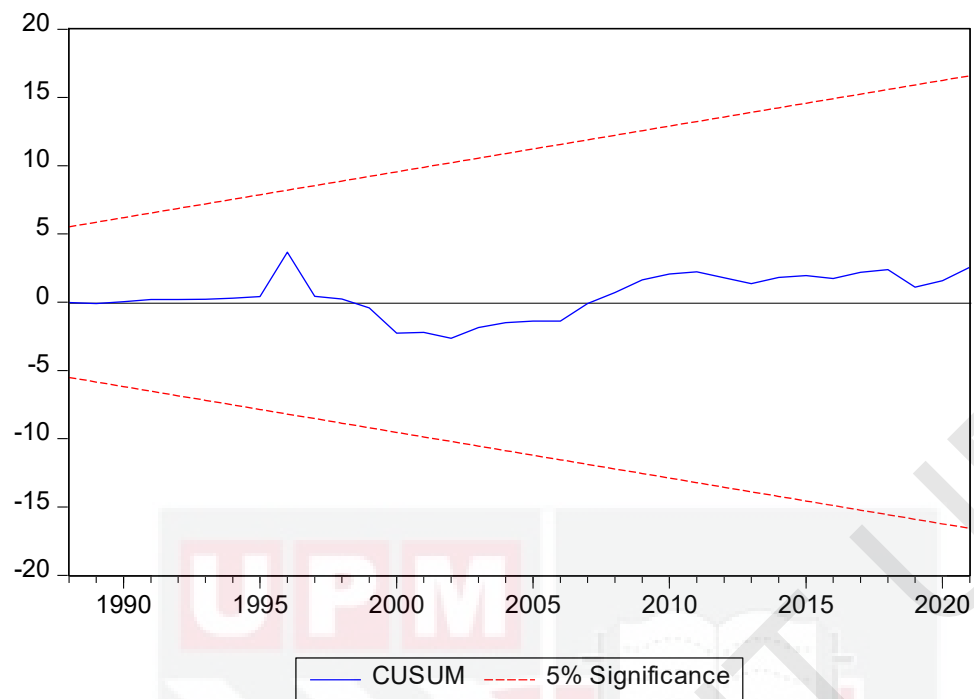


Figure 4.3 : CUSUM Test

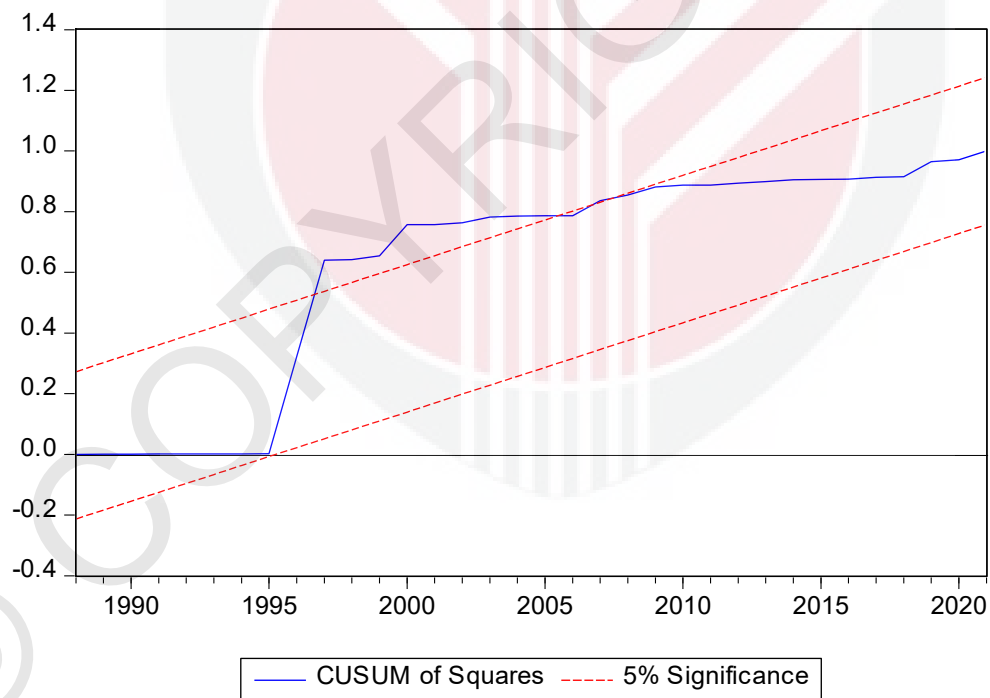


Figure 4.4 : CUSUM of Square Test

Subsequently, the present study employed the methodology of Lartey et al. (2012) to ascertain the potential correlation between remittances, the long-term equilibrium real effective exchange rate of the currency, the impact on spending, and the effects on resource movement that favour the non-tradable sector while impeding the production of tradable goods. The term "non-tradable output" denoted services, whereas "tradable output" encompassed the aggregate of agricultural and manufacturing output. The dependent variable in this study was the production of both tradable and non-tradable output. Furthermore, the standard equation, which encompassed the real exchange rate as the regressand, was also considered.

Table 4.14 presents an estimation of the enduring associations between the Agriculture sector (AGR) and the influx of workers' remittances (REM). This estimate was provided in conjunction with the term of trade (TOT), the ratio of the tradable to the non-tradable sector (TNT), the money supply (MS), and the foreign exchange reserve (FER) in Bangladesh.

The examination of the time series characteristics of the data was conducted through the utilisation of the Phillips-Perron test and the Augmented Dickey-Fuller test. The results of this analysis have been presented in Table 4.9. Based on the findings, it was determined that all of the variables exhibited non-stationarity in relation to their levels while achieving stationarity upon taking the first difference.

Table 4.13 : Bounds Test Results for Co-Integration Relationship

Calculated F-value: 6.14		
Significance level	Critical bounds	
	Lower bounds	Upper bounds
10%	2.08	3.00
5%	2.39	3.38
1%	3.06	4.15

The results of the bounds test, which was conducted utilising two lags, were presented in Table 4.13 (1, 2, 1, 1, 1, 1). The bounds test for co-integration was capable of providing evidence that a long-term relationship existed between the variables. At the specified level of significance, it was observed that the estimated F-test statistic exceeded the upper bound of the critical value provided by Pesaran et al. (2001). According to the obtained result, it was possible to reject the null hypothesis that posited the absence of co-integration among the variables in the model. The outcomes that satisfied the diagnostic tests of the long-term model were located in the bottom panel of Table 4.14.

Table 4.14 : ARDL Model's Estimated Long-Term Coefficients. Dependent Variable: Agriculture (AGR)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
REM	0.04	0.31	0.14	0.89
TNT	15.64	4.86	3.22	0.00
TOT	-11.05	3.60	-3.07	0.00
MS	-0.06	0.08	-0.72	0.48
FER	-0.23	0.05	-4.79	0.00
Diagnostic test				
Jarque–Bera normality test			1.2432	0.5370
Breusch–Godfrey serial correlation test			1.1858	0.3221
Heteroskedasticity Test: ARCH			0.3915	0.5354

The positive REM coefficient, although present, yielded such a negligible impact on AGR that it failed to attain statistical significance. The emergence of this unforeseen

insignificance over the course of time could be attributed to the delayed remittance practises of certain Bangladeshi employees, who refrained from promptly sending their remittances to their country of origin. The insignificance of workers' remittances in exerting an effect on AGR is evident in both the short-term and long-term outcomes. Both of these types of results could have been employed to exemplify this point. The outcomes of the computation indicate that the coefficient pertaining to TNT was positive and possessed a substantial magnitude of value. The results of the calculation revealed that the coefficients for TOT and FER possessed considerably negative values, thereby signifying their significance. The coefficient pertaining to the MS was observed to be negative and deemed insignificant.

Table 4.15 : ARDL'S ECM results. Dependent variable: Agriculture (AGR)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(REM)	-0.15	0.11	-1.33	0.19
D (REM (-1))	-0.29	0.10	-2.80	0.01
D(TNT)	15.81	1.23	12.90	0.00
D(TOT)	-1.70	1.11	-1.53	0.14
D(MS)	0.07	0.03	2.55	0.02
D(FER)	0.03	0.03	0.92	0.37
ECT (-1)	-0.36	0.05	-7.25	0.00

The Error Correction Model of REER is presented in Table 4.15. The statistical significance of the lagged error correction component and its observed negative sign provide corroboration for the existence of a co-integrating relationship between the dependent and independent variables.

Plots of the CUSUM and CUSUMSQ test statistics, denoted as Figures 4.7 and 4.8, respectively, were presented. It was observed that these test statistics resided within the critical bounds of the 5% level, thereby signifying their significance. Upon

analysis of the provided statistics, it is evident that the computed coefficients exhibited a remarkable level of constancy throughout the entire estimating period.

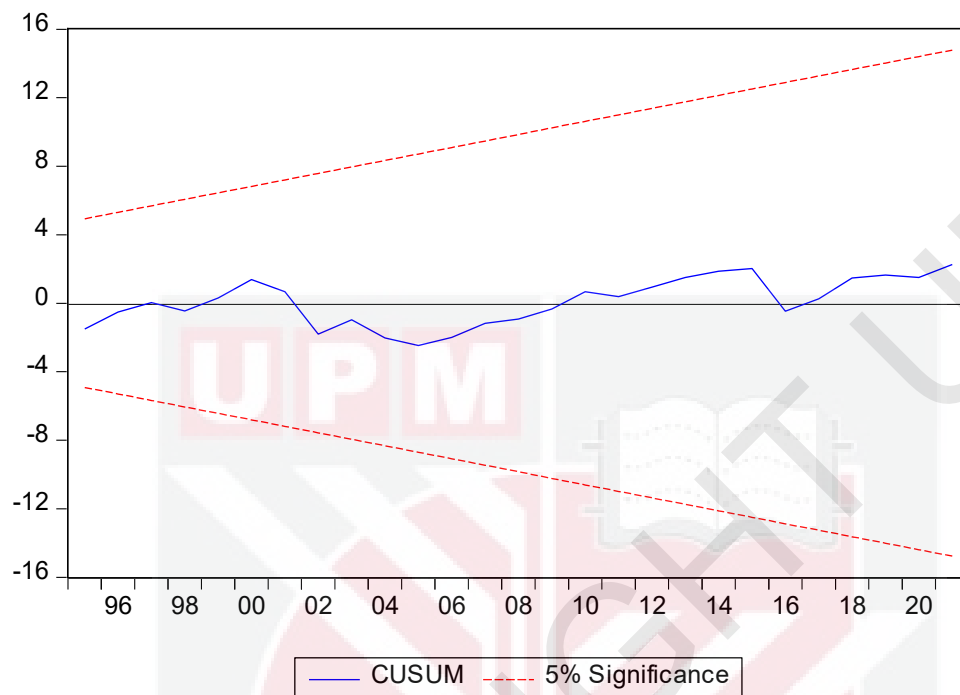


Figure 4.5 : CUSUM Test

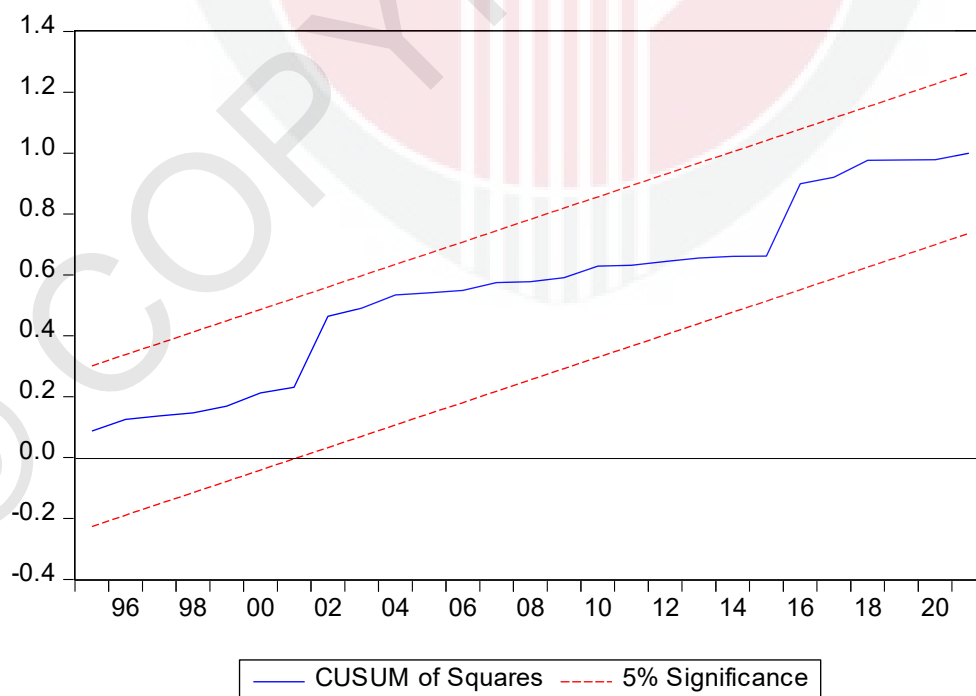


Figure 4.6 : CUSUMSQ Test

In conjunction with the concept of term of trade (TOT), the ratio of tradable to the non-tradable sector (TNT), money supply (MS), and foreign exchange reserve (FER) in Bangladesh, Table 4.16 provides an approximation of the enduring associations between the manufacturing sector (MFG) and the inflow of workers' remittances (REM).

The utilisation of the Phillips-Perron test and the Augmented Dickey-Fuller test was undertaken to scrutinise the time series characteristics of the data. The results are displayed in Table 4.9. Based on the findings, it was determined that all of the variables exhibited non-stationarity in relation to the level of stationarity when subjected to the first difference.

Table 4.16 : Bounds Test Results for Co-Integration Relationship (1,2,1,1,1)

Calculated F-value: 4.53		
Significance level	Critical bounds	
	Lower bounds	Upper bounds
10%	2.08	3.00
5%	2.39	3.38
1%	3.06	4.15

The results of the bounds test, incorporating two lags, were presented in Table 4.16. The bounds test for co-integration has been found to provide substantial evidence regarding the existence of a long-term relationship between the variables. At the level of significance that was assigned, the F-test statistic was found to possess a value surpassing the upper threshold of the critical value, as reported by Pesaran et al. (2001). This result demonstrates that the null hypothesis of no co-integration between the model's variables can be rejected. In the lowermost panel of Table 4.17,

a more comprehensive description is provided regarding the results that conform to the diagnostic examinations of the long-term model.

Table 4.17 : Estimated Long-Term Coefficients for the Selected ARDL Model. Dependent Variable: MFG

Variable	Coefficient	Std. Error	t-Statistic	Prob.
REM	0.16	0.25	0.65	0.52
TNT	9.22	4.01	2.30	0.03
TOT	7.30	2.98	2.45	0.02
MS	-0.02	0.07	-0.27	0.79
FER	0.22	0.04	5.53	0.00
Diagnostic test				
Jarque–Bera normality test			2.9672	0.2268
Breusch–Godfrey serial correlation test			1.7255	0.1986
Heteroskedasticity Test: ARCH			0.2472	0.6220

In the analysis of short-term results, it was observed that the impact of REM on MFG exhibited a positive and statistically significant association. However, upon examining the long-term outcomes, this association was found to be statistically insignificant. Based on the estimated results, it was observed that the coefficients pertaining to TNT, TOT, and FER were all positive and exhibited statistical significance. The coefficient pertaining to the mean square (MS) was found to be negative and deemed statistically insignificant.

Table 4.18 : Results of ECMs for the Selected ARDL. Dependent Variable: MFG

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(REM)	0.24	0.12	1.93	0.06
D (REM (-1))	0.30	0.11	2.64	0.01
D(TNT)	8.68	1.35	6.45	0.00
D(TOT)	0.65	1.22	0.53	0.60
D(MS)	-0.12	0.03	-3.78	0.00
D(FER)	-0.01	0.03	-0.33	0.74
ECT (-1)	-0.47	0.08	-6.23	0.00

Table 4.18 highlights the Error Correction Model of MFG. A co-integrating relationship was observed between the dependent and independent variables, as evidenced by the presence of a lagged error correction term. This term exhibited statistical significance and displayed the anticipated negative sign.

The plots of the CUSUM and CUSUMSQ test statistics, which fell within the critical bounds of the 5% significance level, were displayed in Figures 4.9 and 4.10 correspondingly. The aforementioned finding implies that nearly all of the estimated coefficients exhibited stability throughout the estimation period.

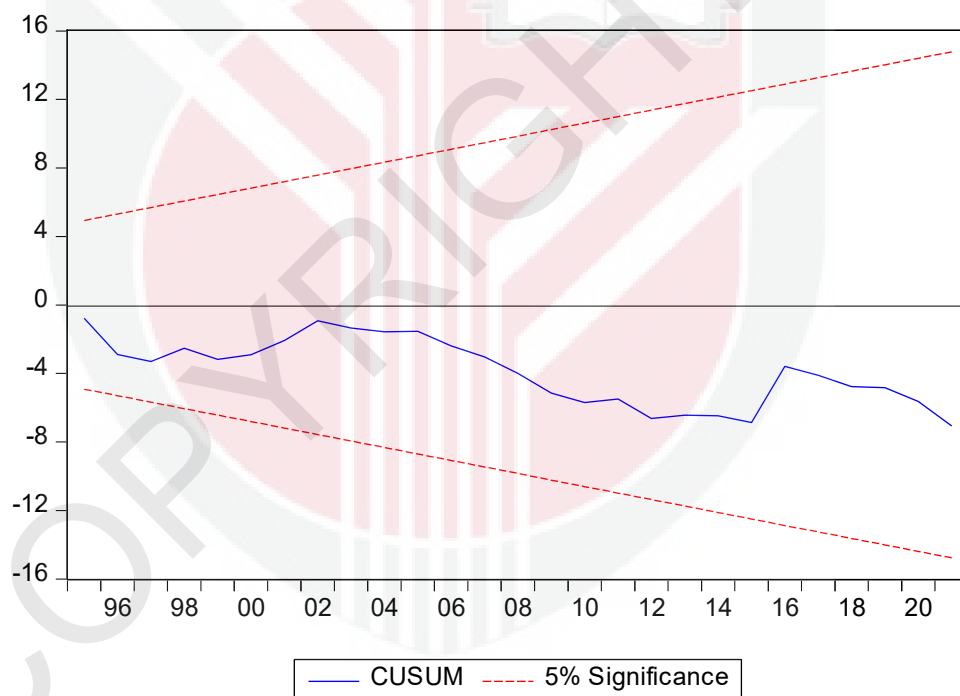


Figure 4.7 : CUSUM Test

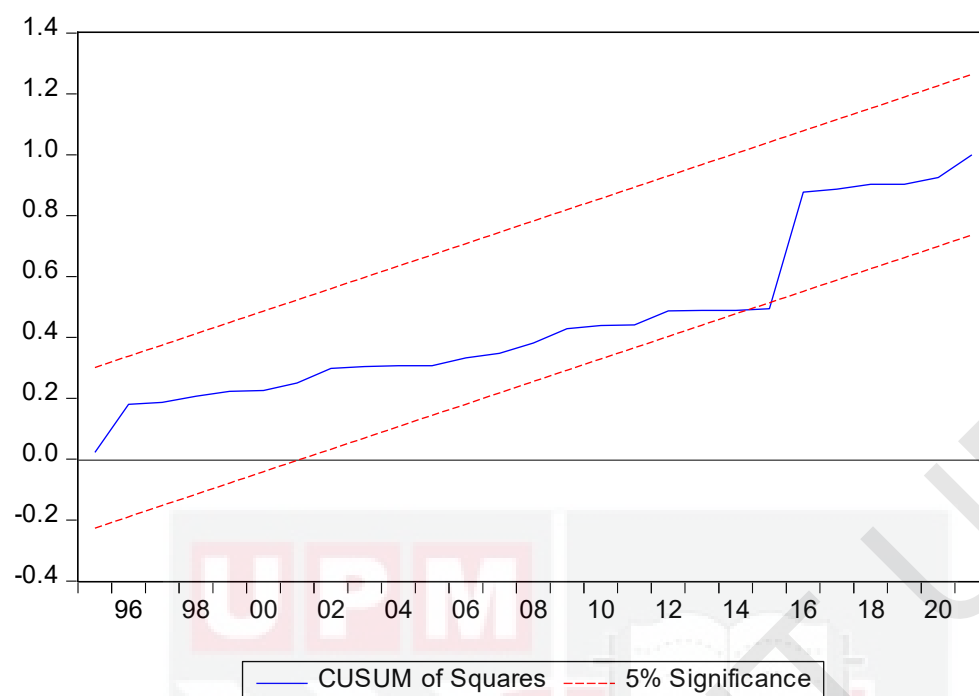


Figure 4.8 : CUSUM of Square Test

The long-term relationships among the Services sector (SERS) and the inflow of worker's remittances (REM), along with the money supply (MS), the foreign exchange reserve (FER), the term of trade (TOT), and the ratio of the tradable to the non-tradable sector (TNT) in Bangladesh were displayed in Table 4.20.

The examination of the time series characteristics of the data involved the utilisation of the Phillips-Perron test and the Augmented Dickey-Fuller test. The outcomes of these investigations have been presented in Table 4.9. All the variables were found to be non-stationary in terms of their level while exhibiting stationarity upon taking the first difference.

Table 4.19 : Bounds Test Results for Co-Integration Relationship

Calculated F-value: 4.23		
Significance level	Critical bounds	
	Lower bounds	Upper bounds
10%	2.08	3.00
5%	2.39	3.38
1%	3.06	4.15

The results of the bounds test, with two lags, are presented in Table 4.19. The bounds test for co-integration has been found to provide evidence regarding the existence of a long-term relationship between the variables. At the specified level of significance, it was observed that the calculated F-test statistic possessed a value surpassing the upper bound of the critical value provided by Pesaran et al. (2001). This finding implies that the null hypothesis, which posited the absence of co-integration among the variables in the model, could be rejected. The results, which satisfied the diagnostic tests of the long-term model, were provided in the bottom panel in Table 4.20.

Table 4.20 : Estimated Long-Term Coefficients for the Selected ARDL Model. Dependent Variable: SERS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
REM	0.11	0.10	1.03	0.31
TNT	-24.69	1.97	-12.51	0.00
TOT	-4.21	1.25	-3.36	0.00
MS	0.00	0.03	-0.17	0.86
FER	-0.06	0.02	-3.46	0.00
Diagnostic test				
Jarque–Bera normality test			0.1971	0.9061
Breusch–Godfrey serial correlation test			0.0421	0.9589
Heteroskedasticity Test: ARCH			0.0713	0.7909

The estimated results indicate that the coefficients for TNT, TOT, and FER were all found to be significant and exhibited a negative value. The coefficient of REM was

found to be positive. Nevertheless, the influence it exerted on surface-enhanced Raman spectroscopy (SERS) was found to lack statistical significance. The coefficient pertaining to the mean square (MS) was observed to be negative and deemed insignificant.

Table 4.21 : Results of ECMs for the Selected ARDL. Dependent Variable: SERS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(REM)	0.66	0.35	1.87	0.07
D (REM (-1))	-1.60	3.84	-0.42	0.68
D(TNT)	22.69	0.49	-46.48	0.00
D (TOT)	1.05	1.60	0.66	0.58
D(MS)	0.05	0.07	0.71	0.49
D(FER)	0.04	0.01	2.74	0.01
D (FER (-1))	0.03	0.02	1.67	0.11
ECT (-1)	-0.39	0.06	-5.96	0.00

The Error Correction Model of SERS is presented in Table 4.21. The confirmation of a co-integrating relationship between the dependent and independent variables is established by the statistical significance and expected negative sign of the lagged error correction term.

The plots depicting the CUSUM and CUSUMSQ test statistics, which resided within the critical bounds of the 5% significance level, were presented in Figures 4.11 and 4.12, correspondingly. Based on the aforementioned findings, it can be asserted that nearly all of the computed coefficients exhibited stability throughout the estimation period.

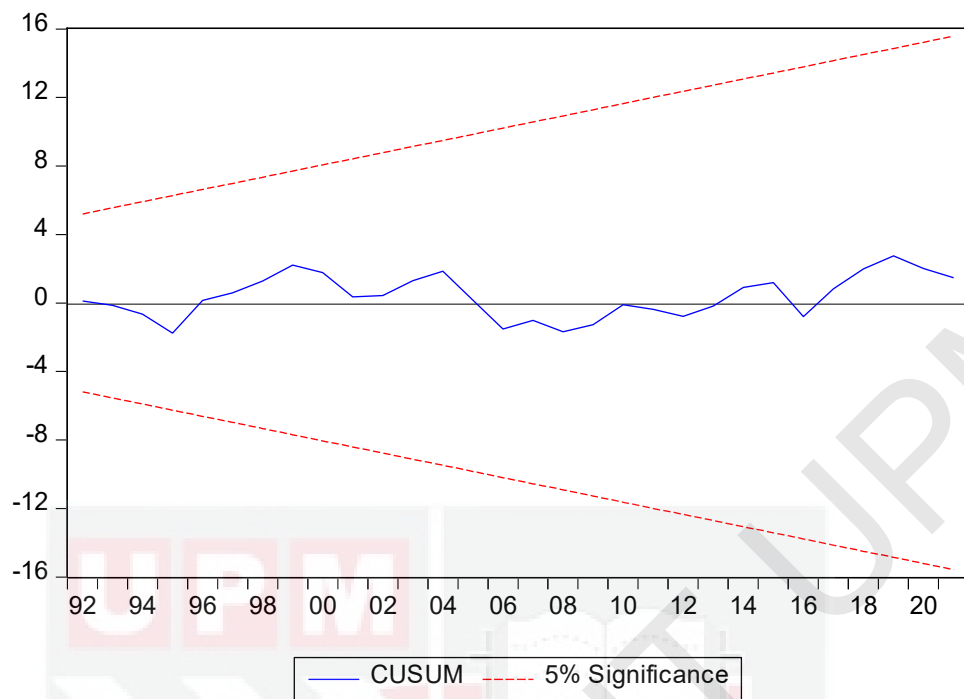


Figure 4.9 : CUSUM Test

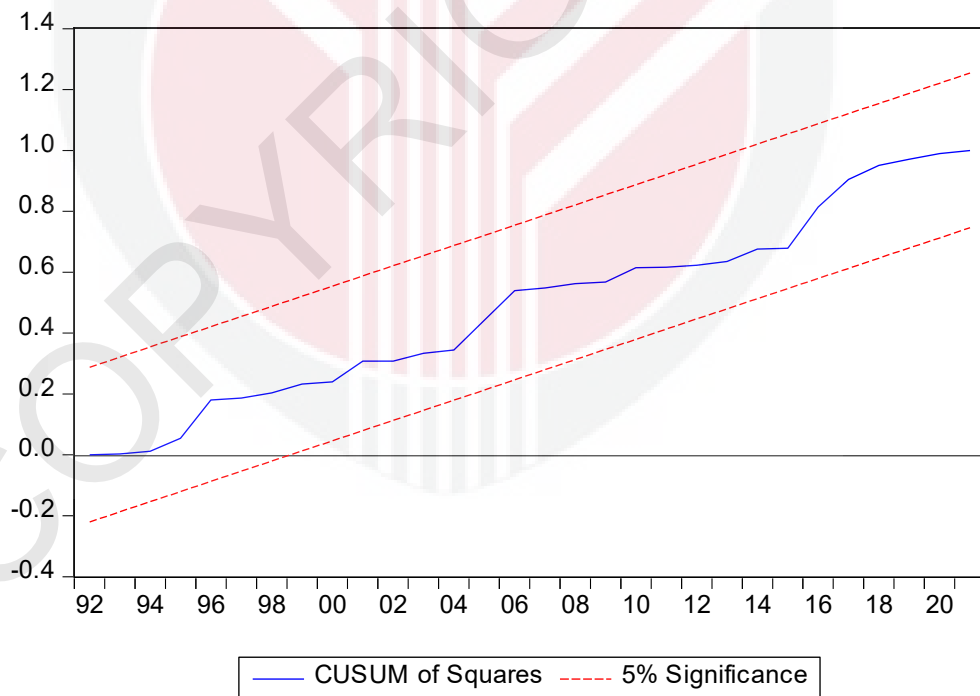


Figure 4.10 : CUSUM of Square Test

The results derived from Tables 4.15, 4.18, and 4.21 revealed that the coefficients pertaining to REM were deemed statistically insignificant. This observation suggests that REM did not possess any discernible long-term influence on AGR, MFG, or SERS. Consequently, the researcher reached the conclusion that this study was incapable of capturing the effect of resource movement on both the tradable sector (i.e. AGR, MFG) and the non-tradable sector (i.e. SERS).

4.4 The Impact of Remittances on Household Consumption Expenditures

This section presented a comprehensive analysis, accompanied by results pertaining to objective three. The objective in question aimed to examine the influence of overseas remittances on the expenditure habits of households in Bangladesh. The presentation and discussion encompassed the exposition of descriptive statistics, accompanied by an estimation of the propensity score for each variable. The results of stratification and propensity score balancing was subsequently presented, accompanied by an estimation of the causative effect and a corresponding commentary. Finding from the study reveal that remittances have positive and significant impact on the amount spent on almost all the spending categories except higher education at university level and housing (mud and bamboo). In this regard, the policymakers should find the process of how to motivate the householders to spend the remittances for the purpose of higher education. The study can be useful for the government and household decision-makers to utilize the remittances sent from abroad. This study contributes to the body of knowledge with recent variations on the microeconomic impact of remittances at the household level in a remittance-receiving country.

4.4.1 Descriptive Statistics

The estimation research was initiated by conducting a preliminary evaluation of the dataset. This evaluation involved the generation of descriptive statistics to illustrate the distribution of the dataset. Furthermore, an estimation of the propensity score was conducted, along with the creation of a graphical curve depicting the dataset. These endeavours aimed to showcase a preliminary association between overseas remittances and each individual microeconomic variable incorporated in the forecasting of the third objective of this research.

For the purpose of the present study, the expenditures made by households were classified into six distinct categories. The aforementioned categories can be delineated as follows: (i) Education, (ii) Health, (iii) Food, (iv) Consumed & durables, (v) Housing & land, and (vi) miscellaneous goods. The aforementioned spending categories were further delineated into more specific categories, as illustrated in Table 4.22.

Table 4.22 : Description of Different Spending Categories

Category	Description	Average budget share	Average annual expenditure (Tk.)
Food	The total expenditures on food within a given household	50.0%	81,300
Health	All forms of household health-related expenditures encompass fees paid to physicians, medical examinations, pharmaceuticals, and travel costs associated with health matters	6.4%	8,882
Education	Expenses such as tuition fees, registration fees, test fees, books, individual lessons, room and board, and other miscellaneous costs	6.8%	14,459
Housing & land	House rent, interior and exterior painting, the acquisition of a residential dwelling and accompanying land, along with routine upkeep and remedial work	12.1%	31,730
Consumed and durables	Mobility, fuel and lighting, apparel and footwear, jewellery, furniture, and other long-lasting products	18.9%	35,575
Miscellaneous goods	Presents, ceremonies, weddings, recreation funerals, taxes and penalties	6.5%	10,362

(Source: Authors' estimation based on HIES 2016)

Note: The budget share for a specific spending category is calculated by dividing the yearly household spending on that category by the overall annual household expenditure.

The estimation of household expenditure on food was accomplished through the maintenance of a diary over a span of 14 days, akin to the methodology employed in the aforementioned survey. This encompasses the quantification, valuation, and aggregate disbursement of commodities procured on a diurnal basis for the purpose of consumption. The survey offered insights into the quantity and market value of products that were not procured by the respondent. In addition, the sum of monetary resources allocated towards sustenance that is consumed beyond the confines of one's dwelling has likewise been encompassed.

The classification denoted as "Household Education Costs" encompassed various components, namely "School Fees," "Registration Fees," and "Exam Fees," in addition to "Expenses to Buy Books," "Personal Teaching Expenses," and "Hostel Expenses" for both male and female individuals within the households. Expenditure encompassed the realm of medicine and other diagnostic procedures alongside the associated travel expenses pertaining to matters of health, all of which were subsumed within the scope of health expenditure.

The term "housing and land expenditures" denoted the monetary expenditures made by households for the procurement of residences and land, alongside the leasing of dwellings and the expenses linked to their upkeep and restoration. The expenses that were incurred by a household for consumable and durable goods included those that were incurred for travelling and petrol costs, as well as those that were incurred for the purchase of clothing and footwear. Durable goods encompassed a wide array of commodities, such as vehicles, furniture, televisions, jewellery, and the like. Ultimately, the allocation of funds towards miscellaneous commodities encompassed the disbursement of household resources on ceremonial events such as weddings and funerals, as well as recreational activities, among others.

Based on the analysis of statistical data, it was observed that households traditionally allocated approximately 50 per cent of their overall budget towards expenditures subsequent to the consumption of food (Table 4.22). Approximately 6.5% of a household's aggregate expenditure was allocated towards educational and medical expenses. It was discovered that expenditures subsequent to the acquisition of investment goods constituted a quarter of the aggregate household spending, whereas

disbursements following the procurement of housing and asset accumulation, such as land acquisition, constituted approximately 18% of the overall household expenditure.

It has been determined that households which had received remittances exhibited a significantly higher expenditure in nearly all categories of spending as compared to those households which did not receive any remittances. The aforementioned findings were derived from absolute values, as indicated in Table 4.23. The findings were found to be in line with the research conducted by De and Ratha (2012) as well as Bam et al. (2016). These studies revealed that an augmentation in income through remittances resulted in a corresponding augmentation in expenditures allocated towards the aforementioned areas. Notwithstanding this, it can be discerned that households receiving average remittances expended a lesser proportion of their overall expenditures, exclusive of food, in comparison to households that did not receive remittances. This is primarily congruent with the consequences that Engel's rule had. Comparatively impoverished households allocated a greater proportion of their overall expenditure towards sustenance.

Table 4.23 : Average Spending on Different Goods by Remittance Status

Spending categories	Amount spent annually (Tk)			Budget shares (%)		
	Treatment	Control	P value	Treatment	Control	P value
Health	14,370	8309	0.00	5.1%	4.4%	0.00
Education	19,471	13,984	0.00	7.4%	6.1%	0.00
Consumed and durables	51,281	34,131	0.00	23.2%	21.6%	0.00
Food	1,00,525	79,852	0.00	44.6%	50.6%	0.00
Housing and land	75,167	27,712	0.00	14.4%	9.8%	0.00
Miscellaneous goods	22,945	9148	0.00	6.3%	3.1%	0.00

(Source: Authors' estimation based on HIES 2016)

Note: A) Number of observations is 45,993 for food, 41,708 for health, 27,614 for education, 40,348 for housing and land, 45,871 for consumed and durables and 35,350 for others.

B) The p-value may be calculated using the two-sided t-test of equal mean for the two groups. It is the level of significance at which the hypothesis of equal mean for different spending categories across remittance recipient and non-recipient households may be rejected.

4.4.2 Estimating Propensity Score

The initial stage in ascertaining the average treatment effect, which can be derived from propensity score matching or the probability of receiving remittances, involved the determination of the propensity score. This score serves as an indicator of the likelihood of receiving treatment. The determination of the participation equation was accomplished by employing a Logit model in the course of the research, with the aim of obtaining the propensity score (as presented in Table 4.24).

Only the variables that had been observed were considered in the process of calculating the propensity scores, as it proved challenging to account for the unobserved variables that had not been observed. Due to the inadvertent omission, it is plausible that the computed propensity score may have exhibited bias.

Table 4.24 : Results for the Propensity Score Matching (Logit Model)

VARIABLES	Household Received Foreign Remittance
Household Size	0.161*** (0.023)
Mobile Phone	1.024*** (0.0788)
Tele phone	-0.0461 (0.132)
Electricity	0.134** (0.0531)
Male Head	-3.317*** (0.075)
No. Household working-age member	-0.055 (0.075)
No. elderly (age >65)	0.072 (0.126)
Secondary	0.350*** (0.078)
Higher Secondary	0.501*** (0.095)
University	-0.123 (0.179)
Agricultural land-owning	0.197*** (0.069)
Mud	-0.585*** (0.145)
Bamboo	-0.853*** (0.180)
Tube well	0.393*** (0.117)
Pucca Toilet/ Latrine (Pit)	0.215*** (0.069)
Rural	0.612*** (0.079)
Urban (Constant)	-1.584*** (0.146)
Observations	15,383

Note: Robust Standard errors in Parentheses*** $p \leq 0.01$, ** $p \leq 0.05$, * $p \leq 0.1$.

Consequently, it was unquestionably imperative to ascertain the accuracy of the scores. The measurement of accuracy using the area under the receiver operating characteristics curve (ROC) for the derived Logit regression was demonstrated in Figure 4.11. The ROC was utilised as a metric to assess the extent to which individuals could be classified into their respective exposure groups, taking into

account their propensity scores (Lobo et al., 2006). In this particular instance, the researcher ascertained that the Logit model appropriately characterised 81 per cent of the exposure events, thereby demonstrating a notable degree of accuracy.

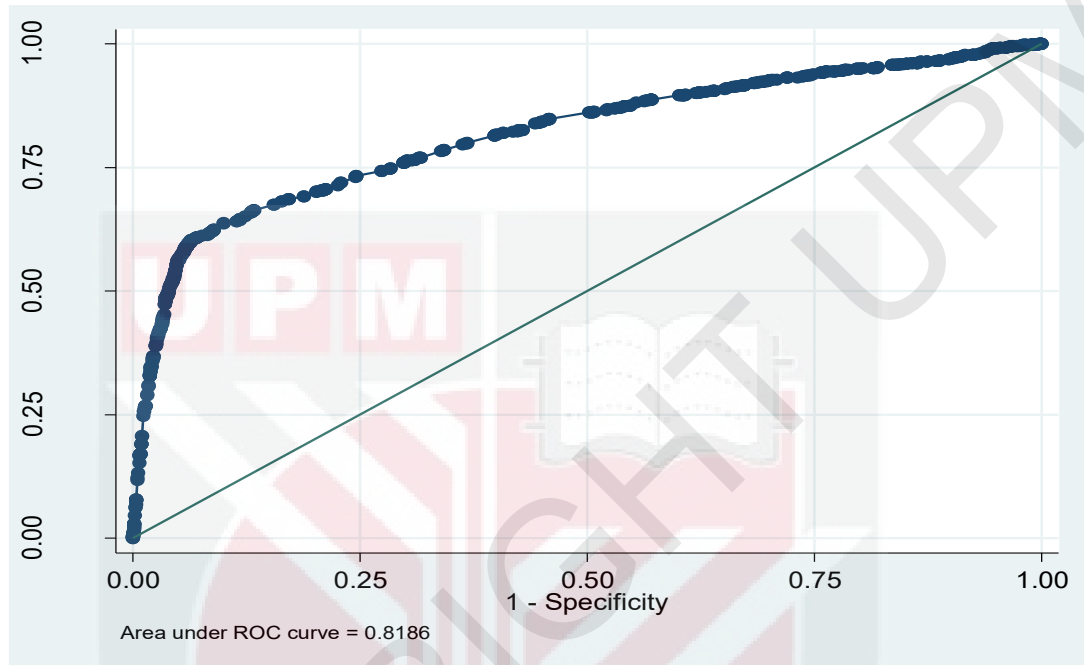


Figure 4.11 : ROC Curve for the Estimated Participation Equation with the Logit Model

Note: The command used to get the figure is `lroc` after estimating the logit model.

The results of the Logit model, as presented in Table 4.24, indicate that rural households possessed a significantly greater likelihood of acquiring remittances from overseas in comparison to urban households. The probability of acquiring remittances is inversely correlated with the educational attainment of the household head. Both of these results can be attributed to the prevailing circumstance that the overwhelming majority of individuals who engage in international travel originate from predominantly rural regions and are raised in households characterised by a comparatively low level of parental education. The likelihoods of receiving remittances were found to exhibit a negative correlation with the magnitude of the

household. Nevertheless, it must be noted that the coefficient did not exert any influence on the statistical analysis. The probability of receiving remittances from abroad was found to be notably greater for households led by women in comparison to households led by males. Considering the prevailing male-dominated trend of migration from Bangladesh, it was anticipated that such an outcome would ensue. A positive and robust relationship was observed between the ownership of agricultural land by households and the likelihood of said households receiving remittances.

4.4.3 Stratifying and Balancing Propensity Score

King and Nielsen (2019) emphasised the necessity of highlighting the extent of bias and model dependency that persisted subsequent to the utilisation of the Propensity Score Matching (PSM) technique, alongside the significance of accuracy. The results obtained by the estimators utilising the nearest neighbours and the radius matching methodologies were found to be mutually consistent. Conversely, the estimators predicated upon radius matching exhibited a notable improvement in mitigating bias. Table 4.25 presented pertinent data regarding the extent of bias that existed prior to and subsequent to the matching procedure, alongside the proportion of bias that was alleviated for each exogenous variable as a direct consequence of the said procedure. The observation that the outcomes of the matching technique yielded a noteworthy decrease in bias across almost all of the variables examined is suggestive of the overall excellence of the matching procedure. Furthermore, the outcomes of the t-test disclosed that, for every variable, the average did not exhibit disparity between the treatment group and the control group subsequent to the process of matching. This discovery has provided evidence that, in the event that matching is applied, the balance criterion is satisfied.

Numerous factors were found to possess a substantial and advantageous association with the likelihood of receiving remittances. The aforementioned factors encompassed the state of electricity provision, the composition of wall materials, and various other variables employed as proxies to gauge the standard of living within the households. The probability of receiving remittances is further influenced by additional household characteristics, including the count of family members in the employable age bracket, the percentage of children residing within the household, and the tally of family members surpassing the age of 65. However, the influence of these factors was found to lack statistical significance.

The model, regrettably, omitted certain geographical characteristics that exerted an influence on the probability of receiving remittances. In contrast to Dhaka, the households in the divisions of Chittagong and Sylhet exhibited a higher propensity to receive remittances from overseas workers, while the households in the divisions of Khulna, Rajshahi, and Rangpur displayed a considerably diminished likelihood of such remittance inflows from abroad.

Table 4.25 : Balancing Test of Propensity Score Matching for the Nearest Neighbour Estimator (Bias Percentage)

VARIABLES	Matched/Unmatched	% Bias	% reduction in bias	t-test
Household Size	Unmatched	-24.8	85.8	-6.73***
	Matched	3.5		0.62
Mobile Phone	Unmatched	18.8	94.4	3.67***
	Matched	-1.0		-0.14
Tele phone	Unmatched	17.9	74.3	3.52***
	Matched	4.6		0.63
Electricity	Unmatched	32.3	93.2	5.45***
	Matched	2.2		0.36
Male Head	Unmatched	-155.8	100	-57.20***
	Matched	0.0		-0.00
No. Household working-age member	Unmatched	-8.4	74.0	-1.70*
	Matched	-2.2		-0.32
No. elderly (age >65)	Unmatched	1.8	64.0	0.33
	Matched	0.6		0.09
Secondary	Unmatched	17.2	78.6	4.45***
	Matched	-3.7		-0.67
Higher Secondary	Unmatched	4.7	-106.1	1.21
	Matched	9.7		1.87
University	Unmatched	-23.4	97.4	-5.07***
	Matched	0.6		0.15
Agricultural land-owning	Unmatched	17.2	98.2	3.21***
	Matched	-0.3		-0.04
Mud	Unmatched	-15.6	68.0	-3.57***
	Matched	5.0		1.16
Bamboo	Unmatched	-19.1	61.1	-4.23***
	Matched	7.4		2.03
Tube well	Unmatched	8.4	85.7	2.03**
	Matched	-1.2		-0.24
Pucca Toilet/ Latrine (Pit)	Unmatched	12.7	67.9	3.24***
	Matched	4.1		0.76
Rural	Unmatched	18.1	97.8	4.45***
	Matched	0.4		0.08

Pre-Matching Analysis, Balancing and Model Independence

Before estimating the effect of remittances on the households' spending based on PSM, it is necessary to check the strength of the quality of the matching algorithm used for this analysis.

The first criterion for estimating the quality of matching is Pseudo- R^2 , which suggests the extent to which the covariates explain the probability of households receiving remittance (Wordofa et al., 2021). Further, Pseudo- R^2 is expected to be very low for the matched compared to the unmatched households. Arising from this argument, the finding in Table *** indicated that a Pseudo- R^2 score of 0.089 was observed for all the selected matching algorithms before the matching exercise declined to 0.014, 0.09, and 0.001 for the one-to-two, 3-nearest neighbors, and the radius matching algorithm in line with the rule of thumb. The findings further revealed that the radius matching algorithm recorded the least possibility of the covariates in influencing the household's receiving remittances.

Table 4.26 : Indicators of the Quality of Different Matching Techniques

Matching technique	Pseudo (Unmatched)	R^2 Pseudo (Matched)	R^2 LR value-unmatched	χ^2 (pLR value-matched)	χ^2 (pMean (Unmatched))	BiasMean Bias (Matched)
NNM (2)	0.089	0.014	186.93 (0.000)***	18.92 (0.942)	10.8	4.6
NNM (3)	0.089	0.009	186.93 (0.000)***	11.84 (0.999)	10.8	3.5
Radius	0.089	0.001	186.93 (0.000)***	1.65 (1.000)	10.8	1.3

Note: The second criterion suggesting a balanced quality of the different matching techniques is the likelihood (LR) ratio. The LR ratio should produce a joint insignificant covariate influence in the households' remittance receiving after matching.

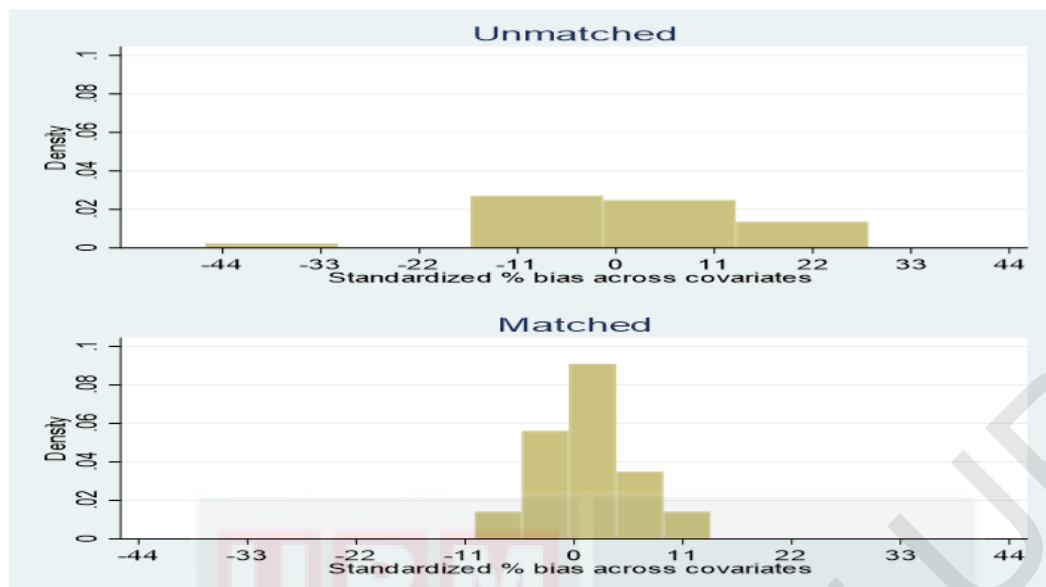


Figure 4.12 : Quality of Matching

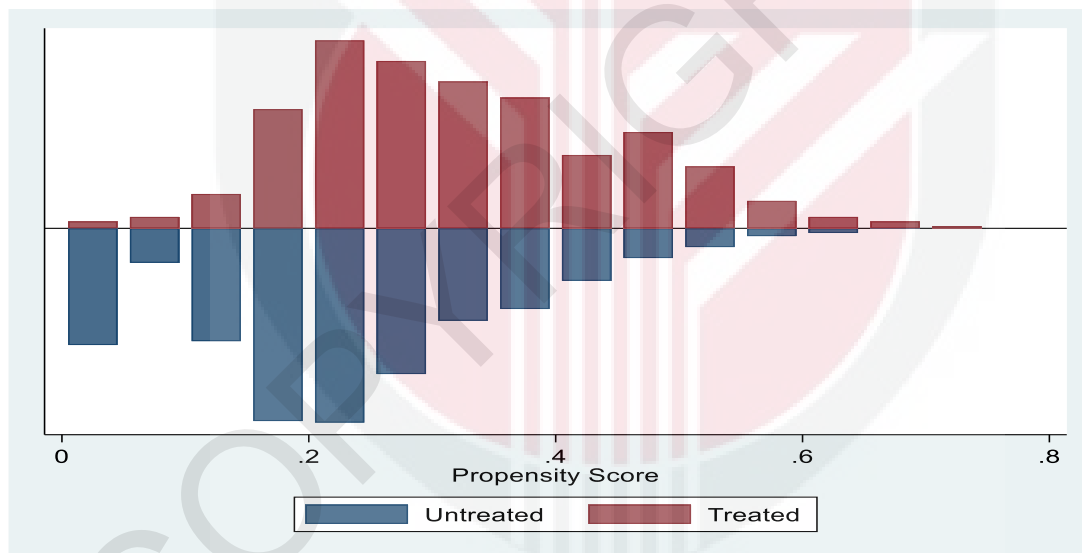


Figure 4.13 : Balancing Property of the Estimated Propensity Score

To further bolster the quality of matching techniques adopted in this study, Figure 4.13 displays the balancing property of the estimated propensity scores. Conclusively, the three matching algorithms employed in this study produced

convergent results, with the radius matching algorithm producing the best statistical significance and outcome.

4.4.4 Estimating Causal Effect and Discussion

Table 4.27 elucidated the influence exerted by the magnitude of remittances received on the aggregate expenditure allocated towards diverse spending categories. Based on the findings, it was determined that although overseas remittances did have a positive impact on the expenditure allocated by households towards their children's education, this particular benefit did not attain a significant level when assessed under the nearest neighbourhood matching or the radius matching criteria. In a comparable manner, the impact of remittances on the aggregate household health expenditures was found to be positive and statistically significant across all employed matching techniques. The present analysis examines the congruence between the research conducted by Wadood and Hossain (2017) as well as Raihan et al. (2009) and the outcomes derived from the investigation pertaining to educational expenses within households. However, it is worth noting that the conclusions drawn from the study concerning healthcare expenditures within households diverge from the anecdotal reports.

Table 4.27 : PSM Results for the Total Amount Spent on Different Spending Categories

Spending categories	Matching criteria	N (Treatment)	N (Control)	ATT	Stan. Error	t-value
Education	Radius	20804.29	18485.76	2318.54	913.27	2.54
	Nearest Neighbor (2)	20804.29	20506.57	297.72	2909.85	0.10
	Nearest Neighbor (3)	20804.29	18661.75	2142.54	2355.34	0.91
Health	Radius	15700.28	10714.98	4985.30	962.79	5.18
	Nearest Neighbor (2)	15700.28	14055.75	1644.53	1980.48	0.83
	Nearest Neighbor (3)	15700.28	12749.39	2950.89	1685.18	1.75
Food	Radius	107399.839	91453.40	15946.44	2187.86	7.29
	Nearest Neighbor (2)	107399.839	89015.87	18383.97 3	13734.05	1.34
	Nearest Neighbor (3)	107399.839	87221.50	20178.34	9942.28	2.03
Consumed & durables	Radius	55484.73	44547.74	10936.99	1772.12	6.17
	Nearest Neighbor (2)	55484.73	45254.71	10230.03	10265.18	1.00
	Nearest Neighbor (3)	55484.73	43528.755	11955.98	7511.45	1.59
Housing & Land	Radius	73053.27	39259.77	33793.50	8079.70	4.18
	Nearest Neighbor (2)	73053.27	32579.18	40474.10	17450.68	2.32
	Nearest Neighbor (3)	73053.27	31223.661	41829.61	13900.53	3.01
Miscellaneous goods	Radius	22027.81	13034.82	8992.99	1886.11	4.77
	Nearest Neighbor (2)	22027.81	10826.45	11201.36	4970.88	2.25
	Nearest Neighbor (3)	22027.81	10213.97	11813.84	3966.92	2.98

In relation to food, households that were recipients of remittances exhibited a notable inclination towards increased expenditure, as compared to households devoid of such financial inflows (as depicted in Table 4.27). The outcome exhibited consistency across the two matching approaches. As per the findings of the ATT, it was observed that households which received remittances from abroad expended an average of Tk 20,178 more per annum on sustenance in comparison to households devoid of such

remittances. The disparity in expenditure may be ascribed to the elevated cost of sustenance. Remittances had a commendable, statistically significant, and unwavering impact on households' overall expenditure on both consumable and durable goods.

The findings further disclose that individuals in the treatment group expended a considerable sum on housing and land in comparison to the control group.

Furthermore, it is worth noting that there exists evidence indicating that the influence exerted by remittances on the overall expenditure of households in relation to other commodities is not only affirmative but also possesses statistical significance. If the ATT was found to be significant for Miscellaneous goods, it would indicate that remittance recipient households, in comparison to non-remittance recipient households, expended a considerably higher amount on non-routine expenses like weddings and entertainment, given the equivalence in treatment and control group households.

Table 4.28 : PSM Results for the Budget Shares of Different Spending Categories

Spending categories	Matching criteria	N (Treatment)	N (Control)	ATT	Stan. Error	t-value
Education	Radius	0.0805	0.0801	0.0005	0.0026	0.18
	Nearest Neighbor (2)	0.0805	0.0956	-0.0151	0.0076	-1.98
	Nearest Neighbor (3)	0.0805	0.0913	-0.0108	0.0065	-1.65
Health	Radius	0.0553	0.0501	0.0051	0.0026	1.99
	Nearest Neighbor (2)	0.0553	0.0653	-0.0101	0.0067	-1.51
	Nearest Neighbor (3)	0.0553	0.0610	-0.0057	0.0058	-0.99
Food	Radius	0.4428	0.4969	-0.0541	0.0058	-9.29
	Nearest Neighbor (2)	0.4428	0.4821	-0.0393	0.0145	-2.70
	Nearest Neighbor (3)	0.4428	0.4816	-0.0388	0.0123	-3.16
Consumed & durables	Radius	0.2105	0.2112	-0.0007	0.0034	-0.21
	Nearest Neighbor (2)	0.2105	0.2098	0.0007	0.0087	0.08
	Nearest Neighbor (3)	0.2105	0.2121	-0.0016	0.0075	-0.21
Housing & land	Radius	0.1476	0.1198	0.0277	0.0066	4.19
	Nearest Neighbor (2)	0.1476	0.1118	0.0357	0.0117	3.06
	Nearest Neighbor (3)	0.1476	0.1167	0.0309	0.0104	2.97
Miscellaneous goods	Radius	0.0634	0.0418	0.0215	0.0029	7.52
	Nearest Neighbor (2)	0.0634	0.0354	0.0280	0.0063	4.43
	Nearest Neighbor (3)	0.0634	0.0373	0.0260	0.0053	4.88

The effects of remittance on the allocation of budget shares across various expenditure categories utilising PSM are presented in Table 4.28. The findings suggest that the impact of overseas remittances on the allocation of household expenditures towards education and health was negative. The impact on education and health in terms of expenditure shares was found to be inconsequential. In the realm of sustenance, households that acquired remittances were observed to allocate a significantly lesser proportion of their total expenditure towards nourishment in

comparison to households devoid of remittance reception. In the study conducted by Bam et al. (2016), it was observed that remittance resulted in remittance-receiving households allocating a comparatively lesser proportion of their expenditure towards food despite yielding higher income, in contrast to remittance-non-receiving households. This trend was consistent across all matching algorithms employed in the analysis. As per the tenets of Engel's law, it was observed by Zimmerman in 1932 that households expended a diminishing proportion of their income on sustenance as their financial resources expanded.

Furthermore, it has been ascertained those remittances exerted a positive and statistically significant influence on the proportion of household expenditures allocated to housing and land.

Remittances were found to exert a deleterious influence on the proportion of households' expenditure allocated towards consumable and durable goods, while conversely, they were observed to exert a beneficial influence on the proportion of households' expenditure allocated towards Miscellaneous goods. The impact, though noteworthy for various commodities, proved to be inconsequential for both consumable and durable goods when evaluated under the nearest neighbour and radius matching criteria.

CHAPTER 5

CONCLUSION

5.1 Introduction

There may be a preamble at the beginning of a chapter. The purpose may be to the present chapter encompassed both a succinct summary and a conclusive analysis of the research that had been undertaken. In Section 5.2, an elucidation was presented regarding the executive summary that was concomitant to the comprehensive investigation. In Section 5.3, a comprehensive elucidation of the policy implications and suggestions derived from the research was provided, with the aim of catering to the interests of both macro-level decision-makers in government and micro-level decision-makers in households. Furthermore, the deficiencies pertaining to the research's methodology were expounded upon in Section 5.4 of the report. In Section 5.5, an overview was presented regarding potential future research paths. In this chapter, a personal commentary was proffered to underscore the manner in which the researcher surmounted obstacles and attained advancement throughout the course of the study endeavour.

5.2 Summary of the Study

5.2.1 The Impact of Remittances on Economic Growth

There should be at least Numerous developing nations are heavily reliant on remittances as a crucial source of both foreign currency earnings and financial assistance. Bangladesh was not an exception to this trend. Utilising the ARDL model, the principal objective of this study was to examine the nexus between

remittances and economic growth over the period spanning from 1976 to 2021. The primary objective of this research was to ascertain whether financial development served as a moderator in the relationship between remittances and economic expansion. The research, in particular, examined the manner in which the expansion of the domestic financial industry could have influenced a nation's capacity to derive economic benefits from remittances sent by its populace.

The study's findings suggested that remittances, which were transmitted by migrant workers, exerted a noteworthy and unfavourable impact on the pace of economic growth in Bangladesh, the recipient country of said remittances. Several reasons can be attributed to the enduring negative correlation observed between remittances and GDP over time. First and foremost, it is noteworthy to mention that the potential ramifications of skilled labour outflows on the gross domestic product (GDP) of smaller nations, such as Bangladesh, have been extensively explored in scholarly literature. Several notable studies have shed light on this matter. Their collective findings indicate that the departure of skilled workers may have adverse implications for the GDP of these countries. Secondly, it is noteworthy that the considerable majority of individuals hailing from Bangladesh who embarked on a journey away from their homeland were not derived from the most disadvantaged socioeconomic strata, nor were they characterised by a lack of proficiency in their respective fields of labour. Indeed, it must be acknowledged that those individuals were, in actuality, among the most gifted and astute individuals across the globe. Their areas of expertise encompassed vital domains such as healthcare and education. The individuals in question would frequently depart from their homeland, driven by both

their financial means and their desire to enhance their economic circumstances further.

5.2.2 The Impact of Remittances on the Exchange Rate

The second objective entailed the examination of how the workers' remittance sector influenced the appreciation or depreciation of the real exchange rate in developing nations such as Bangladesh through the utilisation of disaggregated data from other sectors. The present study sought to examine whether the quantities of remittances exhibited spending effects that potentially resulted in an appreciation in the real currency rate, as well as resource movement effects that stimulated the non-tradable sector while impeding the production of tradable goods.

The long-run estimated results revealed that the ratio between the tradable and non-tradable sectors, the money supply, and foreign currency reserves exhibited a negative and statistically significant relationship. Conversely, the term of trade (TOT) demonstrated a positive and statistically significant association. The aforementioned findings were derived from the utilisation of the REER and ARDL models. REER, AGR, MFG, and SERS experienced adverse effects. Nevertheless, the impact was deemed statistically insignificant as a consequence of the negative rate at which employees' remittances were received. In this research, it was found that no evidence of the spending effects or the resource movement effects was discovered. The phenomenon that became known as Dutch Disease was characterised by two distinct features.

5.2.3 The Impact of Remittances on Household Consumption Expenditures

Remittances constituted the monetary funds that were transmitted by Bangladeshi migrants, who were gainfully employed in foreign nations, for the purpose of providing financial support to their respective families residing in their country of origin. The third objective of this study was to examine the extent to which the recent increase in the overall amount of remittances received by Bangladeshi families had led to alterations in their patterns of discretionary expenditure. It is of considerable likelihood that family members would have been left behind when a remitter would have provided monetary funds, and the remitters would have collectively determined the allocation of said funds. The remittance deemed a pivotal financial resource for numerous families, was allocated towards present consumption, preservation, and investment in either physical or human capital. If the marginal social worth of the investment exceeded the present value of marginal consumption, it was observed that families opted to invest in the health and education of their offspring. In a nation undergoing developmental progress, such as Bangladesh, the financial resources possessed by a family constituted the principal determinant impacting the allocation of funds towards a child's health and education. Parents were concerned about the well-being of their children. As a consequence of this, it was highly probable that households prioritised investing in the health and happiness of their children. In households characterised by limited financial resources, the existence of remittance inflows served as a form of insurance, enabling a greater proportion of female offspring to pursue their educational endeavours.

In the case of Bangladesh, the third objective entailed an investigation into the impact of remittances from overseas on household expenditure behaviour. The aggregate disbursements made by households could be dissected into several discrete classifications, encompassing education, healthcare, nourishment, consumable and enduring commodities, habitation and real estate, and miscellaneous consumption. The research project employed the propensity score matching method to mitigate the influence of self-selection bias. The financial well-being of a family could be construed by evaluating the quantum of monetary resources allocated to each individual member of the household. The expenditure patterns exhibited by individuals and households, alongside the allocation of resources in both the public and private sectors, have been identified as crucial determinants of a nation's economic expansion. As a result of this, household spending emerged as a significant factor that propelled economic growth. Households expended monetary resources on a diverse array of commodities, contingent upon their individual preferences, degrees of satisfaction, and economic means. The remittance, regarded as a household income, possessed the capacity to exert influence upon the manner in which families allocated their financial resources, thereby expediting the pace of economic growth. As per Adams (2005), the purchasing habits of families with regard to a diverse range of consumer and investment items were found to be modified upon the receipt of remittances.

Based on the research findings, it was determined that remittances exerted a significant and favourable impact on the overall expenditure across nearly all expenditure categories, except for housing (mud and bamboo) and higher education at the university level. The potentiality exists for the discoveries derived from this

research to have utility for policymakers in both governmental entities and individual households as they deliberate upon the optimal means by which to employ the remittances transmitted by expatriates to their countries of origin. Furthermore, this study made a valuable contribution to the existing corpus of knowledge by examining the contemporary alterations in the macroeconomic ramifications of remittances on the household level within a nation that serves as the beneficiary of such remittances.

5.3 Policy Implications and Recommendation of the Study

Based on the findings that were discussed in the earlier section, the present section derived policy implications. The initial observation made by the study indicated that remittances exerted a substantial and adverse impact on the economic growth of Bangladesh. However, it was determined that the impact was indeed favourable in the context of enhanced financial development. Due to the exorbitant expenses associated with transmitting funds to their country of origin through established channels, remittances have had an adverse impact on the economic progress of Bangladesh. This phenomenon can be attributed to its discouraging effect on Bangladeshi labourers in promptly remitting their earnings to their country of origin. Therefore, it was imperative that the policy focused on reducing the expenses associated with remittances and promoting the adherence of migrants to lawful channels for sending such remittances. Furthermore, it is imperative that the government place significant emphasis on the expansion of the financial system. The proliferation of mobile banking systems has resulted in a surge in remittances in several developing nations, including India (Islam, 2018). Bangladesh could indeed

have employed such approaches to facilitate the circulation of cash with the assistance of the latest mobile technology.

The formal transmission of remittance money in Bangladesh was impeded by several factors, with the foremost being a dearth of information regarding the procedural intricacies entailed in the overseas money transfer process. Additionally, the rural regions of Bangladesh suffered from an inadequate banking infrastructure, while the banking hours were protracted, and the bank fees were relatively exorbitant. The utilisation of unlicensed remittance companies such as Hundi by Bangladeshi migrants was a prevalent practise. The responsibility of controlling and monitoring all remittance transactions in Bangladesh lies with the Bangladesh Bank (BB), which serves as the nation's central bank. In light of its capacity to mitigate the perils associated with money laundering and other illicit financial activities, it is imperative that the BB undertake measures to actively foster diverse incentives aimed at promoting the formal transmission of remittances. The aforementioned measure would have fostered a state of equilibrium in terms of the government's payment and credit ratings.

Secondly, it was observed through the utilisation of the REER model that an augmentation in the money supply led to a diminution in the REER. As a consequence of this, it was necessary for the government of Bangladesh to exercise extreme caution with respect to the implementation of expansionary monetary policy, as it had the potential to function as the primary factor in the depreciation of Bangladesh's currency.

The effects of changes in terms of trade on the real exchange rate were observed to be evident. This phenomenon is demonstrated by the observation that when the price of exports surpasses the price of imports, there is a resultant appreciation of the real exchange rate. The effect of remittances on resource movement may have varied depending on the prevailing exchange rate regime. This would have been the case, for instance, if a substantial portion of the overall remittances had functioned as a form of insurance, rendering them inherently countercyclical (Acosta et al., 2009). In the event of an adverse shock, be it in the form of trade or productivity within the tradable sector, the outcome shall manifest as a depreciation of both nominal and real currency values, provided that exchange rates exhibit flexibility. The devaluation in question would have augmented the competitiveness of the tradable sector, consequently enhancing exports and overall production, thereby counterbalancing the adverse impact of the initial shock.

Ultimately, the conclusions drawn from the investigation's third objective indicated that remittances exerted a favourable and noteworthy impact on the expenditure allocated towards sustenance, healthcare, consumable goods, and durable items. However, it is important to note that this influence did not extend to higher education at the university level or housing (mud and bamboo). This observation indicated that the influx of remittances enhanced the purchasing capacity of households receiving them, prompting a substantial increase in their expenditure. Education or human capital has been identified as one of the foremost sources of economic growth, despite the fact that remittances have made substantial contributions to the enhancement of the health condition of families receiving them. Therefore, it was suggested that the government of Bangladesh ought to have promoted investment in

education through the provision of tax incentives to families receiving remittances, who allocated said funds towards the pursuit of higher education for their kin. Furthermore, it should be noted that policymakers had the ability to lend their support to policy measures, such as tax exemptions, which provided incentives for the purpose of encouraging constructive investments of remittance earnings, as opposed to mere consumption. In the context of a developing nation such as Bangladesh, remittances constituted approximately one-third of the household budgets of recipient families and contributed to over 30% of the country's GDP, thus establishing themselves as a crucial and indispensable financial inflow. Given that remittances were regarded as private earnings, it was imperative for the government to contemplate the provision of diverse and viable incentives aimed at fostering investment across a broad spectrum of endeavours, with the ultimate objective of engendering sustainable long-term economic growth. In the context of a developing nation, the allocation of remittance funds towards developmental initiatives such as drinking water and irrigation projects, hydroelectric projects, transportation and communication projects, among others, assumes paramount importance. It is noteworthy that the aforementioned endeavour has made a substantial contribution towards the augmentation of the contemporary employment landscape within the nation.

5.4 Limitations of the Study

The present research exhibits significant drawbacks. The present study, akin to the vast majority of other empirical studies, was impeded by the dearth of accessible retrospective data.

In the estimation process for the first and second objectives, the study employed a population ranging in age from 15 to 64 years old as a control variable to represent labour force participation. Additionally, GDP per capita incomes were utilised as a control variable to serve as a proxy for the relative price of non-tradable goods (TNT).

Due to limitations in data availability regarding the significant impact of international remittances on household-level objectives, the research opted to employ the preceding survey, specifically the Household Income and Expenditure Survey (HIES) of 2016, as opposed to the most recent survey, for the purpose of estimating analysis pertaining to the third objective. Furthermore, given that this research solely examined the impact of international remittances on the attributes of a singular nation, the findings of this study cannot be extrapolated to other countries that also receive such remittances.

5.5 Future Research Directions

Remittances, regarded as private profits, did not contribute to the development of individuals or sustainable economic growth over the long term. In order for remittances to exert a lasting influence on economic growth, it is imperative that sound national economic policies and development initiatives be implemented by relevant institutions. Hein de Haas (2007) posited that in the absence of political transformations, a nation is unable to achieve enduring development. Therefore, a notable increase in social protection, an enlargement of investment opportunities, and the establishment of political confidence emerged as indispensable factors. The development impact of remittances was influenced by the capacity and desire of

families to invest, the resources that were accessible to them, and the socioeconomic position of households. The recognition of the significance of this in terms of the country's overall progress had to be undertaken by the government of Bangladesh. In developing countries, it was observed that households did not invariably engage in investment endeavours that facilitated economic advancement.

Consequently, the undertaking of regulating the productive investment of remittance inflows necessitated meticulous research, alongside the formulation of exemplary action plans and strategies. It was deemed imperative to undertake additional research in order to optimise the potential benefits that could be derived from allocating these transfer incomes towards the advancement of a nation's economic growth. Consequently, a compelling necessity arose for conducting extensive research on the ramifications of alterations in household expenditures induced by remittances on the overall economy of Bangladesh.

While it is true that remittance inflows have been associated with positive impacts on economic growth, it is important to acknowledge that they can also give rise to negative feedback effects that impede economic performance in the countries receiving them. Based on the research findings, it has been determined that one of the adverse consequences observed is a decline in export competitiveness resulting from an appreciation in the real exchange rate. It is projected that additional development challenges, namely brain drain and the impact of moral hazard on recipients of remittances, would have been heightened due to the inflow of remittances. The aforementioned phenomenon is brought about by the emigration of individuals possessing exceptional qualifications, whereas the latter is manifested by

means of the wealth effect, which diminishes the motivations of recipients of remittances to augment the labour force. Future research endeavours could have been undertaken to investigate the impact that remittances had on the brain drain and labour supply in nations that were recipients of remittances.

The inquiry regarding the potential detriments to economic growth and welfare in these economies resulting from macroeconomic adjustments subsequent to the arrival of remittances is a matter of utmost significance. Another crucial consideration was the identification of policy combinations that were deemed worthwhile to pursue in order to address these issues. The aforementioned items were set aside for the purpose of subsequent investigation.

The matter concerning the inter-relationship between remittances, alterations in spending behaviour, and economic growth were of a highly intricate nature, entwined with a diverse array of social, economic, political, and institutional facets. In order to conduct a comprehensive investigation into the ramifications of remittances, it was imperative to collect meticulous information from both the sender and the receiver.

Moreover, this study didn't analyse the seasonable effect analysis. Specially it is important analyse the seasonable effect of remittances that are sent in different seasons for example, on Ramadan, Eid and other festivals. How remittances sent during the seasons and festivals could be an effective vein for future studies. Moreover, Bangladesh, is a Muslim majority country where remittance levels fluctuation during throughout Eid occasions could bring difference in the various

outcomes. Hence, future researchers are recommended to conduct studies in this area of research.

Moreover, future studies can include technology as a moderator in their study that could be advantageous and introduce novelty in the methodology by introducing innovation into body of literature.

The present analysis was predicated upon survey data derived from the Household Income and Expenditure Survey of 2016 (HIES-2016), which was not originally designed with the specific aim of investigating remittance-related matters. Consequently, it proved inadequate in considering a substantial quantity of relevant information pertaining to the migrant's abilities, working circumstances, and earnings at the destination. Based on the findings of this investigation, it was determined that a significant issue at the destination was the lack of available information regarding migrants. Furthermore, it is imperative to delve deeper into the impact exerted by remittances from migrants on the expenditure patterns of families residing in developing nations. This particular domain warrants further scholarly investigation in the times to come. The sector in question is one wherein the interests of individual families, society at large, and the government are prone to conflict with one another.

Furthermore, the present study failed to conduct a comparative analysis between internal and external remittances with regard to their impact on household expenditure and economic development. The proposition was put forth for further

investigation, as it was believed that a comprehensive examination would expand the understanding within this particular field.



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APPENDICES

Appendix A

Table A.1 : Unit Root Result Summary for the Impact of Overseas Remittances on Economic Growth 1976-2021

SL.	Variable Name	Variable type	PP	ADF	Remark
1	EG	DV	I(1)	I(1)	I(1)
2	REM	IV	I(1)	I(1)	I(1)
3	FD	IV	I(1)	I(1)	I(1)
4	LF	IV	I(1)	I(1)	I(1)
5	CF	IV	I(1)	I(1)	I(1)
6	REMx _{FD}	IV	I(1)	I(1)	I(1)

Table A.2 : ARDL Long Run Form and Bounds Test

Dependent Variable: D(EG)

Selected Model: ARDL (1, 0, 0, 0, 0, 0)

Sample: 1976-2021

Included observations: 45

Long run				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
REM	-0.512582	0.287235	-1.784541	0.0823
FD	-0.062043	0.071258	-0.870678	0.3894
CF	0.219883	0.106490	2.064819	0.0458
LF	-0.162146	0.241690	-0.670886	0.5064
REMX _{FD}	0.013972	0.007289	1.916827	0.0628

F-Bounds Test

Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-statistic	14.18033	10%	2.26	3.35
k	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68

Table A.3 : Dependent Variable: D(EG)
ECM (short run)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.210101	0.259656	-0.809153	0.4237
D(EG(-1))	-0.257464	0.131399	-1.959401	0.0578
D(CF(-1))	0.271069	0.263900	1.027167	0.3112
D(FD(-1))	0.163307	0.183856	0.888230	0.3803
D(LF(-1))	0.338562	0.496308	0.682162	0.4995
D(REM(-1))	0.697279	0.713216	0.977654	0.3348
D(REMXFD(-1))	-0.015512	0.020294	-0.764363	0.4496
ECM(-1)	-1.054388	0.219800	-4.797034	0.0000

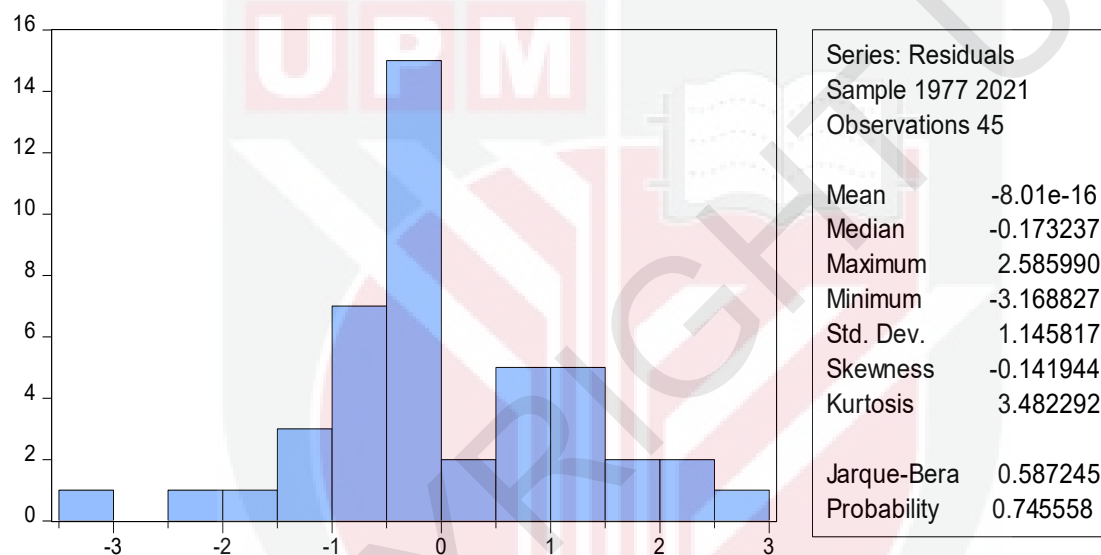


Table A.4 : Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.305211	Prob. F(2,36)	0.7389
Obs*R-squared	0.750306	Prob. Chi-Square(2)	0.6872

Table A.5 : Heteroskedasticity Test: ARCH

F-statistic	2.300929	Prob. F(1,41)	0.1370
Obs*R-squared	2.284938	Prob. Chi-Square(1)	0.1306

Appendix B

Table B.1 : Unit Root Result Summary for the Impact of Overseas Remittances on Real Effective Exchange Rate (REER) 1980-2021

SL.	Variable Name	Variable type	PP	ADF	Remark
1	REER	DV	I(1)	I(1)	I(1)
2	REM	IV	I(1)	I(1)	I(1)
3	INT	IV	I(1)	I(1)	I(1)
4	TOT	IV	I(1)	I(1)	I(1)
5	MS	IV	I(1)	I(1)	I(1)
6	FER	IV	I(1)	I(1)	I(1)

No variable is at I (2) and DV is at I (1)

Table B.2 : ARDL Long Run Form and Bounds Test

Dependent Variable: D(REER)

Selected Model: ARDL(1, 0, 0, 0, 0, 0)

Sample: 1980-2021

Included observations: 41

Long run				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
REM	-0.869570	3.207270	-0.271125	0.7879
TNT	-195.7915	48.88851	-4.004857	0.0003
TOT	115.9803	34.90498	3.322743	0.0021
FER	-1.48E-09	4.97E-10	-2.976399	0.0053
MS	-2.136200	0.908015	-2.352603	0.0246

F-Bounds Test

Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-statistic	6.197629	10%	2.26	3.35
k	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68

Table B.3 : ARDL Error Correction Regression

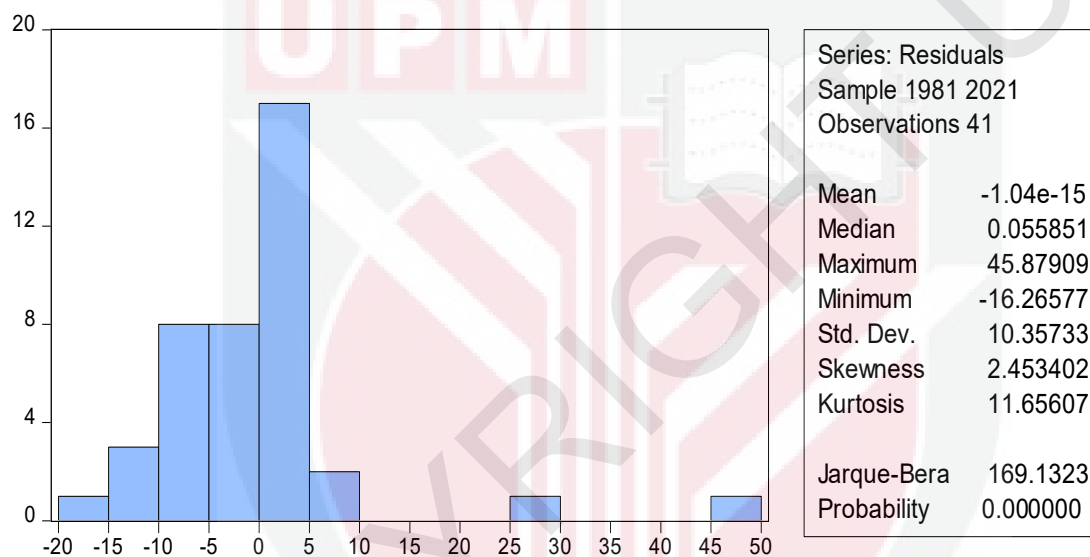
Dependent Variable: D(REER)

Selected Model: ARDL(1, 0, 0, 0, 0, 0)

Sample: 1980-2021

Included observations: 41

ECM Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	186.1991	28.62417	6.504961	0.0000
CointEq(-1)*	-0.640892	0.098130	-6.531024	0.0000

**Table B.4 : Breusch-Godfrey Serial Correlation LM Test:**

F-statistic	0.670278	Prob. F(2,32)	0.5186
Obs*R-squared	1.648526	Prob. Chi-Square(2)	0.4386

Table B.5 : Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	2.224464	Prob. F(6,34)	0.0645
Obs*R-squared	11.55766	Prob. Chi-Square(6)	0.0726
Scaled explained SS	42.34744	Prob. Chi-Square(6)	0.0000

Table B.6 : Heteroskedasticity Test: ARCH

F-statistic	0.103956	Prob. F(2,36)	0.9015
Obs*R-squared	0.223945	Prob. Chi-Square(2)	0.8941

Table B.7 : DV: Sectorial performance (such as Agriculture: AGR)

Main IV: Remittances (REM)

Control Variables: Term of trade (TOT), Relative Price of Non-tradable to tradable goods (TNT), Foreign Exchange Reserve (FER), and Money supply (MS)

SL.	Variable Name	Variable type	PP	ADF	Remark
1	AGR	DV	I(1)	I(1)	I(1)
2	REM	IV	I(1)	I(1)	I(1)
3	INT	IV	I(1)	I(1)	I(1)
4	TOT	IV	I(1)	I(1)	I(1)
5	MS	IV	I(1)	I(1)	I(1)
6	FER	IV	I(1)	I(1)	I(1)

No variable is at I (2) and DV is at I (1)

Table B.8 : ARDL Long Run Form and Bounds Test

Dependent Variable: D(AGR)

Selected Model: ARDL(1, 2, 1, 1, 1, 1)

Sample: 1980 2021

Included observations: 40

Long run					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
REM	-0.020852	0.304511	-0.068477	0.9459	
TNT	15.14695	4.751155	3.188056	0.0036	
TOT	-11.09743	3.537221	-3.137330	0.0041	
MS	-0.052895	0.078089	-0.677364	0.5039	
FER	-3.73E-12	7.56E-13	-4.929520	0.0000	

F-Bounds Test

Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-statistic	3.814435	10%	2.26	3.35
k	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68

Table B.9 : ARDL Error Correction Regression

Dependent Variable: D(AGR)

Selected Model: ARDL(1, 2, 1, 1, 1, 1)

Sample: 1980 2021

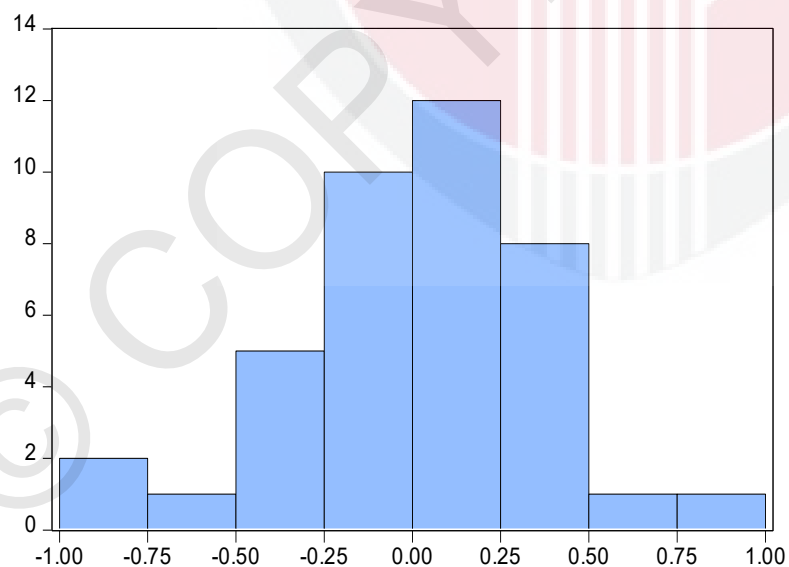
Included observations: 40

Short run				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.140546	1.650398	4.932474	0.0000
D(REM)	-0.161815	0.112645	-1.436498	0.1623
D(REM(-1))	-0.341324	0.107812	-3.165907	0.0038
D(TNT)	16.08222	1.217223	13.21222	0.0000
D(TOT)	-1.952295	1.194289	-1.634692	0.1137
D(MS)	0.066510	0.030099	2.209701	0.0358
D(FER)	1.04E-12	3.87E-13	2.692945	0.0120
CointEq(-1)*	-0.359965	0.069116	-5.208154	0.0000

F-Bounds Test

Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	3.814435	10%	2.26	3.35
k	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68



Series: Residuals

Sample 1982 2021

Observations 40

Mean -2.30e-15
Median 0.028012
Maximum 0.963647
Minimum -0.958568
Std. Dev. 0.375120
Skewness -0.220683
Kurtosis 3.745941

Jarque-Bera 1.252053
Probability 0.534712

Table B.10 : Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.243606	Prob. F(2,25)	0.3056
Obs*R-squared	3.619447	Prob. Chi-Square(2)	0.1637

Table B.11 : Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.670464	Prob. F(12,27)	0.7637
Obs*R-squared	9.182980	Prob. Chi-Square(12)	0.6872
Scaled explained SS	5.744503	Prob. Chi-Square(12)	0.9284

Table B.12 : DV: Sectorial performance (such as Manufacturing: MFG)

Main IV: Remittances (REM)

Control Variables: Term of trade (TOT), Relative Price of Non-tradable to tradable goods (TNT), Foreign Exchange Reserve (FER), and Money supply (MS)

SL.	Variable Name	Variable type	PP	ADF	Remark
1	MFG	DV	I(1)	I(1)	I(1)
2	REM	IV	I(1)	I(1)	I(1)
3	INT	IV	I(1)	I(1)	I(1)
4	TOT	IV	I(1)	I(1)	I(1)
5	MS	IV	I(1)	I(1)	I(1)
6	FER	IV	I(1)	I(1)	I(1)

No variable is at I (2) and DV is at I (1)

Table B.13 : ARDL Long Run Form and Bounds Test

Dependent Variable: D(MFG)

Selected Model: ARDL(1, 2, 1, 1, 1, 1)

Sample: 1980 2021

Included observations: 40

Long run				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
REM	0.233072	0.249430	0.934418	0.3584
TNT	9.855701	3.913092	2.518648	0.0180
TOT	7.481900	2.928853	2.554549	0.0166
MS	-0.021773	0.064372	-0.338232	0.7378
FER	3.58E-12	6.34E-13	5.640761	0.0000

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic k	3.834296 5		Asymptotic: n=1000	
		10%	2.26	3.35
		5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68

Table B.14 : ARDL Error Correction Regression

Dependent Variable: D(MFG)

Selected Model: ARDL(1, 2, 1, 1, 1, 1)

Sample: 1980 2021

Included observations: 40

Short run				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.198450	0.094866	2.091897	0.0460
D(REM)	0.252578	0.125811	2.007591	0.0548
D(REM(-1))	0.362066	0.114915	3.150724	0.0040
D(TNT)	8.393576	1.330893	6.306724	0.0000
D(TOT)	1.024519	1.263557	0.810821	0.4246
D(MS)	-0.110967	0.032831	-3.379936	0.0022
D(FER)	-1.10E-12	4.41E-13	-2.492097	0.0191
CointEq(-1)*	-0.473509	0.090681	-5.221695	0.0000

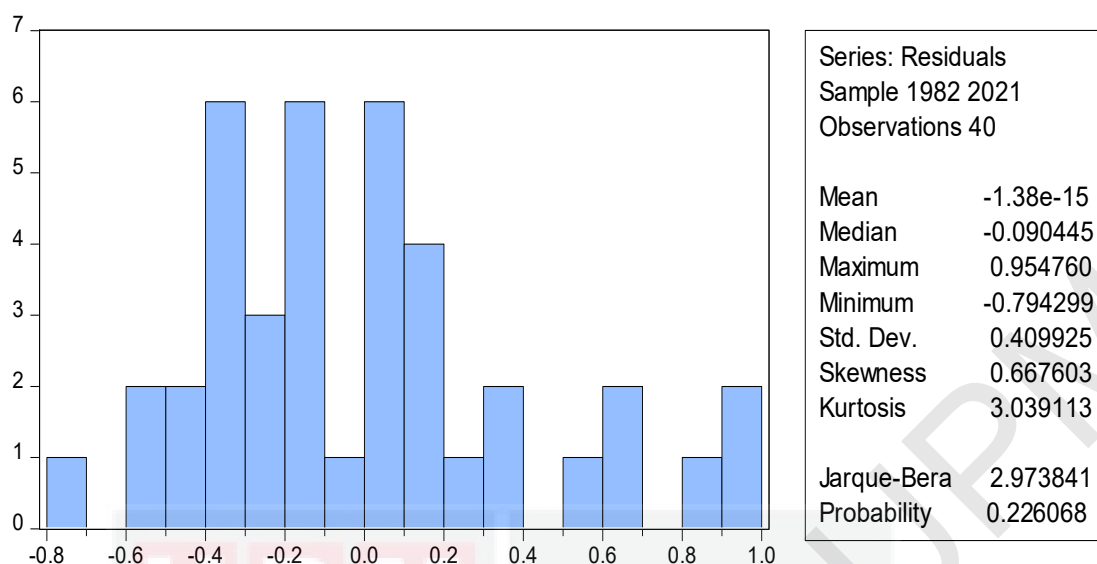


Table B.15 : Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.208695	Prob. F(2,25)	0.1308
Obs*R-squared	6.006501	Prob. Chi-Square(2)	0.0496

Table B.16 : Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.800748	Prob. F(12,27)	0.6468
Obs*R-squared	10.49904	Prob. Chi-Square(12)	0.5723
Scaled explained SS	4.877178	Prob. Chi-Square(12)	0.9620

Table B.17 : DV: Sectorial Performance (*such as Services: SERS*)

Main IV: Remittances (REM)

Control Variables: Term of trade (TOT), Relative Price of Non-tradable to tradable goods (TNT), Foreign Exchange Reserve (FER), and Money supply (MS)

SL.	Variable Name	Variable type	PP	ADF	Remark
1	SERS	DV	I(1)	I(1)	I(1)
2	REM	IV	I(1)	I(1)	I(1)
3	INT	IV	I(1)	I(1)	I(1)
4	TOT	IV	I(1)	I(1)	I(1)
5	MS	IV	I(1)	I(1)	I(1)
6	FER	IV	I(1)	I(1)	I(1)

No variable is at I(2) and DV is at I(1)

Table B.18 : ARDL Long Run Form and Bounds Test

Dependent Variable: D(SERS)

Selected Model: ARDL(1, 0, 1, 0, 0, 1)

Sample: 1980 2021

Included observations: 41

Long run				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
REM	0.124405	0.137236	0.906503	0.3714
TNT	-24.75544	2.440447	-10.14382	0.0000
TOT	-4.115732	1.512282	-2.721537	0.0104
MS	-0.005120	0.035336	-0.144898	0.8857
FER	-9.33E-13	3.73E-13	-2.502679	0.0176
F-Bounds Test				
Null Hypothesis: No levels relationship				
Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-statistic	3.839963	10%	2.26	3.35
k	5	5%	2.62	3.79
		2.5%	2.96	4.18
		1%	3.41	4.68

Table B.19 : ARDL Error Correction Regression

Dependent Variable: D(SERS)

Selected Model: ARD (1, 0, 1, 0, 0, 1)

Sample: 1980 2021

Included observations: 41

Short run				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	22.36071	4.348141	5.142590	0.0000
D (REM)	0.66	0.35	1.87	0.07
D (REM (-1))	-1.60	3.84	-0.42	0.68
D(TNT)	-22.48344	0.506551	-44.38538	0.0000
D (TOT)	1.05	1.60	0.66	0.58
D (MS)	0.05	0.07	0.71	0.49
D(FER)	4.14E-13	1.52E-13	2.723464	0.0104
D (FER (-1))	0.03	0.02	1.67	0.11
CointEq(-1)*	-0.310423	0.060144	-5.161370	0.0000

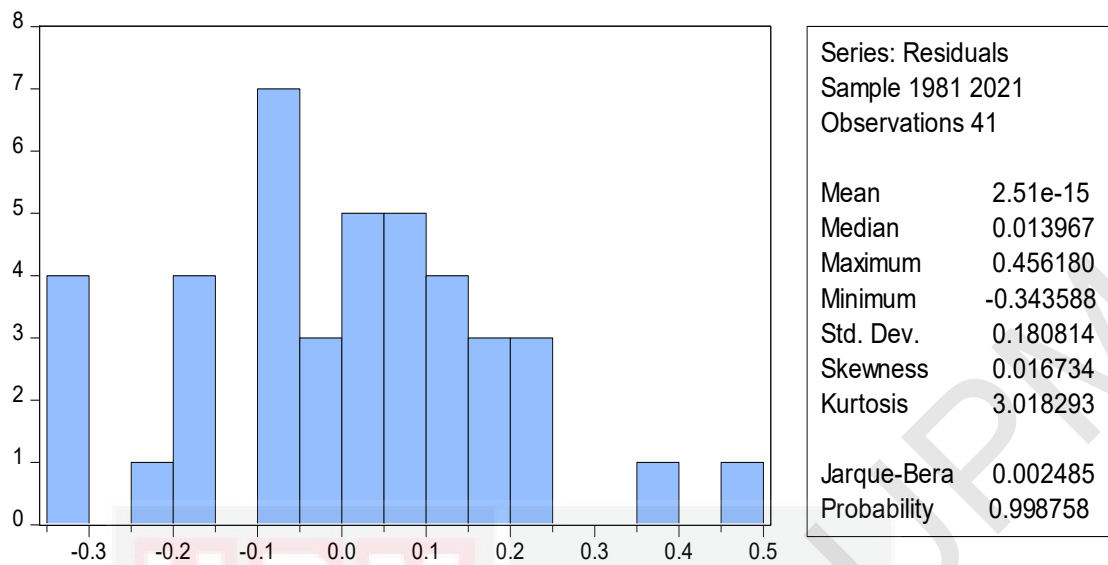


Table B.20 : Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.332982	Prob. F(2,30)	0.7194
Obs*R-squared	0.890386	Prob. Chi-Square(2)	0.6407

Table B.21 : Heteroskedasticity Test: ARCH

F-statistic	0.035358	Prob. F(2,36)	0.9653
Obs*R-squared	0.076460	Prob. Chi-Square(2)	0.9625

Appendix C

Table C.1 : PSM result summary for the amount spent on different spending categories for the Impact of Overseas Remittances on Household Consumption Expenditures (2016)

Radius Matching

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
hh_edu_exp_year	Unmatched	20804.2946	18485.7585	2318.53612	1252.58574	1.85
	ATT	20804.2946	18485.7585	2318.53612	913.270446	2.54
ih_health_exp~ar	Unmatched	15700.2833	10714.9796	4985.30365	861.360371	5.79
	ATT	15700.2833	10714.9796	4985.30365	962.787313	5.18
ih_total_food~ar	Unmatched	107399.839	91453.4016	15946.4372	2447.00486	6.52
	ATT	107399.839	91453.4016	15946.4372	2187.85909	7.29
consumed_durab~s	Unmatched	55484.7337	44547.7432	10936.9905	2311.75123	4.73
	ATT	55484.7337	44547.7432	10936.9905	1772.11995	6.17
ih_housing_lan~p	Unmatched	73053.2748	39259.7746	33793.5002	6186.63278	5.46
	ATT	73053.2748	39259.7746	33793.5002	8079.70405	4.18
ih_other_exp~ar	Unmatched	22027.8102	13034.8243	8992.98585	2249.95042	4.00
	ATT	22027.8102	13034.8243	8992.98585	1886.10606	4.77

Nearest Neighbor (2)

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
hh_edu_exp_year	Unmatched	20804.2946	18485.7585	2318.53612	1252.58574	1.85
	ATT	20804.2946	20506.5744	297.720255	2909.84858	0.10
h_health_exp~ar	Unmatched	15700.2833	10714.9796	4985.30365	861.360371	5.79
	ATT	15700.2833	14055.7493	1644.53399	1980.4792	0.83
h_total_food~ar	Unmatched	107399.839	91453.4016	15946.4372	2447.00486	6.52
	ATT	107399.839	89015.8658	18383.973	13734.0459	1.34
consumed_durab~s	Unmatched	55484.7337	44547.7432	10936.9905	2311.75123	4.73
	ATT	55484.7337	45254.7075	10230.0262	10265.1773	1.00
h_housing_lan~p	Unmatched	73053.2748	39259.7746	33793.5002	6186.63278	5.46
	ATT	73053.2748	32579.1763	40474.0984	17450.6786	2.32
h_other_exp~ar	Unmatched	22027.8102	13034.8243	8992.98585	2249.95042	4.00
	ATT	22027.8102	10826.4547	11201.3555	4970.88397	2.25

Nearest Neighbor (3)

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
hh_edu_exp_year	Unmatched	20804.2946	18485.7585	2318.53612	1252.58574	1.85
	ATT	20804.2946	18661.7521	2142.54249	2355.34396	0.91
hh_health_exp~ar	Unmatched	15700.2833	10714.9796	4985.30365	861.360371	5.79
	ATT	15700.2833	12749.3938	2950.88952	1685.17534	1.75
hh_total_food~ar	Unmatched	107399.839	91453.4016	15946.4372	2447.00486	6.52
	ATT	107399.839	87221.5033	20178.3355	9942.28082	2.03
consumed_durab~s	Unmatched	55484.7337	44547.7432	10936.9905	2311.75123	4.73
	ATT	55484.7337	43528.755	11955.9788	7511.44733	1.59
hh_housing_lan~p	Unmatched	73053.2748	39259.7746	33793.5002	6186.63278	5.46
	ATT	73053.2748	31223.661	41829.6138	13900.5335	3.01
hh_other_exp~ar	Unmatched	22027.8102	13034.8243	8992.98585	2249.95042	4.00
	ATT	22027.8102	10213.9688	11813.8414	3966.92498	2.98

Table C.2 : PSM result summary for the budget shares of different spending categories for the Impact of Overseas Remittances on Household Consumption Expenditures (2016)

Radius Matching

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
h_edu_exp_year	Unmatched	.080519496	.080050491	.000469005	.003166796	0.15
	ATT	.080519496	.080050491	.000469005	.002608861	0.18
h_health_exp~er	Unmatched	.055271726	.050136873	.005134854	.002631013	1.95
	ATT	.055271726	.050136873	.005134854	.002573916	1.99
h_total_food~er	Unmatched	.442814747	.496947698	-.054132951	.006050325	-8.95
	ATT	.442814747	.496947698	-.054132951	.005825234	-9.29
consumed_durab~r	Unmatched	.210460596	.211173755	-.000713159	.003707686	-0.19
	ATT	.210460596	.211173755	-.000713159	.00341473	-0.21
h_other_exp~er	Unmatched	.06335507	.041842793	.021512277	.002711895	7.93
	ATT	.06335507	.041842793	.021512277	.002860716	7.52
h_housing_lan~r	Unmatched	.147578366	.11984839	.027729976	.005380546	5.15
	ATT	.147578366	.11984839	.027729976	.006616867	4.19

Nearest Neighbor (2)

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
h_edu_exp_ye~er	Unmatched	.080519496	.080050491	.000469005	.003166796	0.15
	ATT	.080519496	.095620854	-.015101358	.007636394	-1.98
h_health_exp~er	Unmatched	.055271726	.050136873	.005134854	.002631013	1.95
	ATT	.055271726	.065349722	-.010077996	.006694286	-1.51
h_total_food~er	Unmatched	.442814747	.496947698	-.054132951	.006050325	-8.95
	ATT	.442814747	.482066113	-.039251366	.014526824	-2.70
onsumed_durab~r	Unmatched	.210460596	.211173755	-.000713159	.003707686	-0.19
	ATT	.210460596	.209751945	.00070865	.008658377	0.08
h_other_exp~er	Unmatched	.06335507	.041842793	.021512277	.002711895	7.93
	ATT	.06335507	.035374777	.027980293	.006310073	4.43
h_housing_lan~r	Unmatched	.147578366	.11984839	.027729976	.005380546	5.15
	ATT	.147578366	.11183659	.035741776	.011672671	3.06

Nearest Neighbor (3)

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
ih_edu_exp_ye~er	Unmatched	.080519496	.080050491	.000469005	.003166796	0.15
	ATT	.080519496	.091331874	-.010812378	.006546469	-1.65
ih_health_exp~er	Unmatched	.055271726	.050136873	.005134854	.002631013	1.95
	ATT	.055271726	.060993648	-.005721922	.005751139	-0.99
ih_total_food~er	Unmatched	.442814747	.496947698	-.054132951	.006050325	-8.95
	ATT	.442814747	.48157154	-.038756793	.012282454	-3.16
onsumed_durab~r	Unmatched	.210460596	.211173755	-.000713159	.003707686	-0.19
	ATT	.210460596	.212065838	-.001605242	.00749275	-0.21
ih_other_exp~er	Unmatched	.06335507	.041842793	.021512277	.002711895	7.93
	ATT	.06335507	.037312122	.026042949	.005335616	4.88
ih_housing_lan~r	Unmatched	.147578366	.11984839	.027729976	.005380546	5.15
	ATT	.147578366	.11672498	.030853386	.010399365	2.97

BIODATA OF STUDENT

Mohammad Shahadat Hossain was born on 16th November, 1985 to the family of Mohammad Tofazzal Hossain and Ayesha Akter in Mymensingh of Bangladesh. He is the elder son of his family. Mr. Shahadat's school life began when he was virtually six years old. He obtained his Primary and Secondary School Certificates from East Madar Bari Government Primary School, Chittagong in the year 1997 and Chittagong Collegiate School, in the year 2003 respectively. In 1997, he was also achieved Primary Govt. Scholarship. Later, Mr. Shahadat obtained Higher Secondary Certificates from Islamia Degree College, Chittagong in the year 2005. After that, he obtained Bachelor of Business Administration (BBA) in Economics, Master of Business Administration (MBA) in Finance and Master of Science (MSc) in Economics from Independent University, Bangladesh (IUB), in the year 2010, 2012 and 2017 respectively. Before his second Master's degree, Mr. Shahadat had joined as an Assistant Officer at Mutual Trust Bank Ltd., Bashundhara Branch in clearing department, in the year 2015. During his PhD training, which started since 16 October, 2019; Mr. Shahadat has published 11 research papers in international refereed journals, while 7 of the papers are Scopus published in Scopus Indexed Journals. Among these papers 3 have been accepted in Wiley & Inder science journals and 1 of them is in a SAGE journal. He has also participated 2 conferences in universities in Indonesia, and Canada. Furthermore, he has also published on book chapter in a book published by WILEY Press. He aims to be one of the renowned academicians in the development economics field. Mr. Shahadat can be contacted through his email: shahadat.hossain.upm@gmail.com.

LIST OF PUBLICATIONS

Published Research Papers

- Md. Shahadat Hossain, Mosharrof Hosen, Chuen-Khee Pek, Yue Fang Loh (2024) “Exploring contemporary challenges and prospective solutions for women’s empowerment: Does women’s empowerment impact achieving sustainable development goal five?” *Business Strategy & Development*. Volume 7, Issue 1/e355, <https://doi.org/10.1002/bsd2.355> [Wiley Journal, Scopus Q1]
- Md. Shahadat Hossain, Weng Marc Lim, Islam M.A (2024) “Women Entrepreneurship: The role of Education, National Culture and Various Supports” *International Journal of Business and Emerging Markets*. 16(3): 1-24, DOI:10.1504/IJBEM.2024.10062412. [InderScience Journal, Scopus Q2].
- Md. Shahadat Hossain, Weng Marc Lim, Islam M.A., Hosen, M., & Mohd Thas Thaker, H. (2023) “Missing catalysts of female entrepreneurship Success: Evidence from an emerging economy. *Global Business and Organizational Excellence*, 42 (2), 1-15, <https://doi.org/10.1002/joe.22201> [Wiley Journal, Scopus Q2]
- Islam M.A., Md. Shahadat Hossain, Pullen, E., & Rahman, M. (2023) “Unlocking the potential of women in a male dominated Society: Key Challenges and solutions in integrating Women in digital economic activities. *Business Strategy & Development*, 1-13, <https://doi.org/10.1002/bsd2.255> [Wiley Journal, Scopus Q1]
- Islam M.A., Jantan, A. H., Yusoff, Y.M., & Md. Shahadat Hossain (2023) “Green Human Resource Management (GHRM) Practices and Millennial Employees Turnover Intentions in Tourism Industry in Malaysia: Moderating Role of work environment. *Global Business Review (GBR)*, Vol.-24(4), Pages:642-662, [SAGE Journal, Scopus Q2, ABS, ABDC].
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- M. A. Haque, Naila A. Chowdhury, Islam M.A., Md. Shahadat Hossain & M. Atiqur Sarker (2021) "Tracing the route to Organizational Performance through Expatriate Leadership Effectiveness: The Role of Emotional cultural and Spiritual Intelligence. *International Journal of Business Excellence (IJBEX)*, Vol.-26, Issue-02, Pages:1-21, [Inderscience Journal, Scopus Q3].
- Md. Shahadat Hossain, Lee Chin, Rusmawati Said & Suryati B. Ishak (2020) "Microeconomic Impact of Remittances at the Household level in a Remittance Receiving Country, Bangladesh. *Journal of Humanities & Social Sciences Reviews*, ISSN:2395-6518, Vol.-08(3), Pages:628-634, [Scopus Q1].
- Md. Shahadat Hossain, Lee Chin, Rusmawati Said & Suryati B. Ishak (2020) "Role of Remittances on Gross Domestic Product (GDP) Growth in Developing Countries: The case of Bangladesh. *Journal of Reviews on Global Economics*, ISSN:1929-7092/20, Vol.-09, Pages:242-248, [Scopus Q2].
- Md. Shahadat Hossain, (2019) "Barriers Faced by Rural Female Entrepreneurs of SMEs in Accessing Financial Institutions for Loans in Bangladesh. *Journal of International Business and Management* 2(4):01-09, ISSN:2616-4655, [ISI, ECONBIZ, Google Scholar; RePec, Worldcat].

Published Book Chapter

- Islam M.A., Md. Shahadat Hossain, Hoque, M. E., Khan, T., Hassan, & M. M. (2023) "The Moderating Role of Gender and Employee championing Behavior in the relationship between Green Human Resource Management Practices and Sustainable Organizational Performance: Evidence from Bangladesh. In: Adekoya, O.D., Mordi, C., Ajonbadi, H.A. (eds) *Global Perspectives on Green HRM*. Palgrave Macmillan, Cham. https://doi.org/10.1007/978-3-031-35795-4_6s.

Conference Attended

- Md. Shahadat Hossain & Lee Chin (2021) "Covid-19 Pandemic and its Socio-Economic Impact, a case of Bangladesh, the Fastest growing economy in South Asia Perspective. 1st International Applied Business Conference on Economics and Business. [06-07th May, 2021] Faculty of Economics and Business, University of Guelph-Humber, Toronto, Canada.
- Md. Shahadat Hossain, Islam, M.A., Haque, A., (2020) "Challenges and Solutions in Attracting and Retaining Millennial Employees during Environmental Disruption: A Developing Country Perspective. 8th Gadjah Mada International Conference on Economics and Business. [Yogyakarta, 12th September, 2020] Faculty of Economics and Business, Universities Gadjah Mada, Indonesia.

