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DYNAMICS OF EXCHANGE RATE AND FOREX RESERVES IN BANGLADESH: WAYS TO STABILIZE FOREIGN EXCHANGE RATE

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Abstract:
The exchange rate and foreign exchange reserves stand as pivotal determinants profoundly impacting external and overall economic conditions. A sustained equilibrium in exchange rates alongside robust reserve levels is imperative for managing inflation and fostering favorable trade balances, thereby, bolstering the nation's holistic economic well-being. This study scrutinizes the dynamic interplay of exchange rates and forex reserves in Bangladesh, drawing upon meticulously curated data from Bangladesh Bank and bruegel.org. Methodologically, the investigation relies on rigorous trend and growth models to elucidate pertinent patterns. The analysis unveils a phase of exchange rate stability vis-à-vis the USD to BDT currency pair pre-2022, followed by a marked escalation in recent years attributable to localized currency devaluation. Noteworthy is the trajectory divergence observed between the Nominal Effective Exchange Rate (NEER), demonstrating a downward trend, and the Real Effective Exchange Rate (REER), exhibiting a contrasting upward trajectory surpassing NEER. Moreover, a conspicuous surge in forex reserves is evident until early 2022, succeeded by a precipitous decline to precarious levels. This downturn is ascribed to multifaceted factors encompassing the Ukraine conflict, volatility in oil prices, burgeoning foreign debt obligations of public and private entities, dwindling Foreign Direct Investment (FDI) inflows, and diminished remittances. The governmental response has entailed the adoption of short-term

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strategies aimed at mitigating exchange rate volatility and preserving forex reserves. While certain measures have proven efficacious, others have fallen short of desired outcomes. In pursuit of exchange rate stability, the central bank has instituted a crawling peg exchange rate regime, complemented by governmental interventions restricting imports to safeguard forex reserves. Achieving equilibrium mandates concerted governmental endeavors to invigorate remittance and FDI inflows, thus fostering a more robust economic landscape.

JEL: F31, G18, O24

Keywords: Remittance, FDI, Forex Reserves, ODA, Foreign Exchange, Bangladesh

1. Introduction

In the contemporary epoch characterized by globalization, nations are compelled to exchange commodities and services with the international community, necessitating the conversion of their domestic currency into widely recognized global currencies or those of the pertinent service or commodity-supplying nations. As trade liberalization continues to advance, coupled with the cross-border movement of labor and heightened demand for foreign services such as healthcare and education, the role of the currency market assumes critical importance in facilitating international transactions while concurrently ensuring the stability and prosperity of the domestic economy. The stability exhibited within the foreign exchange market significantly shapes various facets of economic activity, including trade flows, trade balances, balance of payments, and the broader macroeconomic landscape. Moreover, the structure of the exchange rate regime plays a pivotal role in determining both the exchange rate itself and the associated level of exchange rate volatility. Notably, exchange rate volatility tends to be more pronounced under a floating exchange rate regime than a fixed exchange rate arrangement.

Obstfeld and Rogoff (1998) argued that exchange rate volatility has a cost to the economy as it affects firms and households through direct and indirect channels. The direct channel illustrates that people are disgruntled with exchange rate fluctuation as it fluctuates their consumption and leisure. The indirect channel argues that to hedge the risks of future exchange rate fluctuations, the firms may set high prices in the form of risk premiums. The exchange rate volatility influences the trade pattern (Kikuchi 2004). It negatively affects exports (Bilquees *et al.*, 2010; Chit *et al.*, 2010; Subanti *et al.*, 2019), particularly, the overall trade (Hooy and Choong, 2010; Baak, 2004). Rahman *et al.* (2020) have shown a negative effect of exchange rate volatility on trade in Bangladesh.

In the context of trade between Bangladesh and the USA, while bilateral exchange rates govern the exchange of commodities and equipment, Bangladesh conducts trade with other nations, predominantly employing the US dollar as the primary international currency. Given that Bangladesh's trading partners also use exchange rates relative to the US dollar, using a composite exchange rate index becomes necessary to comprehend the

behavior of the foreign exchange market comprehensively. This index typically comprises two composite forms of exchange rates: the nominal effective exchange rate (NEER) and the real effective exchange rate (REER). REER serves multiple purposes, including examining a nation's foreign trade transactions, acting as a gauge of global competitiveness, providing targets for monetary policy, serving as criteria for addressing external shocks, and serving as operational targets for foreign exchange interventions aimed at managing exchange rates. Moreover, REER is a robust indicator of the macroeconomic ramifications of exchange rate movements, surpassing the insights offered by individual bilateral rates. By assessing a currency's value relative to other currencies and discerning whether its value has appreciated or depreciated vis-à-vis trading partners, REER significantly influences a nation's external competitiveness, resource allocation dynamics, and consumer expenditure patterns. Notably, a sustained appreciation of REER undermines a country's external competitiveness by reducing the cost of imports for consumers while increasing the relative cost of exports for manufacturers. Consequently, this trend adversely affects fiscal revenues, employment levels, and domestic production, exacerbating the current account deficit, as noted by Monga and Lin (2015). Conversely, a decline in REER prompts a reduction in imports and enhances the affordability of exports, thereby stimulating domestic production. Consequently, this trend leads to a current account surplus over time, bolstering government revenues and augmenting foreign reserves.

Before 1993, there was no formal forex market in Bangladesh. The Bangladesh Bank was the sole agent in managing the forex market. At the early stage, Bangladesh followed a pegged exchange rate and adopted a managed exchange rate regime in 1976. A floating exchange rate regime started on May 30, 2003. However, Bangladesh Bank keeps its eyes on the foreign exchange market and intervenes when it is needed to stabilize the market. Such intervention in the managed floating regime causes the misalignment of the exchange rate: either overvalued or undervalued.

This paper explores the dynamics of the exchange rate between USD and BDT and the forex reserve in Bangladesh. It also examines strategies to manage the volatility of exchange rates and forex reserves in Bangladesh.

2. Foreign Exchange Market in Bangladesh

The evolution of the Foreign Exchange Market in Bangladesh commenced prominently after 1993, signifying a transformative phase in currency exchange dynamics. Before this pivotal juncture, the Bangladesh Bank held a monopoly over foreign currency transactions, serving as the exclusive provider of foreign currency services. The determination of exchange rates primarily relied on the interplay between foreign currency demand and supply, a mechanism that underwent significant alteration following the advent of current account convertibility. In 1976, Bangladesh adopted a managed float regime, which persisted until August 1979 when it was succeeded by a currency-weighted basket method for determining exchange rates. Subsequently, in 1983,

the exchange rate management framework transitioned to a trade-weighted basket method, with the US dollar designated as the intervention currency. Concurrently, establishing a secondary exchange market (SEM) alongside the official exchange rate framework gave rise to a curb market. However, until 1990, the coexistence of multiple exchange rates under various export benefit and Home Remittances Schemes engendered a pronounced disparity between official and SEM rates. This situation precipitated regulatory conflicts, inadequate risk management practices, and diverse forms of government guarantees for foreign exchange users, contributing to macroeconomic imbalances. In response, the government undertook phased adjustments to unify the official and SEM rates, culminating in their convergence in January 1992. The commencement of currency convertibility on 17 July 1993 marked a significant milestone, heralding the inception of a relatively open foreign exchange market in Bangladesh. Prior to this, the Bangladesh Bank routinely declared mid-rate along with buying and selling rates for the dollar applicable to authorized dealers (ADs), initially characterized by a narrow spread of Tk 0.10, which gradually expanded to Tk 0.30.

Currently, the exchange rate management system in Bangladesh closely monitors the movement of the taka's exchange rate against a basket of currencies using the REER mechanism, aiming to maintain proximity to the equilibrium rate. The key participants in Bangladesh's foreign exchange market include the Bangladesh Bank, authorized dealers, and customers. Authorized dealers, exclusively resident entities in the foreign exchange market, are empowered to transact and hold foreign exchange domestically and internationally. Bangladesh Bank issues licenses for authorized dealerships solely to scheduled banks, with the amount of foreign exchange holdings subject to open position limits stipulated by the central bank. Bangladesh Bank engages in spot transactions of dollars with authorized dealers, with each transaction required to be in multiples of $10,000, subject to a minimum of $50,000. Additionally, registered money changers facilitate foreign currency transactions for tourists, selling foreign currencies to outgoing Bangladeshi travelers according to entitlements, while any excess holdings must be retained with authorized dealers. Certain service establishments, such as hotels and shops also hold limited money-changing licenses to accept foreign currencies from foreign tourists, with the provision that these currencies are subsequently sold to authorized dealers. Customer transactions predominantly cater to individual needs and facilitate export, import, and remittance activities.

Since May 2003, following the introduction of the floating exchange rate regime for the Bangladeshi Taka (BDT), the foreign exchange market of Bangladesh underwent a significant transformation characterized by deregulated features. Market participants, for the first time, operated without intervention from the government or the Bangladesh Bank. Despite initial apprehensions regarding the potential adverse repercussions of floating exchange rate, the market exhibited rational behavior in response to the altered foreign exchange dealing system. Notably, amidst buying pressure attributed to speculation, the value of the US dollar witnessed an increase of approximately Tk 1.00, reaching Tk 61.30 in the market. This surge could potentially be attributed to the closure

of numerous money markets worldwide. The Bangladeshi Taka made its debut in the international market under the Floating Exchange Rate (FER) regime, with the US dollar trading between Tk 58.55 and Tk 58.63 on the day following the float, compared to Tk 58.55 and Tk 58.70 the preceding day. Market transactions totaled around US $22 million in a single day, displaying no abnormal market behavior. In the secondary market, the dollar's rate fluctuated between Tk 60.00 and Tk 61.30 throughout the week, compared to Tk 59.80 to Tk 60.35 in the preceding week. Despite a slight upward bias in the dollar's exchange rate, the Bangladeshi Taka demonstrated resilience against the US dollar throughout the initial week post-float, buoyed by a robust supply position, particularly adequate supply from authorized dealers, which mitigated strong demand for the dollar. However, in the informal market, the dollar continued to trade slightly higher compared to the interbank market, consistent with previous trends. It is noteworthy that the Bangladesh Bank took precautionary measures to forestall potential erratic market behavior.

3. The Recent Behavior of Macro Fundamentals and the Forex Market

The global economic landscape is currently marked by sluggish growth, elevated inflation rates, and supply chain disruptions stemming from the aftermath of the COVID-19 pandemic and the Russia-Ukraine conflict. Bangladesh is not immune to these inflationary pressures, primarily driven by soaring import costs attributed to the appreciation of the US dollar. Consequently, the surge in domestic inflation has eroded the country's export competitiveness, exacerbating the trade deficit. Data from the first nine months (July-March) of the 2021-22 fiscal year reveals a stark increase in import payments by 44 percent, juxtaposed with a 33 percent rise in export income, culminating in a widening trade deficit to the tune of USD 24.9 billion. Simultaneously, remittance inflows experienced an 18 percent decline during this period, contributing to a ballooning current account deficit, reaching approximately USD 14 billion. Furthermore, the reopening of borders has fueled an uptick in foreign currency demand, driven by increased travel activity, including higher education pursuits abroad, albeit hampered by pandemic-related disruptions. Despite tuition fees being settled through formal channels, individuals resort to informal avenues, such as the kerb market, to manage out-of-pocket expenses, given transaction constraints associated with credit cards and procedural hurdles in accessing formal channels like Bangladesh Bank. Similarly, medical expenses incurred overseas prompt individuals to acquire US dollars through informal channels due to limitations imposed by credit card transaction caps and bureaucratic delays in formal application processes. Moreover, heightened demand for foreign currency during the Hajj pilgrimage, coupled with illicit financial transactions conducted in foreign currency, further strains the foreign exchange market.

The strain on the foreign exchange market has resulted not only in the depreciation of the Bangladeshi taka against the US dollar but also in the emergence of at least three distinct exchange rates, adding complexity to the situation: the informal rate, formal rate,

and selling-buying rate of Banks. In response to pressures to transact at the dictated spot rate, banks have resorted to conducting transactions at short-tenured forward rates, incurring higher costs for businesses. Throughout the fiscal year 2021-22, the Bangladesh Bank injected approximately USD 5 billion into the forex market to maintain exchange rate stability. While this may have facilitated government procurement of fuel and essential commodities at lower prices, it has not succeeded in stabilizing the exchange rate. Indeed, the taka has experienced a modest depreciation against the dollar, amounting to only 3.38 percent during the first nine months of FY22. This contrasts with several other countries, including China, India, Pakistan, Sri Lanka, the Philippines, Turkey, and the UK, which have devalued their local currencies by 5-50 percent.

Bangladesh faced a sharp rise in overall inflation, mostly caused by food inflation, and it is knocking the two-digit form of inflation at the end of 2023, which was 7.48 percent in 2022 and 5.36 percent in 2021. The economy faces several problems generated locally and globally. A fall in remittance inflow, plummeting tendency of forex reserve, slow down of exports, global economic slowdown, and wars are augmenting the woes.

4. Forex Crisis and Recovery Strategies in Other Countries

The 1991 Indian economic crisis marked a significant downturn in India's economic trajectory, precipitated by a balance of payments deficit exacerbated by overreliance on imports and external factors. The roots of India's economic woes can be traced back to 1985 when imports surged, plunging the country into a twin deficit scenario: a trade imbalance alongside a substantial fiscal deficit. The trajectory of India's fiscal policy had already veered towards looseness by the summer of 1979, coinciding with the nation's grappling with the most severe drought since Independence and the global oil shock triggered by the Islamic Revolution in Iran. This period witnessed a surge in food grain procurement prices without corresponding increases in issue prices, alongside tax deductions on agricultural inputs. Fertilizer subsidies skyrocketed tenfold under the Janata government (1977-80), escalating from Rs. 60 crores to Rs. 600 crores. Concurrently, food and export subsidies experienced rapid growth. Meanwhile, the gradual liberalization of imports from 1976 onwards led to a notable upsurge in imports, particularly of intermediate and capital goods, while export growth failed to match pace. Furthermore, international aid and loans dwindled post-1976. Remittance inflows from workers in the Persian Gulf temporarily plugged the current account deficit, bolstering foreign reserves, which swelled to over $7 billion by 1978, sufficient to cover nine months of imports. However, the unsterilized accumulation of reserves resulted in an expansion of the total money supply, with dollar inflows accumulating at the central bank while rupees were dispensed in exchange. Broad money growth, averaging 20% during the Janata years, was further fueled by increased Reserve Bank of India (RBI) overdrafts to the central and state governments. Against the backdrop of fiscal imprudence, rapid monetary expansion, and political instability exacerbated by the disintegration of the Janata government, the severe drought and global oil shock of 1979 further exacerbated

India's economic challenges. Agricultural and food grain production plummeted by a sixth, while the terms of trade deteriorated by a third, attributed to the oil price surge, and the current account deficit ballooned from 4% (1978-79) of exports to 31% (1981-82).

Amidst analysis of 75 countries, Bolivia has witnessed the most pronounced decline in its reserves since the onset of the COVID-19 pandemic. As of September 2022, the latest month with available data, the landlocked South American nation possessed foreign exchange reserves adequate to cover 0.825 months of imports, reflecting an 88% reduction compared to March 2020. The depletion of Bolivia's reserves can be attributed to a combination of factors, notably a sustained large fiscal deficit monetized by the central bank and adherence to a fixed exchange rate regime, as identified by the IMF. Data from Haver Analytics reveals that the international reserves held by Bolivia's central bank amounted to approximately $372 million in January 2023, representing less than a tenth of their level in January 2020. Sri Lanka follows Bolivia with the second most significant decline (-77.9%) in import coverage since the pandemic. The South Asian nation has grappled with what the IMF termed as "the mother of all crises," characterized by political instability, economic collapse, and soaring public debts. After months of awaiting approval for a $2.9 billion bailout, Sri Lanka secured financial assurances from China, India, and its major bilateral creditors as announced by the IMF on March 7. Lebanon ranks third in the list of countries experiencing a sharp decline in foreign reserves relative to imports among the 75 countries under scrutiny. Between March 2020 and December 2022, Lebanon's foreign reserves plummeted by 75.7%, equivalent to 8.312 months' worth of imports. The country has been mired in its deepest economic crisis exacerbated by the COVID-19 pandemic and a catastrophic explosion at the Port of Beirut in August 2020. Additionally, Pakistan and Kyrgyzstan are among the five countries witnessing a decline of over 60% in their reserves since the onset of the pandemic, with both nations' foreign reserves in December 2022 covering less than one month of imports. While the majority of the 75 developing countries experienced a decline in reserves, 12 countries, including Ecuador and Bosnia and Herzegovina, witnessed improvements. Notably, Nigeria exhibited commendable performance compared to its counterparts, with a 40.9% increase in its FX reserves, although the latest available data extends only up to September 2021.

5. Literature Review

The real exchange rate (REER) misalignment denotes the discrepancy between the actual REER and its equilibrium level. Ambaw *et al.*'s (2022) research revealed that REER misalignment is primarily impacted by price inflation and interest rates, rather than the output gap. Conversely, a shock to REER misalignment correlates with eventual increases in price inflation and short-term interest rates, alongside a negative output gap. In the context of a floating exchange rate regime, rates may exhibit excessive volatility due to speculative bubbles or contagion, impeding investment decisions and undermining growth potential. Conversely, developing nations opting for fixed exchange rates often

encounter challenges, as currency appreciation over time is driven by inflation differentials, productivity shifts, or other factors. It is widely acknowledged that exchange rates, akin to asset prices, demonstrate short-term behavior influenced by news, susceptibility to contagion, and bandwagon effects (Williamson, 1983). Yagci (2001) suggests that short-term financial flows, driven by speculation, manias, panics, and herd behavior, may play a role in this dynamic. While speculation could potentially realign exchange rates with equilibrium, empirical evidence, as highlighted by Krugman (1993), does not consistently support speculative efficiency.

If the exchange rate's level is influenced partly by irrational or limited-information-based rational behavior, fundamental factors lose significance as determinants. This suggests that floating exchange rates may display varying degrees of misalignment. Should the short-term impacts of speculation and herd behavior dissipate rapidly, the issue of misalignment might not be crucial under such an exchange rate regime. Another potential explanation for misalignment in floating rates arises from the heightened financial integration of developing nations. With the increased integration of capital markets globally, exchange rate determination is dominated by capital account transactions (Yagci, 2001). Consequently, there may exist a significant disparity between the actual exchange rate and the rate necessary for goods sector equilibrium. Excessive capital flows into or out of a country can lead to unwarranted and unsustainable currency appreciation or depreciation. Yagci (2001) further suggests that exchange rates may develop distinct short-term and medium-term dynamics, while long-term dynamics could also be influenced by hysteresis or persistent herding behavior.

Unforeseen disclosures of information have the potential to influence the exchange rate's level. Changes in underlying economic factors could trigger exaggerated responses from currency traders. Bandwagon effects might lead to an excessive appreciation of a currency, surpassing what is justified by economic fundamentals. Conversely, speculation could induce similar circumstances without altering the underlying fundamentals. When misalignment arises from either of these origins, hysteresis might elucidate why the misalignment persists, often resulting in detrimental effects of currency overvaluation on an economy. While floating exchange rates may be feasible, they may not always be preferable (Williamson, 1985).

Opting for fixed exchange rates can be a viable strategy for a developing nation, contingent upon the nature and severity of the challenges it encounters. However, when conventional measures fail to accommodate or counteract these challenges, the country may find itself compelled to uphold a rate that no longer aligns with the underlying fundamentals supporting the peg. The recent history of fixed exchange rates illustrates numerous instances of actual currency appreciation amid nominal rigidity, resulting in overvaluation and the attendant complications it entails. Usually, this peg ultimately culminates in a crisis of varying forms, with misalignment playing a pivotal role in precipitating the currency crash.

Numerous strategies exist to potentially mitigate speculative pressure on exchange rates, including enhancing policy transparency and addressing corruption and

other country-specific risk factors. Additionally, utilizing exchange rate regimes as a policy instrument could serve to mitigate misalignment. Research indicates that REER misalignment can adversely affect developing economies in various ways. Specifically, REER overvaluation has been linked to slower economic growth (Ghura and Grennes, 1993; Rodrik, 2008; and Elbadawi, Kaltani, and Soto, 2012). Studies demonstrate that REER misalignment, particularly overvaluation, correlates with reduced growth levels, primarily by diminishing demand for goods in the tradable sector. Moreover, REER misalignment tends to coincide with institutional deficiencies and market inefficiencies prevalent in many low-income economies, amplifying its adverse impact on the tradable sector and, consequently, lowering growth prospects (Rodrik, 2008).

Given the potential impact of REER misalignment on economic growth, it's reasonable to expect a corresponding effect on exports. For instance, Ghura and Grennes (1993) demonstrated that REER overvaluation could diminish export volumes by effectively acting as a tax on export profits. Empirical evidence from Pick and Vollrath (1994) revealed a significant negative impact of REER misalignment on agricultural exports. Elbadawi (1998) further substantiated this, showing that even after accounting for REER volatility, the adverse effect of misalignment on exports persisted. Notably, the findings suggested that REER misalignment exerts an influence on exports beyond the impacts of exchange rate volatility. In the context of developing economies, the detrimental effects of REER misalignment extend to both agricultural and non-agricultural exports. For instance, Sekkat and Varoudakis (2000) observed that REER overvaluations in developing economies often coincided with declines in manufacturing exports. Conversely, Freund and Pierola (2012) found that substantial REER undervaluation typically precedes significant increases in manufacturing exports, termed a "surge" in export growth. Sekkat (2016) also highlighted the potential impact of REER misalignment on export diversification in developing economies. Considering the adverse effects on exports, REER misalignment may lead to welfare losses. Engel (2014) argued that this could be attributed to resource allocation inefficiencies resulting from misaligned exchange rates, where households in different countries pay disparate prices for identical goods, leading to inefficiencies and welfare losses. Consequently, Engel (2014) proposed that policymakers address currency misalignment alongside inflation stabilization and output gap management to mitigate these adverse effects.

Recently, Ambaw and Sim (2021) conducted a study revealing that REER misalignment may exert an influence on political stability. Analyzing data from 35 sub-Saharan African countries spanning from 1975 to 2006, they uncovered a correlation between REER misalignment and increased civil conflict, even after accounting for factors such as rainfall and commodity price shocks—factors commonly associated with civil unrest. Their findings suggest that achieving REER stabilization and effectively managing currency misalignment could contribute to fostering political stability. Moreover, currency crises have been linked to currency misalignment by studies such as Holtemöller and Mallick (2013) and Heriqbaldi *et al.* (2020). For instance, Holtemöller and Mallick (2013) investigated the predictive power of REER misalignment for currency

crises, revealing that significant and persistent misalignments were indicative of impending macroeconomic crises. Similarly, Heriqbaldi, Widodo, and Ekowati (2020) explored the role of misalignment in triggering exchange rate crises, focusing on the Indonesian rupiah. They found that a substantial proportion of rupiah-related crisis episodes could be attributed to large shocks in REER misalignment.

Several studies have explored the connections between REER misalignment and macroeconomic fundamentals. For instance, Asongu and Nnanna (2020) uncovered distinct long-term relationships between Cameroonian economic fundamentals—such as trade dynamics, government expenditure, and openness—and the REER, in contrast to other member states. These findings underscore the pivotal role of monetary and exchange rate policies in realigning the real exchange rate with medium-term fundamentals. Khaleque (2021) showed that economic policies – fiscal policies and monetary policies – played a significant role in improving GDP growth in Bangladesh. While monetary policy, particularly aimed at curbing inflation, contributes to REER stability, a flexible exchange rate policy facilitates adjustments in the nominal exchange rate to maintain REER stability. It's imperative for authorities to implement initiatives aimed at enhancing future productivity and competitiveness, such as investments through the Public Investment Fund (PIF). Additionally, policymakers should remain vigilant about currency misalignment and consider strategies to promote domestic production over imports in government consumption and public investment projects. Encouraging local content development can further diversify the economy. Lastly, attracting foreign investment and assets can foster technological advancements and improvements in economic, financial, and social infrastructure, ultimately bolstering competitiveness (Hasanov and Razek, 2023).

Studies also showed that REER misalignment of the Renminbi (RMB) is not without precedent concerning its magnitude, duration, or the breadth of currency coverage. Moreover, we observed limited empirical support for the assertion of Chinese currency manipulation. Contrary to expectations, the accumulation of foreign assets does not consistently lead to currency misalignment. Additionally, panel-based estimates of misalignment across four economies underscore this point. Furthermore, the observed volatility in REER misalignment poses a potential risk of fueling inflation within the domestic economy (He *et al.,* 2012; Qin *et al.,* 2010).

Studies showed that increased volatility in the dirham adversely impacts trade flows, leading to reductions in both exports and imports. Moreover, misalignments also exert influence on trade flows, with overvaluation resulting in decreased exports, increased imports for Morocco, and a subsequent deterioration of the trade balance with the European Union. However, neither volatility nor misalignments significantly affect foreign direct investments (FDI) directed towards Morocco. Additionally, the analysis highlights that only adjustments in the REER of Cameroon and Gabon play a significant role in restoring long-term equilibrium following a shock. Consequently, based on our quantitative analysis of REER paths, there appears to be no immediate necessity for adjusting the level of the peg (Bouoiyour and Rey, 2005; Asongu, 2014).

6. Materials and Methods

We have compiled the daily, monthly, and annual average USD/BDT exchange rate from Bangladesh Bank. The NEER and REER data have been collected from bruegel.org. The forex reserve data have been collected from Bangladesh Bank. To understand the pattern of exchange rates, forex reserves, and various sources of forex reserves, we used the trend analysis and measured the growth of the variables using the growth model.

7. Trend and Growth of Nominal and Real Exchange Rate

The nominal daily exchange rate remained relatively stable, ranging between 68-70 from January 2007 to December 2010. However, in 2011, the nominal exchange rate surged to over 84 by the year's end. Notably, the gap between buying and selling rates widened from 0.08 in 2008 to 0.8 in 2011, before slightly decreasing to 0.6 in 2012. This gap fluctuated thereafter, maintaining levels between 0.06 to 0.15 from 2012 to 2021. Remarkably, in 2022, the gap soared to 8.35, marking the highest observed between 2007 and 2022. Subsequently, between January 2023 and July 2023, it decreased to 3.54 (Table A1 in the appendix). The average monthly nominal exchange rate hovered between BDT 68/USD to BDT 69/USD from 2007 to 2009. During this period, the foreign exchange market faced intermittent pressure, largely attributable to seasonal import-export patterns and speculative influences. Notably, in fiscal years 2005 and 2006, the country's foreign exchange market exhibited significant instability, with the highest volatility observed in March 2006. In the interbank market, the taka/US$ exchange rate peaked at 71.75 on March 21, 2006. These fiscal years witnessed a rapid devaluation of the Bangladeshi taka against the US dollar, with average rates standing at 61.39 and 67.08, respectively. Furthermore, in FY 2007, the taka depreciated further to 69.03, reflecting a depreciation of over 17 percent from FY 2004. To alleviate this pressure, Bangladesh Bank intervened by selling US dollars in the interbank market and permitted banks to withdraw limited excess funds from their foreign exchange clearing accounts. Additionally, it relaxed restrictions on forward and SWAP transactions. However, in FY 2008 and 2009, the taka appreciated against the US dollar, averaging 68.80 in FY 2009 due to increased inflows from remittances and export receipts. Bangladesh Bank purchased a net total of US$ 499.2 million in FY 2009 to stabilize the value of the US dollar. The scope of the foreign exchange market expanded further, with authorized dealers being allowed to hedge commodity price risks using standard exchange-traded futures/options and over-the-counter derivatives on commodities with prior approval from Bangladesh Bank. Interbank transactions in the country's foreign exchange market, including spot, forward, and swap, also surged substantially in FY 2009, reaching US$ 4.4 billion, reflecting a growth of over 25 percent compared to the previous year. This indicates a rapid maturation of the market and a reduction in banks' dependency on Bangladesh Bank. By the end of 2010, the average monthly nominal exchange rate rose to 70 and sharply

increased to around 84 by the end of 2011. Subsequently, the average monthly nominal exchange rate exhibited a declining trend, ranging between 77-80 from 2012 to 2017.

Figure 1: The trend of the daily nominal exchange rate

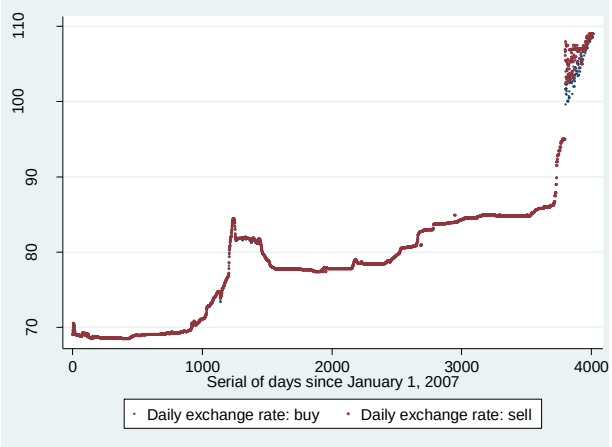


Figure 2: The trend of the gap between the daily USD buying and selling rate

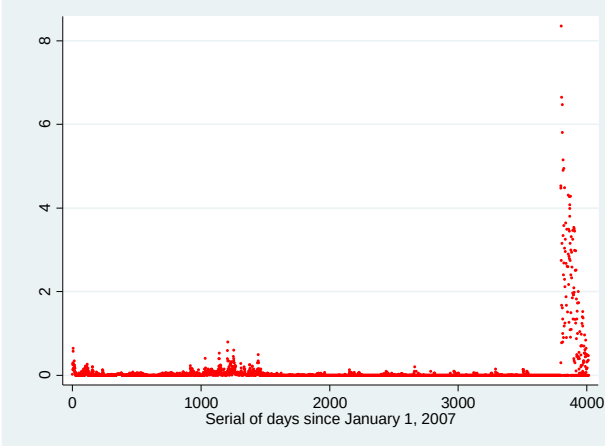


Figure 3: The trend of percent change in the daily nominal exchange rate

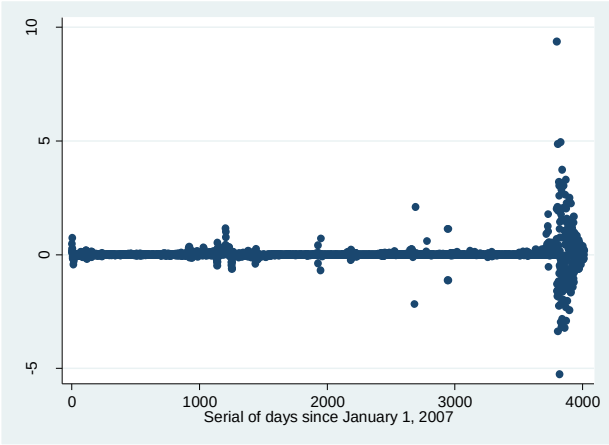
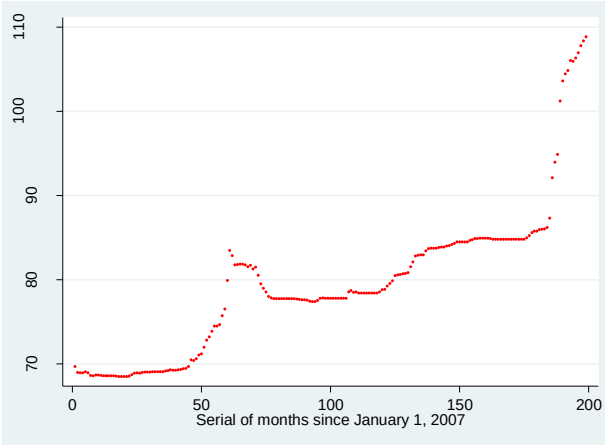


Figure 4: Trend of the monthly nominal exchange rate



The nominal exchange rate was rising by about 1.77 BDT each year. The real exchange rate also followed a rising trend and it increased by about 3.66 units each year. The growth analysis showed that the nominal exchange rate grew at an instantaneous rate of 3.14% and the estimated compound growth rate was 3.20%. On the other hand, the real exchange rate grew at an instantaneous rate of 6.75% or a compound growth rate of 6.98% between 1987 – 2022.

Figure 5: The trend of the average annual nominal and real exchange rate (1987-2022)

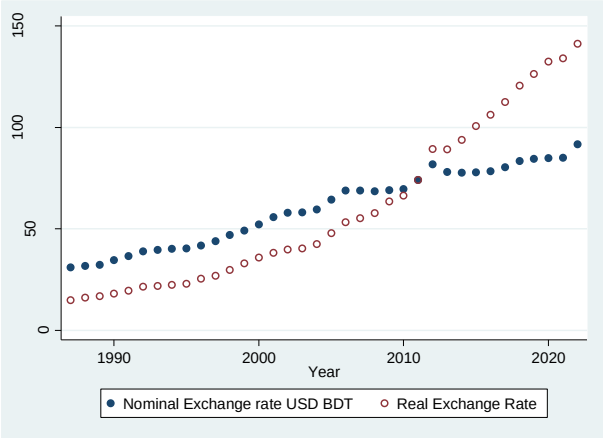
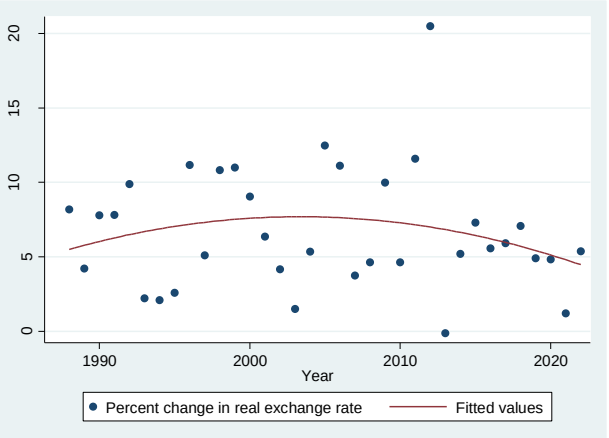


Figure 6: The trend of percent change in the average annual real exchange rate (1987-2022)



Source: Author's presentation (Data: World Development Indicator)

Table 1: The trend and growth of nominal exchange rate (1987-2022)

Variables	Unit Change Each Year	Instantaneous Growth Rate	Compound Growth Rate
Nominal exchange rate	*1.77*	3.14%	3.20%
Real exchange rate	3.66	6.75%	6.98%

Source: Author's estimation (Data: World Development Indicator)

There is a general downward trend in NEER, and the rate of reduction is slowing down, whereas the trend of REER shows two patterns:

1) a very slow declining stage between 1970-2007, and
2) an upward trend since 2008. The REER shows that prior to 2007, out of 35 years, there were appreciations in 16 years with an average appreciation of 5.73%, and there were depreciations in 19 years with an average depreciation rate of 6.39%.
3) After 2007, there were appreciation in 10 years out of 16 years with an average appreciation of 6.57%, whereas there were depreciations in 6 years with an average depreciation rate of 1.30%.

The patterns of annual NEER and REER often present volatility moderately by adjusting the appreciation and depreciations in monthly NEER and REER. The trends of monthly NEER and REER have been shown in Figure 7.

Figure 7: Trend of NEER and REER (annual)

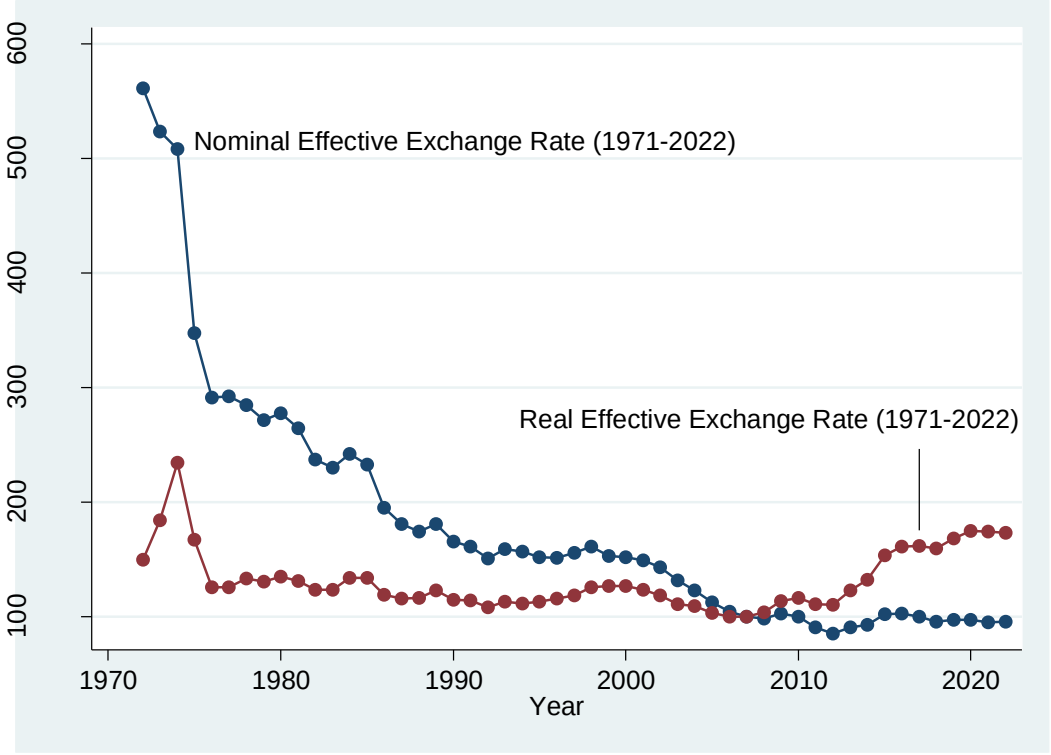
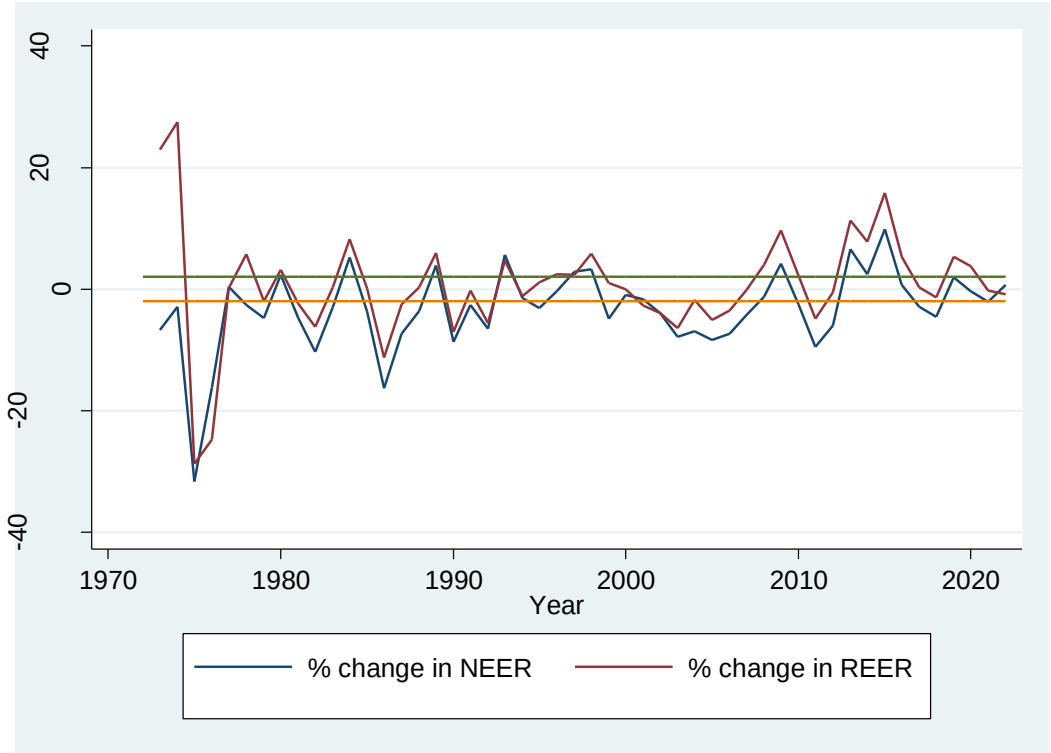


Figure 8: Trend of appreciation or depreciation of NEER and REER annual



Source: Author's presentation (Data: bruegel.org)

There are two generic patterns of the trends in monthly NEER and REER. First, both showed a downward trend up to 2007 but the reduction in monthly NEER was much faster than the reduction in monthly REER, consequently, they meet in 2007. After 2007, monthly NEER has shown a downward and upward pattern but has shown a slow downward trend. On the other hand, after 2007, despite some downward movements, there was a sharp rising trend in monthly REER. Although the general trends in monthly NEER and REER have shown different forms prior to and post-2007, the general appreciation/ depreciation in NEER and REER lies mostly in the banded range ±2% change in NEER and REER. The recent appreciation in REER has been reflecting the overall price level pressure in Bangladesh compared to its trading partner countries.

Figure 9: Trend of NEER and REER monthly data

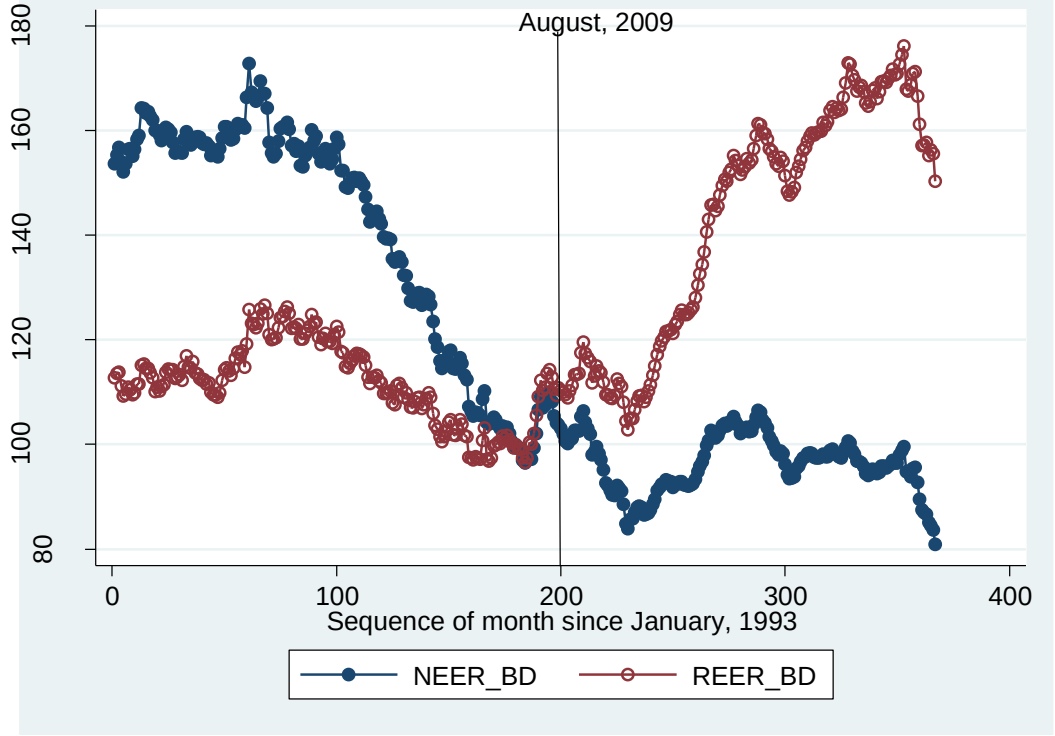
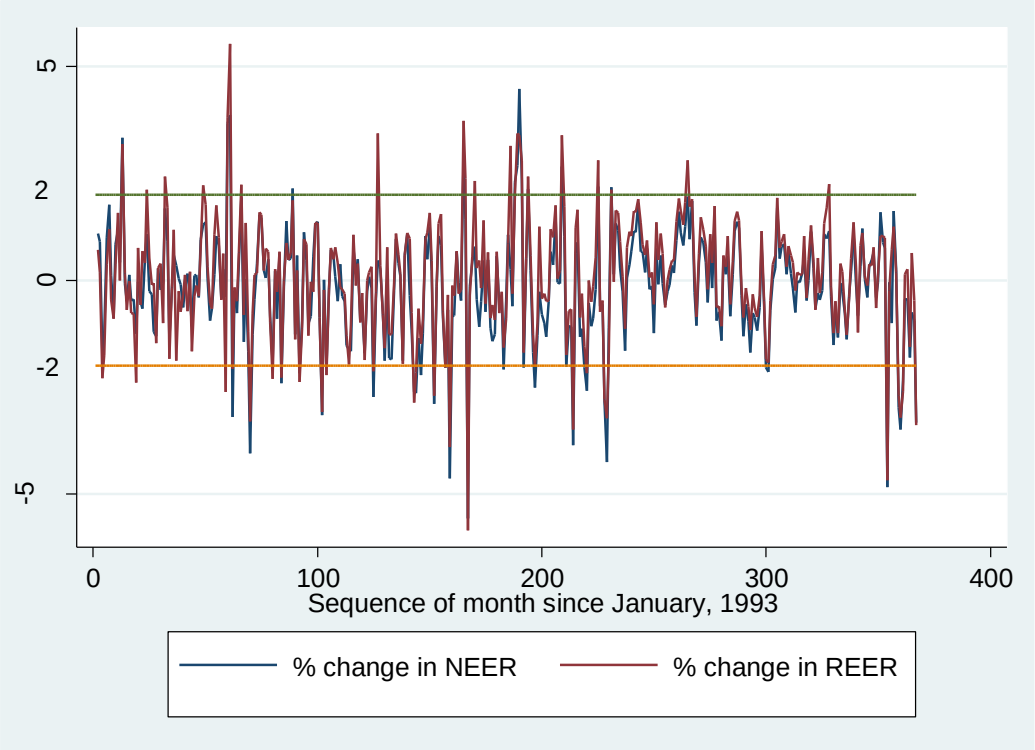


Figure 10: Trend of appreciation or depreciation of NEER and REER monthly data



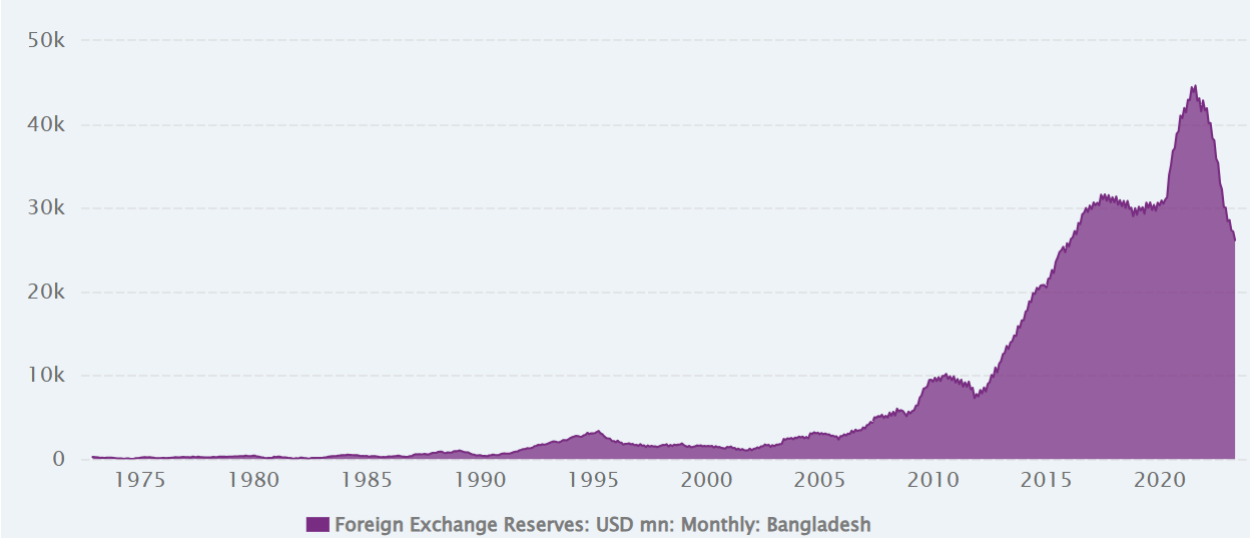
Source: Author's presentation (Data: bruegel.org)

8. Forex Reserve in Bangladesh

The market-led stable exchange rate helps to stabilize the external economy as well as contributes to making the domestic economy stable. On the other hand, a managed or fixed exchange rate may accumulate pressure in the forex market, and the burst of the accumulated pressure can hit the economy badly. Bangladesh has been facing a downtrend in the forex reserve of the country which is intimidating the people, the policymakers, and the government. In August of 2021, the reserve reached USD 48 billion, an all-time high in the history of Bangladesh. The pattern of forex reserve showed some important features:

1) reached the USD 10 billion milestone in 2010,
2) there was a rising trend since 2010 and continued till the beginning of 2018,
3) the forex reserve remained in the range of USD 30-32 billion between the beginning of 2018 and the middle of 2020,
4) there was a sharp accumulation in forex reserve during COVID-19 till August of 2021, and
5) the reserve has followed a sharp declining trend since September 2021.

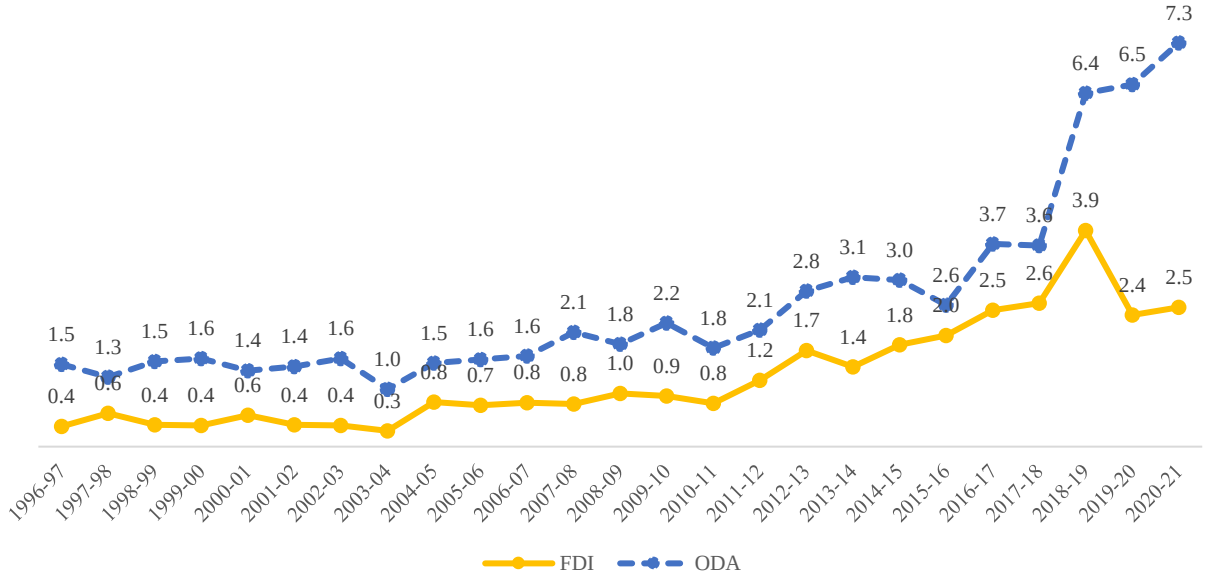
Figure 11: Trend of forex reserve in Bangladesh (Monthly data: USD million)



Source: CEIC data

It is a timely question "How can we increase the forex reserve?" A tested method is difficult to find at this moment, but temporary strategies like restraining luxury imports, exerting efforts on export expansion, increasing the flow of remittances, and reducing the gap between commercial service expenses or increasing the income. To maintain long-term stability and growth, we badly need foreign direct investment (FDI).

Figure 12: Trend of FDI and ODA in Bangladesh (1996-97 to 2020-21)



Source: Bangladesh Bank.

8.1 Bangladesh Foreign Aid

Foreign Aid played an important role in the growth history of Bangladesh. Aid predominantly fuels public investment as aid goes for annual development programme (ADP). We observe a slow rising trend up to fiscal year 2010-11 and a larger positive trend

after FY 2010-11. It follows a down pattern in 2019-20. In 2022, the aid volume was recorded at 10.008 USD billion and it was 7.958 USD billion in 2021 (CEIC Data). Although the aid volume is showing a rising trend, the aid dependency in Bangladesh is declining over time.

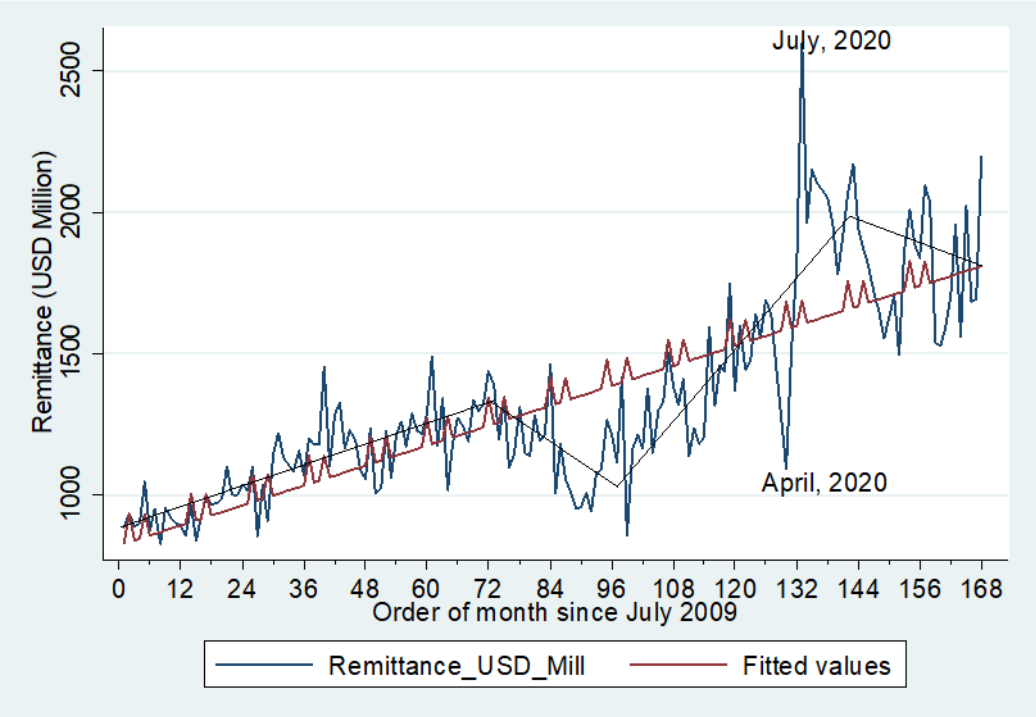
8.2 Foreign Direct Investment in Bangladesh

Figure 12 shows that the volume of FDI in Bangladesh rose slowly up to 2010, and a slightly sharp rising pattern was observed for the period 2011 to 2018. After 2018, it tended to decline. In 2011, it hit the milestone of over 1 billion USD and reached 2.5 USD billion in 2020.

8.3 Remittance inflow

The trend of monthly remittance inflows (July 2009 – June 2023) is presented in Figure 13. We observed four patterns in the actual flows of remittance. First, up to the middle of 2015, there was an upward trend in the flow of remittances. Second, we observed a short downtrend after the middle of 2015, and that continued in 2016 as well. Third, we observed a shard uptrend since early 2017 and that continued up to January 2020. There was a major drop in remittance flow (Approximately 1093 USD million) in April 2020 due to the COVID-19 lockdown led to limited transactions, nationally and globally. In May and June of 2020, the remittance inflows sharply increased and reached the peak (2598 USD million) ever in July 2020. Fourth, after July 2020, there was a general downtrend in remittance inflows. However, the remittance inflows in terms of BDT have shown an upward trend since April 2020 due to the depreciation of Taka against the US dollar (Figure 13).

Figure 13: Pattern of remittance inflows (USD million) in Bangladesh (July 2009 – June 2023)



8.4 Public and Private Sector Borrowing from Foreign Countries

Table 2 shows that the amount of outstanding debt (billion USD) is on a rising trend, and the public sector is the major borrower. The private commercial borrowing showed an increasing trend since June 2021 and continued up to March 2022. However, it has tended to decline since September 2022. The current outstanding of private borrowing from foreign sources is creating pressures on foreign currency management.

Table 2: Outstanding external debt (Billion USD) in Bangladesh

Quarter	Public	Private	Total	Share of private debt
June 2021	68.88	18.69	87.57	21.34
September 2021	65.05	19.69	84.74	23.24
December 2021	67.72	23.08	90.8	25.42
March 2022	68.25	24.98	93.23	26.79
June 2022 (R)	69.28	25.95	95.23	27.25
September 2022	67.29	25.40	92.69	27.40
December 2022	72.21	24.31	92.69	27.40
March 2023	73.55	22.18	96.52	25.19
June 2023	75.85	22.26	95.73	23.17
September 2023	75.27	21.28	98.11	22.69
Quarterly growth rate (%)				
Instantaneous	4.2	4.7	4.5	
Compound	4.3	4.8	4.6	

Source: Bangladesh Bank.

Private Non-Guaranteed debt was reported at 632.245 USD million in 2018. This records an increase from the previous number of 533.922 USD million for 2017.

Table 3: Private Non-Guaranteed External Debt from 2007 to 2018

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Million (USD)	22.0	51.9	81.4	105.1	141.9	177.8	211.6	297.8	325.7	473.5	533.9	632.2

Source: Bangladesh Bank.

According to the ERD estimate, the interest payment for the foreign loan was Tk. 9,322 crore in fiscal year 2023, which will increase to Tk. 12,376 crore in fiscal year 2024. The imbalance in foreign trade is rising which is intensifying the instability in the currency market - an increase in the interbank dollar rate and a decline in the forex reserve. Although artificial, the taka per dollar was stable for a relatively long time, in a recent period, the exchange rate overshoot to nearly 117 taka per dollar.

9. Strategies to Stabilize the Exchange Rate and Manage Forex Reserves

Ensuring a stable exchange rate is pivotal for supporting both exporters and importers. However, disruptions in the foreign exchange market, prompted by local or global political or economic factors, can lead to exchange rate misalignment, potentially causing trade imbalances. To stabilize the foreign exchange market, central banks can deploy

various strategies, including demand and supply management, as well as buying or selling foreign currency. However, the effectiveness of such interventions depends on the strength of the forex reserves. In cases where reserves are insufficient to meet future foreign debts, stabilizing the exchange rate through selling foreign currency becomes challenging. Central banks may resort to sterilized intervention, which involves simultaneous buying or selling of foreign currency alongside open market operations to maintain the monetary base. Additionally, employing jawboning strategies can be effective if reserve volumes are adequate and policymakers' statements are perceived as credible. Successful policy implementation hinges on the appropriateness of policy tools, the timing of interventions, market responsiveness, and credibility. Untimely or inappropriate policy measures may exacerbate volatility. Bangladesh experienced a significant increase in nominal and real exchange rates in 2023, with the disparity between official and kerb market rates reaching a peak. To address this, the government implemented several measures, including import restrictions on luxury items to alleviate pressure on foreign currency demand and incentivize expatriates to use formal channels for remittances. However, despite the incentive hike, remittance inflow remained stagnant, partly due to the prevalence of hundi transactions. These informal channels offer advantages such as favorable exchange rates, communication convenience, quick money delivery, emergency credit facilities, and accessibility for both legal and illegal expatriates. Furthermore, the government secured loans from the IMF to bolster economic policies and stabilize forex reserves, while the Bangladesh Bank intervened by purchasing dollars from private banks.

10. Recommendations

The exchange rate and, thereby, the forex reserve in Bangladesh enter a volatile state due to several factors ranging from domestic and international issues. Despite the healthy condition of the forex reserve between 2018 and 2021, the country soon observes a sharp deaccumulation of its reserve. On the other hand, in the post-COVID-19, the import demand rises, the remittance flow tends to decline, external debts tend to increase, ODA shows a relatively sharp rising trend, but FDI shows a downward trend, the trade deficit continues to rise, war-led tensions are growing up globally, and the dollar is being appreciated. In these circumstances, Bangladesh adopts several strategies to stabilize the foreign exchange market and to keep its forex reserve in a healthy condition. The short-run import restriction seems effective in preventing the sharp decline of the reserve but fails to keep the exchange rate at a stable position. Bangladesh Bank implements the IMF-recommended foreign exchange policy and uses the forex reserve strategies to secure approved funds. Although the short-term measures help to keep the forex reserve at a desired level and the exchange rate creeps slowly on the rising trend, Bangladesh should adopt strategies to stabilize the foreign exchange and to accumulate the forex reserve. Bangladesh should exert effort to increase the inflow of foreign currency. First, steps should be taken to increase remittance inflow. The government should encourage

expatriates to send foreign currencies through formal channels. Such aims can be achieved if the money delivery time is reduced and the gap between the official exchange rate and the rates offered by hundi agents reaches a desirable minimum. Based on the remittance-sending pattern and size, the credit card facility for the expatriate family may help to meet the emergency demand for money and encourage the expatriate to send foreign currency through formal channels. Second, the government should take strategies to increase export earnings and reduce the trade deficit. Third, the overall business environment should be improved to attract both domestic and foreign investors to invest in various sectors of the country. Fourth, luxury items should be discouraged from being imported, and the import-substitution industry can be promoted to reduce dependency on imports. Fifth, strict monitoring should be continued on the money laundering and illegal capital flight. Sixth, a crawling peg[ii] system adjusted with the real exchange rate may be followed in the short run.

The foreign exchange market in Bangladesh experiences volatility due to various domestic and international factors. Despite a healthy forex reserve from 2018 to 2021, there's a notable decline observed afterward. Factors such as increased import demand post-COVID-19, declining remittance flows, rising external debts, and growing trade deficits, alongside global tensions and dollar appreciation, contribute to this situation. Bangladesh implements multiple strategies to stabilize its forex market and maintain a healthy reserve. Short-term import restrictions help prevent rapid reserve declines but fail to stabilize the exchange rate. Following IMF-recommended policies and securing approved funds are among the measures taken. While these short-term efforts maintain reserve levels and gradually improve the exchange rate, Bangladesh must adopt further strategies for stability and reserve accumulation. Initiatives to increase remittance inflows, encourage formal channels for expatriate transactions, boost export earnings, improve the business environment for domestic and foreign investors, discourage luxury imports, monitor money laundering, and implement a crawling peg system adjusted to the real exchange rate could be beneficial.

11. Conclusion

Since the establishment of the Foreign Exchange Market in Bangladesh, it has been under the full control of the Bangladesh Bank. Previously, the Bangladesh Bank would announce mid-rates alongside buying and selling rates for the dollar, applicable to authorized dealers (ADs), with spreads ranging from Tk. 0.10 to Tk. 0.30. Presently, the exchange rate management system in Bangladesh monitors the movement of the taka against a basket of currencies using a REER mechanism aimed at maintaining proximity to the equilibrium rate, with a primary focus on USD-BDT exchange rates. Exchange rate

[ii] A crawling peg is a system of exchange rate adjustments in which a currency with a fixed exchange rate is allowed to fluctuate within a band of rates. The par value of the stated currency and the band of rates may also be adjusted frequently, particularly in times of high exchange rate volatility. The method fully uses the key attributes of the fixed exchange regime, as well as the flexibility of the floating exchange rate regime.

management stands as a crucial task for the central bank, which, despite following a floating exchange rate system, intervenes in the foreign exchange market. However, recent volatility in the forex market has reached unprecedented levels, with a shortage of dollars compared to demand and instances of panic buying. Foreign borrowing interest rates have surged to 8.3%, while local loan rates stand at 9%. Factors such as inflation, risk premiums, real interest rates on local loans, liquidity crises, and fears of local currency depreciation are dissuading private firms from seeking foreign currency loans. The prevalence of hundis and dwindling foreign currency inflows are further exacerbating pressure on the forex market. To ensure a stable exchange rate market and maintain healthy reserve conditions, relevant authorities must focus on identifying new sources of foreign currency demand and avenues for earning foreign currency to address both conventional and emerging demands for capital and consumer goods.

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Conflict of Interest Statement
The authors declare no conflicts of interest.

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Appendix

Table A1: The gap between daily buying and selling exchange rate (USD) (January 2007-July 2023)

Year	Average	Maximum	Median	90th percentile
2007	0.0506	0.6500	0.0200	0.1350
2008	0.0115	0.0800	0.0100	0.0300
2009	0.0097	0.0600	0.0000	0.0300
2010	0.0256	0.2300	0.0173	0.0500
2011	0.0695	0.8000	0.0400	0.1500
2012	0.0812	0.6000	0.0450	0.2100
2013	0.0086	0.0600	0.0025	0.0300
2014	0.0051	0.0500	0.0000	0.0200
2015	0.0053	0.1300	0.0000	0.0200
2016	0.0045	0.1000	0.0000	0.0200
2017	0.0070	0.2000	0.0000	0.0200
2018	0.0013	0.1000	0.0000	0.0000
2019	0.0032	0.1000	0.0000	0.0000
2020	0.0026	0.1500	0.0000	0.0025
2021	0.0059	0.1450	0.0000	0.0100
2022	0.6933	8.3500	0.0000	3.1553
2023	0.7364	3.5373	0.3500	2.3300

Table A2: The gap between monthly average buying and selling exchange rate (January 2007-July 2023)

Year	Average	Maximum	Median	90th percentile
2007	0.0503	0.2225	0.0281	0.1103
2008	0.0112	0.0326	0.0070	0.0282
2009	0.0097	0.0261	0.0099	0.0252
2010	0.0260	0.0667	0.0227	0.0426
2011	0.0703	0.1947	0.0624	0.1195
2012	0.0826	0.2426	0.0670	0.1355
2013	0.0085	0.0227	0.0080	0.0187
2014	0.0051	0.0128	0.0047	0.0093
2015	0.0052	0.0186	0.0007	0.0168
2016	0.0045	0.0200	0.0005	0.0182
2017	0.0075	0.0233	0.0062	0.0183
2018	0.0013	0.0053	0.0000	0.0048
2019	0.0032	0.0178	0.0014	0.0073
2020	0.0023	0.0168	0.0003	0.0045
2021	0.0060	0.0301	0.0017	0.0271
2022	0.6874	2.5325	0.0000	2.2169
2023	0.7230	1.5058	0.5478	1.5058

Table A3: The monthly average nominal exchange rate (January 2007-July 2023)

Year	Average	Minimum	Maximum	Average % change	Maximum % change
2007	68.8745	68.5821	69.7103	-0.1477	0.2226
2008	68.5917	68.5098	68.8885	0.0372	0.2511
2009	69.0395	68.9105	69.1660	0.0335	0.1081
2010	69.6487	69.2046	70.6171	0.1737	1.1208
2011	74.1673	71.0426	79.9379	1.0445	4.4636
2012	81.8347	80.5178	83.4970	0.0700	4.4523
2013	78.0960	77.7503	79.5109	-0.2901	0.0009
2014	77.6104	77.4000	77.8019	0.0054	0.3403
2015	77.9490	77.8000	78.7475	0.1011	0.9299
2016	78.4688	78.4000	78.8047	0.0062	0.3138
2017	80.4302	78.8673	82.1285	0.3453	0.8699
2018	83.4731	82.8246	83.9000	0.1783	0.8476
2019	84.4559	84.0210	84.8990	0.0987	0.2082
2020	84.8716	84.8003	84.9500	-0.0097	0.0583
2021	85.0862	84.8003	85.8000	0.0978	0.4044
2022	93.9025	85.9545	104.8783	1.7085	6.6804
2023	107.1998	105.9634	108.8609	0.5345	1.1294

Figure A1: Foreign Aid – disbursement (USD Million)

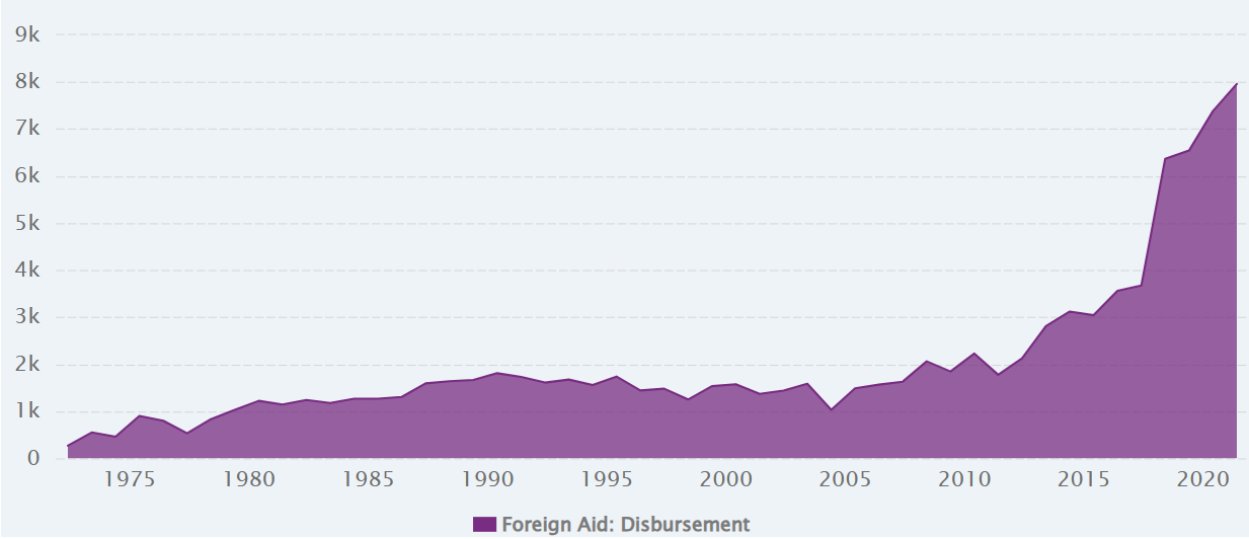


Figure A2: Foreign direct investment (USD Million)

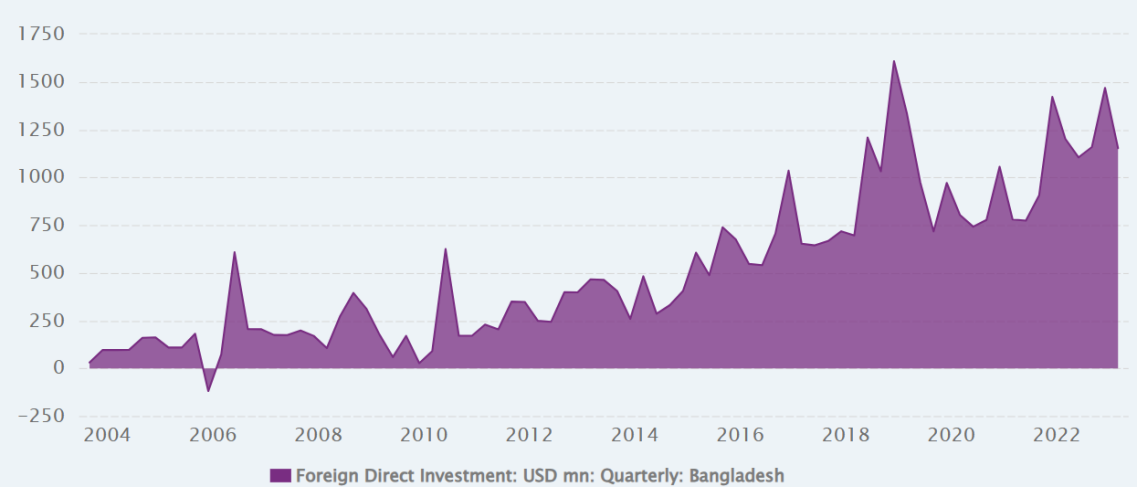


Figure A3: Trend of private remittances (USD Billion)

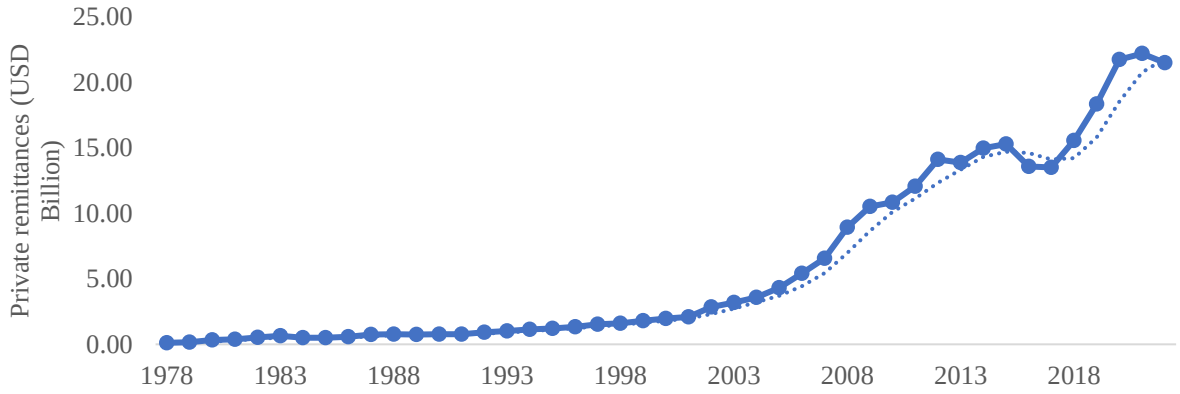
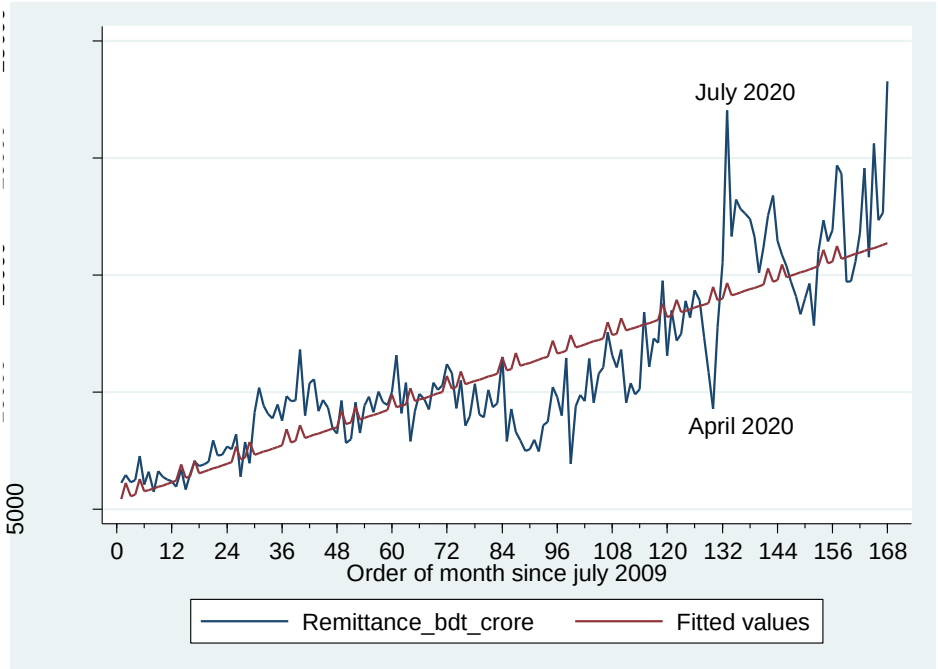


Figure A4: Pattern of remittance inflows (Crore BDT) in Bangladesh (July 2009 – June 2023)



Note: The fitted line is drawn based on predicted remittance and the prediction is done based on trend effect, occasion effects (Ramadan, Eid-ul-fitr, and Eid-ul-adha). 67-78 for year 2015, 79-90 for year 2016, 91-102 for year 2017, 103-114 for year 2018, 115-126 for year 2019, 127-138 for year 2020, 139-150 for year 2021.