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Remittance Inflows, Exchange Rate and Economic Growth in Liberia

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Abstract

With no empirical evidence, remittance inflows have been assumed to influence the exchange rate movement and to contribute to growth in Liberia. Since 2009 there has been a considerable surge in remittance-GDP ratio. The issue is that remittance-GDP relationship is still controversial in the literature. The question, therefore, is: do remittances really influence the exchange rate and growth in Liberia? This study, therefore, investigates the empirical relationships between remittance inflows and economic growth as well as between remittance inflows and the exchange rate in Liberia. Using monthly data, the study employs impulse response functions in a vector autoregression (VAR) framework to conduct the analysis. The results show that remittance inflows have positive influence on growth and an appreciating effect on the exchange rate. The study concludes that the Central Bank of Liberia (CBL) policy formulation may consider workers remittance inflows to strengthen the exchange rate in order to achieve its objective of price stability and enhance growth.

JEL Classification: C22, E58, F24, F31

Keywords: Remittance Inflows, Economic Growth, Exchange Rate, Transmission Mechanism, Impulse Response Function, Shock, Vector-Autoregression.

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1.0 Introduction

Remittances may be described as the transfer of money, by electronic means and through friends to recipients abroad. Remittances may be formal or informal depending upon the mode of transfer. Formal remittances include money sent and received through banks, post offices, non-bank financial institutions, foreign exchange bureaus and money transfer operators like Western Union, MoneyGram and RIA. It is informal, if it involves transfer of money which do not follow formal contracts and hence, not captured in flows data. Informal channels include cash transfers based on personal relationships through business people, or carried out by courier companies, friends, relatives or oneself (Freund and Spatafora, 2005).

There are a number of reasons why policy makers, researchers and development workers are interested in actual remittance flows information. It leads to the appropriate investment and development policy, provides accurate database for researchers, increase the type and number of services provided by banks and financial-service providers. This is especially the case in Liberia where there are limited financial products and shallow financial sector. Remittance transactions, therefore increase the number of financial services and help improve profitability of financial service providers of the country.

In most cases, data on remittances are estimated (e.g. World Bank bilateral remittances data) and underrepresented mainly due to a number of informal ways money is remitted. Such lack of accurate data makes it difficult to establish the actual impact of inflows of remittances within the recipient countries. Freund and Spatafora, (2005) noted that informal remittance transactions ranged between 50 – 250 percent of remittances captured through the formal modes of transfer.

1.1 Overview of Global, Regional and Sub-Region Workers' Remittances

After the major financial setback and the consequential declines in most global financial flows, due to the financial crisis of 2008/09, global inward remittances picked-up in 2010 as economic recoveries kicked-off in remittance-source economies. Growth in remittance inflows averaged 6.9 percent from 2010 – 14². However, the growth momentum subsided in 2015 with growth declining to minus 1.7 percent. According to World Bank's data, global remittance inflows stood at US\$592.0 billion in 2014 which subsided to US\$581.6 billion, 0.8 percent of global GDP of

² Lowest growth occurred in 2014 at 3.5 percent and highest in 2011 at 13.6 percent.

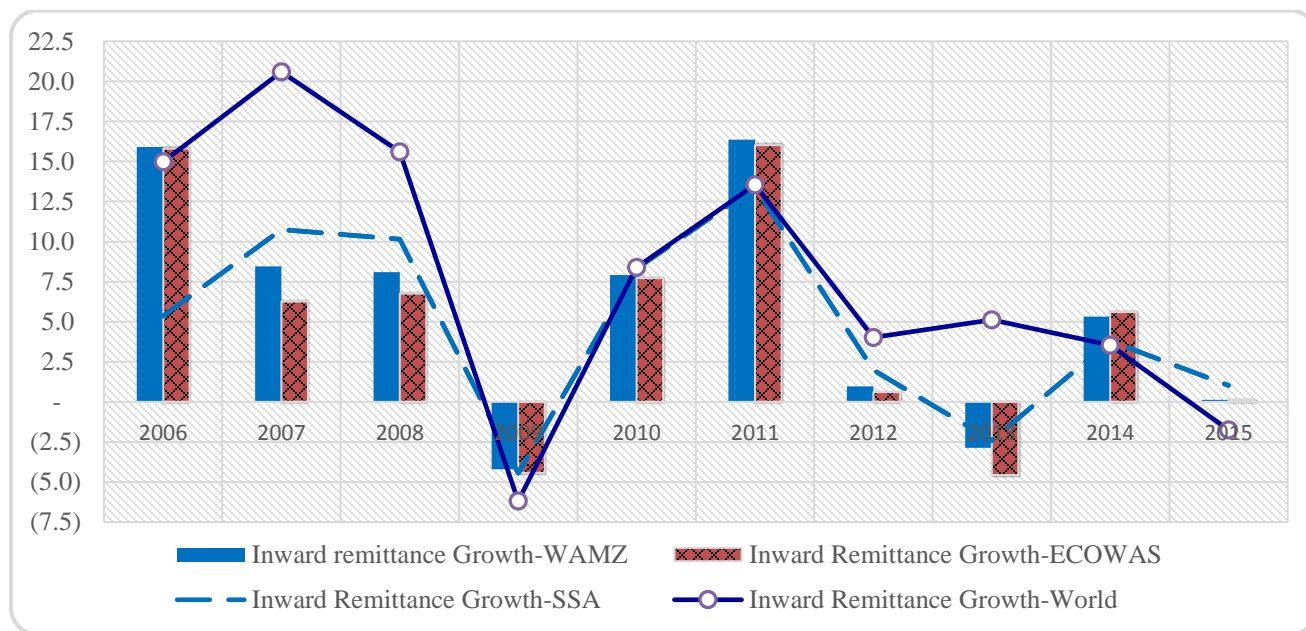
US\$73.4 trillion in 2015. In sub-Saharan Africa (SSA) countries, remittances received declined in 2013 and 2015. Of the global total in 2015, sub-Saharan Africa accounted for US\$41.6 billion constituting about 2.7 percent of SSA GDP and 7.2 percent of the total global remittances inflows. On the sub-Regional front, the Economic Community of West African States (ECOWAS) and West African Monetary Zone (WAMZ), respectively, received the total of US\$28.1 billion and US\$23.7 billion of global remittances constituting 4.5 percent and 4.4 percent of their respective current GDPs in 2015. From the sub-Regional remittance totals, Nigeria alone accounted for 73.7 percent (in ECOWAS) and 87.3 percent (in WAMZ) in 2015.

Key factors leading to the decline in remittances in 2015 were the depreciations in currencies of remittance-source countries including the Eurozone and Russia and slump in global commodities prices (Migration and Development Brief 26). The trend of global remittances inflows was projected to be on the rise and expected to reach 707 billion in 2016 (Migration and Development Brief 21) and the upward movement is expected to continue, at least, in the medium term on the back of increase wave of migrants from the MENA region as a result of increased socio-economic, political and military crises unfolding in the region.

In spite of the expected growth in inward remittances to the developing world, particularly SSA, significant setback is anticipated to occur in the trend. According to Migration Policy Institute's estimate³, in 2005 two out of every five migrants in the world reside in developing countries and most of these migrants came from other developing countries. Thus, as south-south migration increases over the years and in the face of global price shock, inward remittances to developing countries which are from other developing countries are likely to suffer setbacks as were the cases in 2013 and 2015, should the price shock continues in the medium to long run.

³ <http://www.migrationpolicy.org/article/south-south-migration-and-remittances>

Chart 1: Growths of Global, SSA, ECOWAS and WAMZ Inward Remittances



Source: The World Bank Annual Remittances

1.2 Cost of Remittances

Remittance Prices Worldwide (RPW) Issue number 19, indicates that the average (un-weighted) cost of remitting money worldwide stood at 7.42 percent in Q3, 2016, declining by 18 basis point from Q2. Similar reduction occurred in the weighted average which declined to 5.43 percent for the same period. The weighted average shows the magnitude of flow through a particular remittance corridor. Regional costs of remittances have significance variances depending on the region. In spite of the fact that most regions exhibited declines in average remittance cost, sub-Saharan Africa remained the costlier region with the average cost reducing to 9.52 percent in Q3, 2016 from 9.58 in Q2. South Asia, whose average cost remained stable at 5.41 percent, maintained its status as the least costly remittance corridor.

According to (Migration and Development Brief 26), the world average cost of sending US\$200 of remittances, was 7.4 percent of the sent amount in the Q4, 2015 declining from 8.0 percent and 9.0 percent in 2014 and 2008, respectively. Despite, this improvement, the cost of sending US\$200 from SSA particularly South Africa on average is 18-20 percent in 2015, suggesting that South Africa remained the most remittance-costly G20 nation.

For Liberia, though the average cost of remitting money to the country declined significantly from 7.0 percent in 2012 to 5.3 percent in 2015, it is still beyond the commitment of G20 nations (5.0 percent) and the Sustainable Development Goal 10 Target C which calls for the reduction in average transaction cost of remittances in the world to 3.0 percent or less as well as eliminating remittance corridor whose transaction cost exceeds 5.0 percent by 2030, (Index Mundi)⁴. RPW (*Sending Money from United States to Liberia*) indicated that the cost of sending US\$200 from the United States to Liberia averaged 5.54 percent in Q3, 2016 from 5.25 percent in Q2. On the other hand, remitting money from Liberia to the rest of the world on average costs 18.0 percent for US\$100, 11.6 percent for US\$200 and 9.67 percent for US\$300 in 2015, Table A.3 in the Appendix. The costs indicates that as the sent amount in USD terms increases it cost declines. But the story may be different when sending money in Liberia dollar. The sender suffers higher cost in terms of exchange rate differential in converting the Liberian dollar to the equivalent in United States dollar plus the usual sending fee.

1.3 Background of Remittance Flows to Liberia

Like global remittances data, information on remittance flows to and from Liberia is scanty occasioned by informal transfer transactions due to relatively high costs of remitting money to and from the country. Low-capacity statistical institution prompted by inadequate support is among other factors that contribute to limited data availability. Data on remittances are captured monthly through commercial banks monthly banks returns (MBRs) to the Central Bank of Liberia and available data on remittances dated back to 2005. However, what is considered total inflows in Liberia is not the same as migrants or workers inward remittances. It is an aggregate of inflows coming from export receipts, worker inward remittances, service receipts and official transfers to the economy including grants, of which worker remittance inflow on average accounted for 34.1 percent in the last seven years. On the other hand, total outflows consist of import payments, worker outward remittances, service payments and official transfers outside of the economy of which worker outward remittances on average accounted for 21.7 percent for the same period.

⁴ Index Mundi: <http://www.indexmundi.com/facts/liberia/indicator/SI.RMT.COST.ZS>

	2009	2010	2011	2012	2013	2014	2015
Workers' Remittance Inflow	180.10	260.00	488.20	509.00	374.80	473.00	615.29
workers' Remittance Outflow	128.40	243.40	231.20	368.60	324.10	299.20	293.29
Total Inflow	759.10	980.50	1,261.10	1,387.90	940.60	1,404.70	1,551.22
Total Inflow	785.40	995.10	1,362.30	1,244.80	1,200.60	1,610.90	1,533.58
Ratio of Workers' Inflow to Total Inflow (%)	23.70	26.50	38.70	36.70	39.80	33.70	39.67
Ratio of Workers' Outflow to Total Outflow (%)	16.30	24.50	17.00	29.60	27.00	18.60	19.12

Source: Central Bank of Liberia

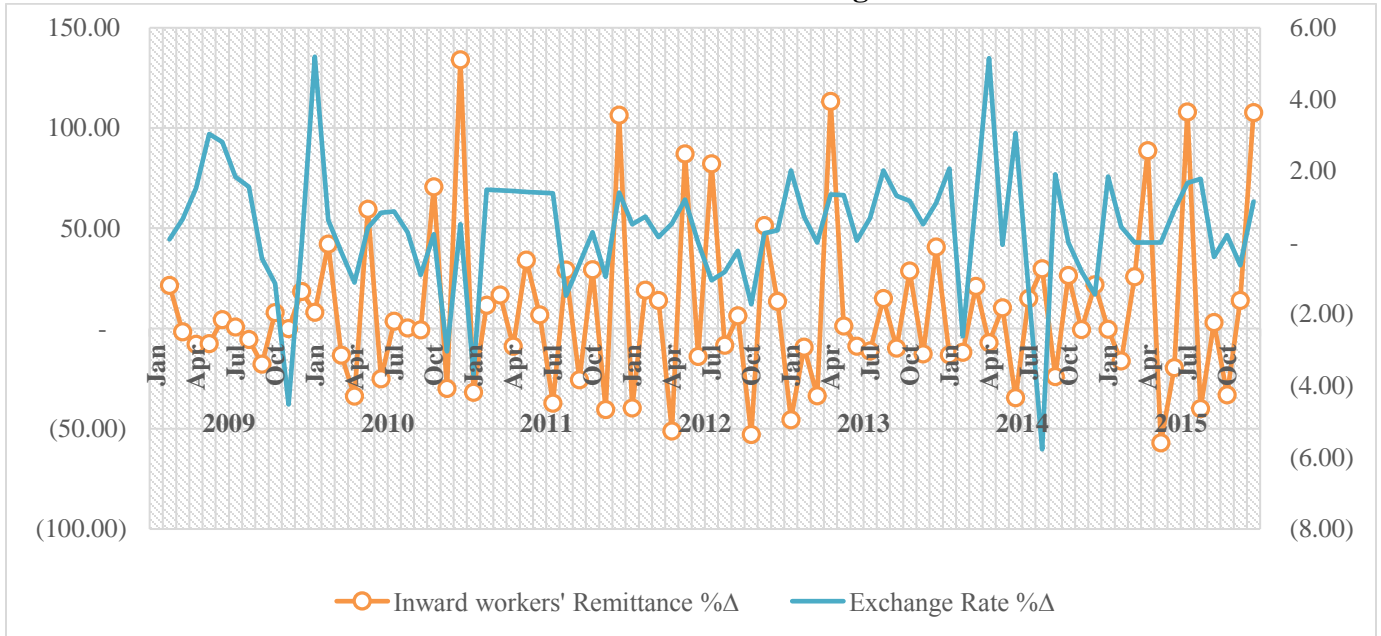
In standard balance of payments analysis, remittances referred to data on workers or migrants remittance flows plus compensation to cross-border workers which differ from total flows in the context of Liberia. On this note, the word remittance or remittances in the paper referred to workers' remittances to or from Liberia.

The importance of remittances came into focus few months following the inception of the Liberian civil crisis on December 24, 1989. With the shattering of the already underperforming economy, Liberians began attracting empathies from families, friends and well-wishers abroad and the flows of financial assistances (later recognized as remittances) originated to maintain relatives and friends livelihoods. Data on these earlier flows were captured in neighboring countries where Liberians sought refuge, food and shelters. In these perilous times, remittances and international aids flows served the consumption needs in the absence of labor incomes for the majority of Liberians in refugee camps abroad, suggesting that remittances to Liberians were largely humanitarian and altruistic in nature.

In spite of the fact that the banking system began to revive after the first phase of the conflict in 1997, data on aggregate inflows of foreign exchange and other variables readily became available in 2005 and in 2007 data on total flows were disaggregated. As the ratio of workers remittance inflows to GDP⁵ begin to expand, remittances became a relevant policy variable in the economy. The Central Bank of Liberia which succeeded the National Bank of Liberia by an Act in 1999 was now taking remittance data into account in formulating exchange rate policy as the seasonal trend in remittance inflows was assumed to be an important factor influencing movement in the exchange rate.

⁵ GDP figures are estimates from IMF and Liberian Authority.

Chart 2: Trends in Workers Remittance Inflows and Exchange Rate



Source: Central Bank of Liberia

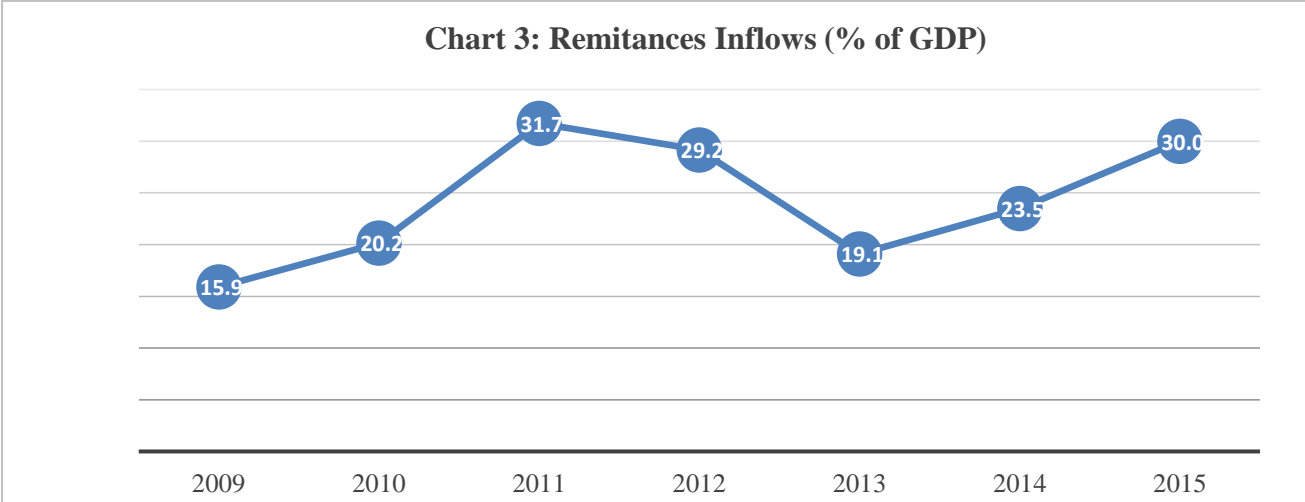
The ratio of workers remittance inflows to GDP rose to 20.2 percent in 2010 from 15.9 percent in 2009. It peaked at 31.7 percent and 29.2 percent, respectively, in 2011 and 2012. Given that the United States of America is the first largest source of workers remittances to Liberia, it is important to consider economic and financial developments in that country relative to developments in remittances to Liberia. World Bank’s bilateral remittances estimates showed that from 2010-15 the total of US\$2,306.3 million remittances flowed into Liberia of which 40.0 percent, 17.2 percent and 13.5 percent, respectively, flowed in from the United States, the Guinea and the Ivory Coast. On the other hand, the total of US\$670.8 million flowed out of Liberia of which 43.6 percent, 22.2 percent and 15.3 percent, respectively went to Nigeria, Ivory Coast and Lebanon⁶.

The trend in remittance-GDP ratio seems to follow, closely, easy monetary policy measures by the United States to stimulate growth in the world largest economy. Following the first round of quantitative easing (QE1) in 2008-09, on November 3, 2010 Fed pronounced the resumption of QE2 and pledged to purchase US\$600 billion long-term treasury bonds to rescue and stimulate the US economy. The US\$600 billion buying exercise ended June, 2011. By September of the same year,

⁶ The bilateral remittances data in the appendix (A.4) are evident that the United States is the largest remittances sender to Liberia.

Fed recommitted itself to a new purchase of US\$400 billion of Treasury securities of 6–30 years maturity range which ended June 2012 with further commitment to buy agency mortgage backed securities. On September 13, 2012 Fed voted (11 to 1) to launch QE3 and also pledged to buy US\$40 billion of mortgage backed securities monthly, (Market Watch © 2015⁷). With these stimulus developments (QE2 and QE3) in the United States, Liberia saw successive growths in remittance-GDP ratio from 15.9 percent in 2009 to 20.2 percent in 2010, 31.7 percent in 2011 and 29.2 percent in 2012.

On May 22, 2013 Fed Chairperson, Ben Bernanke, informed the US Congress about Fed decision to scale down bond purchase. The announcement triggered US stock market to sink. This also coincided with a slowdown in remittance-GDP ratio, moderating to 19.1 percent. Again in September, 2013 Fed decided not to taper but keep bond purchase steady at US\$85 billion a month into 2014. Again, interestingly, remittance-GDP ratio rebound in 2014 by about 440 basis points with the counter decision to maintain Fed stimulus program.



Source: Central Bank of Liberia

The analysis is suggestive of a high likelihood that favorable economic condition in the United States of America, is the most likely driver of increase in remittances to Liberia in response to the humanitarian crisis in the West African country. Such a high probability and the conclusion therefrom that increase in remittance-GDP ratio in Liberia is driven by increased economic activities in the US are consistent with data in Table A.4 in the appendix which indicates that the United States is the highest remitting economy to Liberia.

⁷ <http://projects.marketwatch.com/short-hostory-of-qe-and-the-market-timeline/#10>

Without any empirical evidence, workers remittance inflows have been considered to significantly influence movement in the exchange rate and because the CBL's monetary policy is anchored on the exchange rate stability as the intermediate target to achieve price stability, the Bank has consistently follow trend in remittance inflows as one indicator of the availability of foreign exchange in the economy to inform its intervention into the forex market to smooth exchange rate volatility. For instance, the Bank usually scale down its interventions in July and December when remittance inflows are usually high⁸. The issue is that basing national policy measure on an unsubstantiated evidence may lead to faulty policy and hence inefficient allocation of meager resources. Therefore, it is important to empirically establish the extent to which remittance inflows drive the exchange rate movement in Liberia. Additionally, given the rise in remittance-GDP ratio and the importance and the inconclusive nature of literature on remittance-growth nexus, it becomes obligatory to determine the empirical relationship between remittance inflows and economic growth in Liberia.

This study, therefore, intends to establish the empirical relationship between remittances inflows and the growth of the Liberian economy. It also intends to determine the link between remittance inflows and the Liberian-United States dollars exchange rate. The determination of such crucial relationships will help inform and guide the limited monetary policy instrument available to the CBL. Conceivably, a crucial contribution of this study, perhaps, could be that it adds onto the pool of existing literature on remittance flows, a country-specific analysis for Liberia, a country which may be considered as been on the blind side of country-specific empirical literature.

The rest of the paper is organized as follows: section 2 reviews literature on remittance-growth and remittance-exchange rate nexuses. Section 3 expands on the methodology employed to investigate the relationships. In section 4, the analyses and results of the model are presented and finally in section 5, the conclusion and recommendations emanating from the results are provided. References and Appendix follow section five.

⁸ The months of July and December, respectively, mark Independence Day and Christmas and New Year seasons. These seasons has been historically characterized by large scale celebrations and increase in households and public expenditures and family members usually attract financial assistance from relative and friends abroad.

2.0 Literature Review

2.1 Theoretical Literature

Remittances are theorized to strengthen growth through several channels including facilitating entrepreneurial investments, insurance against unexpected shocks, smoothing household consumption patterns, financing household savings, etc. On the other hand, remittances can put up growth impeding effects. This may especially be the case if households substitute remittance receipts for labor income, thus, adversely affect labor supply and reduce the amount of productive hours available to the economy (Chami et al., 2005). In such a situation, the remittance-receiving households replace productive labor hours with leisure hours. Additionally, remittance inflows can also be growth-retarding, if too much foreign exchange inflows help to strengthen the domestic currency and reduce the competitiveness of the economy (Lopez et al, 2007).

Nyeadi and Atiga (2014) outlined four theories that motivate migrant remittances. They are Altruistic, Self-interest, Implicit Family Contract and Co-insurance theories.

Altruistic Theory: states that the migrant has the obligation to send money back to his family members at home because of the love and affection he/she has for his/her family members. This could be due to the fact that the migrant has undertaken his journey abroad as a result of poverty prevalence back home and hence wants to smooth the consumption pattern of his/her family. The theory further argued that altruistic remittances reduce over time. Chami et al. (2005) asserts that, though, the motive behind remittances may be multi-faceted, but altruism among family members served as benchmark for modeling the relationships between causes and effects of remittances.

Self-Interest Theory: this theory maintains that the migrant saves portion of his/her income in the destination country and remit part home for investment projects such as the purchase of land, property, and investment into the capital market. It is believed that interest rates on such investments will be higher in the home country than in the destination, and there are people back home to administer the investments.

Implicit family contract theory: this is an assumption that family members of a migrant shouldered the cost of his/her travel or schooling abroad, wholly or partially, such that the migrant feels morally obligated to pay back after some time. The migrant therefore has an implicit contractual loan with the family which he pays gradually when he/she settles. The theory further

assumes that the remitted sum will depend on the financial standing of the migrant in country of destination.

Co-insurance Theory: the theory assumes that a better economic condition exists in host rather than in the home country. Implying that a family will seek all opportunities to sponsor its member to travel into a foreign country in search of prosperity, such that in the case of economic down turn in the home country, the migrant will remit money back home to support the family. This theory further explains that in the case of negative economic shocks in host country, the migrant family back home will reciprocate the migrant kindness and will serve as a form of insurance to him or her. This theory is premised on diversification principles.

Additionally, Adenutsi (2010) outlined three schools of thought as far as the developmental impact of remittance inflows is concerned. The Developmental Optimists, Developmental Pessimists and Developmental Pluralists. The optimists believed that international migration leads to a North-South (developed to developing countries) transfer of investment capital and promotes the exposure of migrant-home economies to liberal, rational and democratic ideas, modern knowledge and education. On the other hand, the remittance-developmental pessimists, counter argue that the final effect of international migration and remittances is the entrenchment of the problems of underdevelopment. The pessimists based their argument on the fact that remittances are preceded by brain drain and huge expatriation of the productive segment of the population. Thus, causing acute shortage of the needed human resources in the usually poor migrant countries of origin. The final school of thought, the developmental pluralists posit that, both the optimists and pessimists are on the extreme fringes. They argue that international remittance inflows involved both positive and negative outcomes.

2.2 Empirical Literature

Many studies have empirically documented remittance-growth as well as remittance-real exchange rate and remittance-inflation relationships. There are diverse findings and conclusions on the subjects. Several researchers found positive relationship between remittance inflows and growth especially in developing economies, see Akobeng (2015) and Quartey (2006) for examples. On the other hand, others concluded that there is negative relationship, for instance, Cáceres and Saca (2006). In the case of remittance-exchange rate impact, literature points to appreciating effect which makes the remittance-receiving economy less competitive in the international market with

an adverse effect on growth, Lopez et al., (2007). Some literature also documented inverse or no relationship between remittance inflows and inflation.

2.2.1 Positive Impacts

Qayyum and Arif (2008) documented in their paper “Impact of Remittances on Economic Growth and Poverty: Evidence from Pakistan” that remittances have a positive and significant impact on economic growth in Pakistan. They found out, further, that international migration through remittances supports poverty reduction in key districts in Pakistan, namely: Punjab, Sindh and Balochistan. Their conclusion was that “the importance of remittance inflows cannot be denied in term of growth enhancement and poverty reduction that consequently improves the social and economic conditions of the recipient country.”

Laniran and Adeniyi (2015) analyzed the determinants of international remittances to Nigeria using annual data spanning 1980 – 2013. The method of analysis was vector error correction model. Their overall conclusion indicates that remittance receipts in Nigeria are largely influenced by portfolio options rather than altruism. They further concluded that remittance flows to Nigeria are pro-cyclical in nature rather than countercyclical. The study however arrived at some specific findings. The study indicated a positive relationship between remittance and income per capital in the long run and the first lag of the short run but negative for the second lag, an inverse relationship between remittance and inflation in the long run. Interestingly, the short run reveals a positive relationship; positive relationship between remittances and domestic credit in long run and negative in the short run. The diverse relationships found by the study, all things equal, may lend support to the inconclusiveness of remittance impact.

Ahortor and Adenutsi (2009) conducted a study intended to verify the macroeconomic impact of cross-border remittances on economic growth in 31 small-open economies , 15 countries in sub-Saharan Africa (SSA), and 16 from Latin America and the Caribbean (LAC) from 1996 – 2006. They used annual data in a dynamic panel framework to estimate the impacts in SSA and LAC. The results for the 15 SSA countries show that remittances have both positive contemporaneous and dynamic impacts on income growth in SSA, such that a 10 percent contemporaneous increase in remittances induced real per capita income to grow by 0.3 percent and a 1.0 percent rise in the 1st and 2nd lags of remittances resulted in 0.27 percent and -0.25 percent impacts (or a small but positive and significant net impact) on growth in SSA. Across the 16 LAC countries, the results

reveal that an increase in remittances inflows induced 1.8 percent growth in per capita income but the 1st and 2nd lags were significant and negatively related to growth, amongst other results. In combined terms, the dynamic panel results for all 31 countries indicated that remittances were positively related to growth in all 31 countries in SSA and LAC. The study concords and confirms the developmental optimists' view that remittances promote long run growth in small open economies.

Fayissa, and Nsiah (2008) using panel data estimation for 37 Africa countries documented evidence that remittances promote economic growth in countries where the financial systems are less developed by serving as alternative means to finance investment and helping overcome liquidity constraints. They observe through their conclusion that migration has a deleterious effect on the labor force of the migrant country of origin. They recommended that Africa could improve growth not only by investing in the traditional sources of growth such as investments in physical and human capitals, trade and FDIs but also by strategically harnessing the contributions of remittances by ensuring their efficient and reliable transfers and improving governance performance.

2.2.2 Negative or No Impacts

Notwithstanding, some empirical studies concluded that high remittance inflows have a substantial probability to diminish real economic output particularly in less developed countries whose industrial sectors are still rudimentary. The following constitutes empirical studies that saw negative or no impact of remittances on economic performance and other macroeconomic variables.

Cáceres and Saca (2006) analyzed the economic impact of remittances on the El Salvador's economy. Using a vector auto-regression (VAR) model consisting of real and monetary variables, they found out that remittance inflows induce declines in the index of economic activities, international reserves, and money supply. Their results further indicate that remittances increase the interest rate, imports and consumer prices. The study recommends that strengthening economic policy that encourages the use of remittances in capital formation to maximize remittance benefits would be appropriate for the El Salvador policy makers.

Clemens and McKenzie (2014) demonstrated that the growth effect of workers' remittances may be illusory. They pointed to evidence, among other things, that inward remittances has minimal effect on growth due to its offsetting effect on the supply of labor. They indicated that rising inward remittances are associated with outflows of labor resources from the migrant country of origin. Thus, the inflows of remittances from migrants abroad only compensate for the voids and the economic deficiencies created in the economy of origin by the migrants' absenteeism.

Nwaogu and Ryan (2015) used a dynamic spatial framework, to investigate how foreign direct investment (FDI), foreign aid and remittances impact economic growths in 53 African and 34 Latin American and Caribbean countries. Their results show that foreign aid and FDI have positive impacts on economic growth in Africa. On the contrary, remittances to Africa have an insignificant impact on economic growth across each of the different specifications. Their justifications for the results was that remittances to Africa (during the study period) were not necessarily spent on items that promote long-term growth and that there are high incident of informal remittance flows to Africa due to weak formal channels. In Latin America and Caribbean their result reveal that foreign aid has a negative impact on growth across the different specifications, while neither remittances nor FDI has any impact.

2.2.3 Empirical Evidence on Remittance-Exchange Rate Nexus

Mongardini and Rayner (2009) estimate the relationship between grants and remittances and the equilibrium real exchange rate in Sub-Saharan African (SSA). They used the pooled mean group (PMG) estimator, developed by Pesaran et al. (1999) as the main estimation technique. The PMG estimator is centered on an ARDL method which constrains the long-run coefficients to be homogenous across groups while allowing for heterogeneous short-run dynamics. The results indicate that grants and remittances are not associated, in the long run, with an appreciation of the real effective exchange rate in SSA and are therefore not likely to give rise to Dutch disease effects. Their findings suggest that grants and remittances may be used to ease supply constraints or boost productivity in the non-tradable sector in the recipient economies.

Lopez et al., (2007) investigated the empirical link between workers' remittance inflows and the real exchange rate in Latin America. Their empirical results show that one percentage point increase in the remittances to GDP ratio would lead to a real effective exchange rate appreciation of about 2.5 percent. They recommend reduction in payroll taxes to be compensated by increase

in sales taxes. This is because remittances have a higher probability to raise reservation (or minimum) wage, implying that, in the tradable sector, employment adjustment has to be carried out to maintain the competitiveness of the sector. Therefore, to maintain the competitiveness of an economy without cutting down employment, payroll taxes had to be reduced to induce employment.

Ball et al, (2009) used a theoretical model and panel vector auto-regression techniques to explore the role exchange rate regimes play in understanding the effect of remittances. The analysis considers yearly and quarterly data for seven Latin American countries. Their theoretical model predicts that remittances in the short run increase inflation and domestic money supply under a fixed exchange rate regime but decrease inflation and generate no change in the money supply under a flexible regime.

3.0 Methodology

In the section, the theoretical or conceptual framework and method of data analysis used in this study are presented. Justifications for the model and variables included in the model are highlighted. Data issues relating to source and frequency are also discussed.

3.1 Conceptual Framework

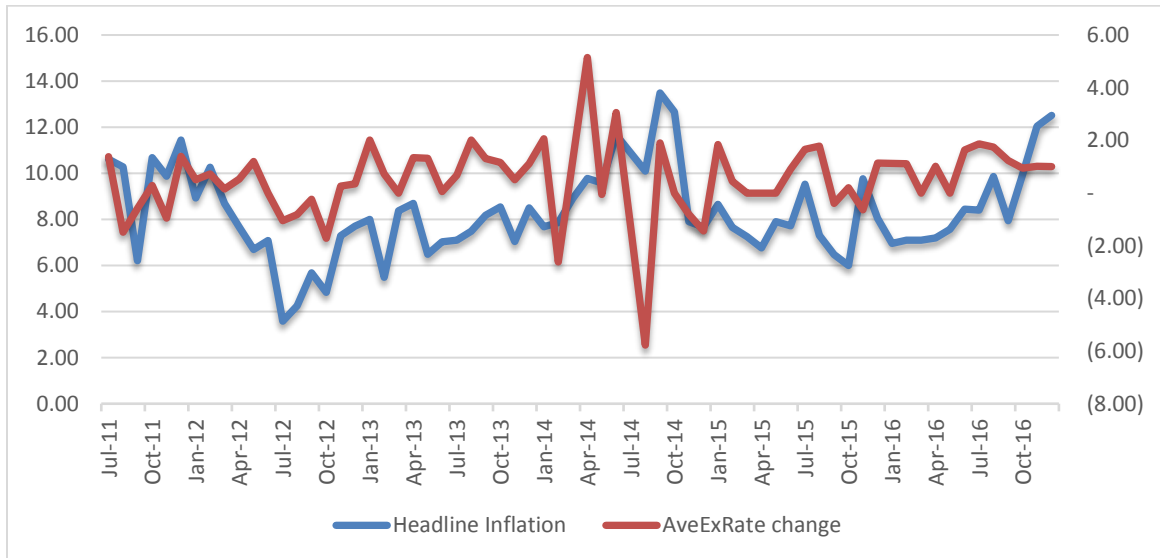
Conceptually remittances and other foreign exchange inflows affect real economic variables such as growth and the price level through several channels, most relevant to the study are discussed below and it can be perceived that the transmission processes, in some cases, overlap.

- **Money Supply Channel:** theoretically, a change in remittance inflows affect the money supply through its impact on the country's foreign reserve position. The expansion or contraction in money supply is expected to increase or decrease the interest rate which will in turn affect investment and the overall economic activity and price level in the economy (Cáceres and Saca, 2006). In Liberia, inflows of remittances directly increase the overall money supply through increase in net foreign assets and Liberian dollar in circulation. The CBL has a policy of 25 percent remittance surrender, partly intended to build external reserves. The policy allows the Bank through the commercial banks to convert into local currency and pay remittance recipients 25 percent of their remittance inflows. Thus, an increase in remittance inflows facilitate reserves accumulation by the CBL increasing its

foreign assets. Another side to the coin is that, an increase in remittance inflows also raises domestic currency in circulation though the injection of the local equivalent of the 25 percent.

- Exchange Rate Channel:** also an increase in remittance inflows allows the Bank to intervene into the foreign exchange market for the obvious purpose of maintaining stability in the exchange rate. Since the exchange rate pass thru to inflation appears very high in Liberia suggested mainly by recent depreciation in last quarter of 2016 and first quarter 2017 and consequential rise in inflation, the probability is very high that an increase in remittance inflows is expected to keep the exchange rate and hence inflation stable. Chart 4 shows trends in the Liberian-US dollars exchange rate and Inflation.

Chart 4: Movements in Exchange and Inflation Rates



- Households' income:** it is assumed that remittance inflows give rise to household income, increasing aggregate spending and hence boost economic activity, all else being equal. Remittance inflows also increase household access to finance and promote their ability to save and invest even at a lower deposit rate. In spite of the low and constant average deposits rate of 2.00 percent for the Liberian and United States dollars deposits in Liberia, deposits in both US and Liberian dollars, respective, rose (for example) to US\$435.8 million and L\$10.2 billion in 2016 from US\$234.3 million and L\$2.2 billion in 2009. It may be argued that with an increase in the supply of loanable fund at lower cost (deposit rate) by households, investment fund may also be supplied to investors at low cost (lending

rate). Also an increase in remittance inflows is expected to reduce the demand for investment fund, thus, helping to keep interest rate on lending low. A situation that is expected to boost investment and employment and hence growth of the economy.

- It may also be argued that since remittance inflows in Liberia has a large humanitarian component, an increase in inflation in Liberia, remittance recipients are likely to attract more remittances, as inflation reduces the real income of households and hence, their welfare. The theoretical implication is that causality between remittances and inflation runs in both directions. Similar double directional causality might exist between remittances and growth. This is because in an event of economic boom, the humanitarian component of remittances is likely to decline. Bougha-Hagbe (2004) developed a model that support causality running from GDP to remittances. Thus, the issue of endogeneity was of concern in the study but was laid to rest as the null hypothesis (a particular variable Y does not Granger cause X) of Granger Causality test conducted could not be rejected, Table A.2 in Appendix.

In sum, a shock to remittance inflows in Liberia is most likely to affect the price level and growth through the money supply, exchange rate, lending rate and households' demand channels. To adequately describe these transmission channels and processes, the study used the Impulse Response Function (IRF) in a vector auto-regression (VAR) framework as in the work of Cáceres and Saca (2006). Favero (2008) noted that VAR is appropriate to provide empirical evidence on the response of macroeconomic variables to policy impulses in order to discriminate between alternative theoretical models of the economy. Thus, following Lutkepohl and Kratzig (2004), a set of 'n' time series variables $y_t = (y_{1t}, y_{2t}, \dots, y_{nt})'$, a VAR model of order p (VAR(p)) which captures the dynamics interactions among a set of variables can be written as

$$y_t = A_1 y_{t-1} + A_2 y_{t-2} + \dots + A_p y_{t-p} + u_t$$

Where the A_i 's are (nxn) coefficient matrices, y_t is a column vector of observable variables at time t , p is the optimal lag length and $u_t = (u_{1t}, u_{2t}, \dots, u_{nt})'$ is an unobservable homoscedastic error term. Y_t encompasses all the variables included in the model.

3.2 Variables and data included in the Model

Variables descriptions and names included in the model specification are shown in Table 2 below.

Table 2: Variable Description and Name

Variables Description	Variable name used in the Estimation
Real GDP Growth	<i>RGDP_Growth</i>
Inflation	<i>Infl</i>
Inward Workers' Remittances	<i>RIflow</i>
Broad Money	<i>M2</i>
Gross Foreign Exchange Reserves excluding SDR	<i>Gfxres</i>
Average Liberian-US dollars Exchange Rate	<i>AveExRate</i>
Lending Rate (an Indicator for domestic Investment)	<i>Lendrate</i>

Source: As developed by author.

Based on Cáceres and Saca (2006), Remittance inflows is the beginning of the transmission process. Money supply, international reserves, lending rate and exchange rate are the transmission variables that convey the remittances' shock, and output growth and the general price level are the shock receiving variables that end the transmission of shock to remittances.

The logarithms of all variables except real GDP, lending rate and inflation are used. The growth rate of real GDP is used, since logs of negative numbers are not applicable. Inflation and lending rates were used in their level. All variables are integrated of order one I(1) except real GDP growth, lending rate and inflation, which are I(0). The Augment Dickey-Fuller (ADF) test was used to determine the order of integration. The ADF test results are included in Table 3 of section 4.

3.3 Justifying Variables Inclusion

Remittances tend to reduce demand for investment funds and therefore exert downward pressure on the prices of those investment funds. Hence, remittances have the tendency to positively impact investment through reduction of interest (lending) rate and through increase in household income and household capital expenditure and savings. Remittances also tend to reduce demand for foreign exchange thereby helping to appreciate the domestic currency and have a stabilizing or diminishing effect on inflation. Since remittances have a tendency to increase house-holds' savings, they are expected to increase the money supply and help to raise foreign exchange holding

and hence foreign reserves for central banks. With a tendency to boost investment through increased savings and reduced interest rate, they have a high likelihood to spur growth.

3.4 Data Issues

Data used are monthly data spanning 2009-01 to 2016-06. All data were obtained from the Central Bank of Liberia database, the Liberia Financial Statistics (LFS). It is important to remember that Liberia does not have a month national account series. So the monthly GDP data used in the model were obtained through EViews data conversion technique using the quadratic match-sum extrapolation option to convert annual Liberia GDP data estimates to a monthly series under the assumption that an annual GDP estimate in Liberia is the sum of quarterly or monthly data. Thus, the quadratic match-sum is appropriate in that it employs the advance extrapolation technique to break down the annual GDP estimate to the corresponding monthly equivalents.

3.5 Empirical Model

Empirical estimation will involve estimating and an unrestricted and determining impulse responses of output growth, the general price level in the economy, lending rate as the indicator for domestic investment, money supply (broadly defined as M2), exchange rate and gross external reserves. Impulse responses from these macroeconomic indicators will be established based on one standard-deviation shock to inward workers' remittances. Since, the VAR model contains seven variables, seven equations were estimated empirically using the optimal lag length that was determined using the appropriate information criteria.

The choice of VAR and Impulse Response Functions (IRFs) over a Vector Error Correction Model (VECM) is explained by the mixture of I(1) and I(0) variables. According to Gujarati (2004), if a time series variable, X_t , is integrated of order one i.e. I(1) and another time series variable, Y_t , is integrated of order zero i.e. I(0), then their linear combination [$Z_t = X_t + Y_t$] is also I(1). This definition conflicts with that of co-integration which holds that, two variables which are I(1) are co-integrated if there exist at least one linear combination that is I(0). Second, because IRFs adequately describe dynamic interaction among variables through its transmission processes of shocks from one variable to the other, a VAR IRFs model is the appropriate choice among other models for the study.

4.0 Model Estimation and Results

In this section, model estimation techniques and time series analyses including unit root analyses, optimum lag length criteria, VAR stability, LM serial correlation test, Granger Causality test and residual diagnostic analyses are presented. Efforts are also made to discuss the results of the impulse response functions and their implications in this section.

4.1 Estimation

The process of estimation, began with unit root analysis using the Augmented Dickey-Fuller (ADF) test under the null hypothesis that a particular variable has a unit root. A statistically significant probability value for the ADF statistic leads to the rejection of that null hypothesis and vice versa. Of the seven variables included in the model, four are integrated of order one i.e. I(1) and three, I(0). Thus, the I(1) variables were made stationary by taking their first differences.

Table 3: Unit Root Analysis

Variable ⁹	ADF Statistics	Probability	Integration Order
Infl	-4.273	0.0000	I(0)
Laveexrate	-0.605	0.8633	I(1)
Lendrate	-2.597	0.0970	I(0)
Lgfxres	-1.850	0.3543	I(1)
LM2	-2.449	0.1351	I(1)
Lriflow	-2.554	0.1065	I(1)
RGDP_Growth	-2.764	0.0678	I(0)

Source: EViews output.

The unrestricted VAR was estimated with the optimum lags of 3 that was selected on the basis of Akaike Information Criterion (AIC) and lags exclusion test which rejects the fourth lag as insignificant for inclusion. In the estimation, the real variables came first and then followed by the nominal variables since the order of variables in an unrestricted VAR is very important in determining the pattern of recursiveness in impulse-response determination and because financial variables react faster than real variables, Cáceres and Saca, (2006). Test for VAR stability showed that the estimated VAR was stable and stationary as all the inverse roots of the characteristic autoregressive-process polynomial lie within the unit circle. This is very important because an

⁹ The letter 'L' in front of a variable name except 'Lendrate' indicate natural logarithm.

unstable VAR renders the standard error of the impulse response invalid. The null hypotheses of no serial correlation for autocorrelation LM test and no cross term for VAR heteroscedasticity test cannot be rejected suggesting that higher order serial correlation and heteroscedasticity are not to be worried about in the estimation.

As noted in the conceptual framework, the issue of endogeneity and bi-directional causality between remittances and growth and remittances and inflation was a concern in the analysis. Granger causality test was conducted. The test is a common method of investigating causal relationship, by estimating an equation in which Y is regressed on k lagged values of Y and k lagged values of additional variable X. We can evaluate the null hypothesis that X does not Granger cause Y (Hood III et al, 2008). If one or more of the lagged values of X are significant, we can reject the null hypothesis. However, the practical aspect of Granger causality test involves repeated estimations. The lag of the estimation with the minimum (Akaike and Schwarz) information criteria is chosen as the optimum lag length. In this study, this procedure was followed and the maximum lag length of ten was chosen. Table A.2 in the Appendix summarizes the results which indicate that causality is unit-directional and runs from remittances to growth.

4.2 Results and Implications

4.2.1 Reaction of Exchange Rate

Exchange rate's response to one standard deviation shock to remittance inflows is consistent with the economic expectation and other previous empirical literature which maintained that inward remittances are associated with real exchange rate appreciation which are growth-diminishing due to the fact that (real) exchange rate appreciation reduces the competitiveness of an economy. Such conclusion can also be made from the stand point of nominal exchange rate. That is, a nominal exchange rate appreciation, based on Mundell-Fleming analysis, makes a domestic products costly in the eyes of foreign buyers and therefore reduces exports. However, such reduction in exports does not apply to Liberia's current situation, as the economy does not exports manufactured goods, except for re-exports and few primary commodity exports – cash crops, minerals and round logs. Thus, in light of the current import-dependent nature of the Liberian economy, economic policy that counteract nominal depreciation and promotes stability or appreciation in the exchange rate are consider prudent and growth-enhancing.

The result (A.1: Figure 1 Chart 1 in Appendix) indicates that a positive shock to inward remittances will have an appreciating effect on the exchange rate. In the second month, one standard deviation increase in inward remittances will on average strengthen the value of the Liberian dollar by 0.2 percent. The effect of the shock will begin to die in the third and fourth. Thereafter, in the fifth to the twelfth months the exchange rate experiences a negligible and intermittent depreciations and appreciations (which may be described as broad stability in the exchange rate) suggesting that other determining factors may be at work as the effect of remittance shock dies after the fourth month.

4.2.2 Reaction of Lending Rate

Lending rate is used in the study as indicator for domestic investment. A lower (lending) interest rate boosts domestic investment and hence growth and a higher interest rate does exactly the opposite. The expectation of the study, is that one standard deviation shock to inward workers' remittances will boost households' income and hence households consumption and investment capacities and therefore reduces households reliance on banks credit thereby reducing the demand for investment fund and hence reduce the lending rate. This means that inward remittances are supposed to exert a double increasing effects on investment, first by increase in households' savings or capital expenditure and by their ability to reduce lending rate.

However, the response from lending rate as a result of one standard deviation shock to inward remittances (A.1: Figure 1 Chat 2 in Appendix) proves counterproductive to the expectation. A positive shock to inward remittances causes an increase in lending rate in the second month and decline in the third and fourth months, rose again in fifth and sixth months. The fluctuation dies in the tenth month after which lending rate returns to equilibrium in the eleventh month. The fluctuation indicates that inward remittances do not have clear and discernable impact on investment through the lending rate channel. But because data on investment is not available, the direct impact of workers' remittance on investment could not be established.

4.2.3 Reaction of Real GDP Growth Rate

The response of real GDP growth (A.1: Figure 2 Chat 1 in Appendix) is consistent with expectation but must be interpreted with caution. GDP data in the economy is still being estimated on quarterly and annual bases. The result here applies to a situation of monthly estimates of GDP and may be generalized in future situation when actual monthly GDP data are available. The result shows that

one standard deviation shock to inward remittances will have a positive growth effect on real output in the second and third months on average by 2.1 percent, decline in the fourth month by 3.8 percent, rise again in the fifth month by 2.9 percent, falls in the sixth and seventh months by about 1.0 percent. The effect dies in the tenth month. This response of monthly growth as a result of one standard deviation shock to inward remittances implies that on an annual basis, inward remittances will contribute on average by about 0.25 percentage points to RGDP growth. For the last 10 years (2006 -2015) real GDP growths for the economy averaged 6.4 percent. To the extent that worker remittances alone contribute about 0.3 percentage points means remittance is a significant contributor to growth, annually.

4.2.4 Reaction of Inflation

Inflation's response to one standard deviation shock to inward remittances is interpreted in term of exchange rate pass through to inflation. As the exchange rate appreciates as a result of a positive shock to remittances, individual prices of imported commodities fall subsequently and hence the general price level falls as well.

The result in (A.1: Figure 2 chart 2 in the Appendix) is consistent with that expectation. One standard deviation shock to inward workers remittances leads to a decline in headline inflation rate by about 0.3 percentage points in second month after the shock, in the third month, inflation, vis-à-vis the pre-shock level, will rise by 0.13 percentage point. It begins to stabilize in fourth month and the shock completely dies in the ninth month.

4.2.5 Reactions of Broad Money

The expected reaction of broad money (A.1: Figure 3 Chat 1 in Appendix) to one standard deviation shock to remittance inflows occurs in the third month after the shock has taken place, indicating that a shock to inward remittances increases the overall money supply in the Liberian economy within the third month of the shock by 0.9 percent. There is no reaction in the first month of the shock which is true for all variables in the model. In the second month, the result indicates that a shock to remittances reduces broad money supply by 0.8 percent, a result which is not all together surprising. Remittances inflows are recorded by banks, upon arrival, as remittances in transit (deposits in transit). The funds are instantly withdrawn from the banking system by recipients, reducing total deposit initially. Most of the funds are then re-injected into the system

as either United States dollar or Liberian dollar deposits, thus, increasing money supply at a later time. The shock effect extinguishes after the eighth month.

4.2.6 Reaction of Gross Forex Reserves (excluding SDR holdings)

As anticipated, the reaction of gross foreign exchange reserves (Appendix A.1: Figure 3 Chat 2) to one standard deviation shock to inward remittances is consistent with the theoretical expectation. A shock to inward remittances affects gross reserves with a lag of one month. Thereafter, in the second month gross forex reserves increase by 0.8 percent and decline thereafter in the third month by 0.6 percent. The effect of the shock continues from the fourth to the sixth months during which gross forex reserves increase on average by 0.3 percent. The effect of the shock generally quenches in the eight months.

5.0 Conclusion and Recommendations

5.1 Conclusion

Given the empirical evidence on the transmission processes of inward remittances to some key macroeconomic variables, the following conclusions can be reached. First, it is evident that real GDP, exchange rate, lending rate as an indicator for domestic investment, gross forex reserves and inflation react to change in inward remittances with a lag of one month. Such a conclusion provides an empirical basis to confirm the assumption that macroeconomic variables affect an economy with a time lag. However, the length of the lag may depend on the frequency of a particular macroeconomic variable.

Second, the Central Bank of Liberia may directly affect the levels of exchange rate, broad money supply and gross forex reserves by directly varying the levels of inward remittances. The CBL may also use remittance inflows to influence economic growth and achieve its final objective of price stability. Such ultimate objectives may be achieved by varying the levels of exchange rate, money supply and gross reserves through influencing the inflows of remittances.

As evident by the reaction of the exchange rate, an important implication emanating from this result is that, the exchange rate has a shock absorbing mechanism which allows a shock to the variable to die quickly in four months (A.1: figure 1 chat 1). That is, in case of a shock to the exchange rate, the variable has a built-in stabilizer to counter volatility even without CBL

intervention, however, the time it takes to stabilize, most likely, depends on the intensity of the shock.

5.2 Recommendations

Due to the significant impact of inward remittances on the exchange rate and because the exchange rate is the de facto monetary policy anchor (band not explicitly stated) for the Central Bank of Liberia, remittances inflows could be used to play some key role as a monetary policy variable that could help achieve exchange rate stability and hence, the price stability objective of the Bank. One way to do this is for the Bank to work with all stakeholders (remittance institutions, national and international, banks, and government) in reducing the cost of remittances to Liberia through tax reduction and the alleviation of bureaucratic bottlenecks in all processes that lead to free flow of remittances.

Since exchange rate has an inherent self-adjustment mechanism which allows the variable to stabilize itself in four months, then stabilization intervention by the CBL into the forex market must be done only to smoothen volatility within the four-month period, otherwise the exchange rate should be allowed to self-adjust in the face of limited foreign exchange reserves. The adoption of such policy measure is beneficial in two dimensions: first, in the midst of resource constraints, such a policy would promote government's policy of foreign reserves accumulation which solidifies and strengthens the country's counter cyclical capital position. Second, it allows actual interaction between demand and supply of foreign exchange to determine the equilibrium exchange rate.

There may be a counter argument that because Liberia is a net importing economy, where large proportion of the daily consumables, including the nation's staple (rice), are imported, the wellbeing of the ordinary citizens is hinged on the exchange rate. Thus, allowing the exchange rate to depreciate within four months before self-adjustment may be detrimental to the already disadvantaged masses. However, what should be remembered with such an argument is that, when a policy action is not controllable and sustainable, it becomes a shock, itself. The CBL intervention into the foreign exchange market is unsustainable, at least for now, occasioned by a very limited reserves position. Thus, with limited reserve standing, it is only prudent to allow demand-supply interactions set the equilibrium exchange rate. However, in the case of exchange rate or currency crisis, defined by plus or minus 10 percent depreciation/appreciation rate or greater ($\geq \pm 10$ percent

depreciation or appreciation), then using the meager foreign exchange resources needed to build external reserves for intervention becomes a justifiable policy action.

Crucially, this study allows us to determine the impact of inward workers' remittance on the key policy variables of the economy (namely: exchange rate, growth, inflation and broad money supply). But there are still unanswered questions which the study did not attempt to answer. The issue of the effect of workers' outward remittances or more preferably the effect of net workers' remittances on the economy was left unanswered. Therefore, commissioning another remittance-impact study that addresses this un-attempted question is highly an imperative. Additionally, consideration is being made to use quarterly data including quarterly GDP estimates to assess the responses of the macroeconomic variables in the study to shock to remittance inflows.

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Appendix

A.1 Figure 1: Responses from Exchange and Lending Rates to one SD shock to Inward Workers' Remittances

Response to Cholesky One S.D. Innovations ± 2 S.E.

Chart 1: Response of FDLAVEEXRATE to FDLRIFLOW

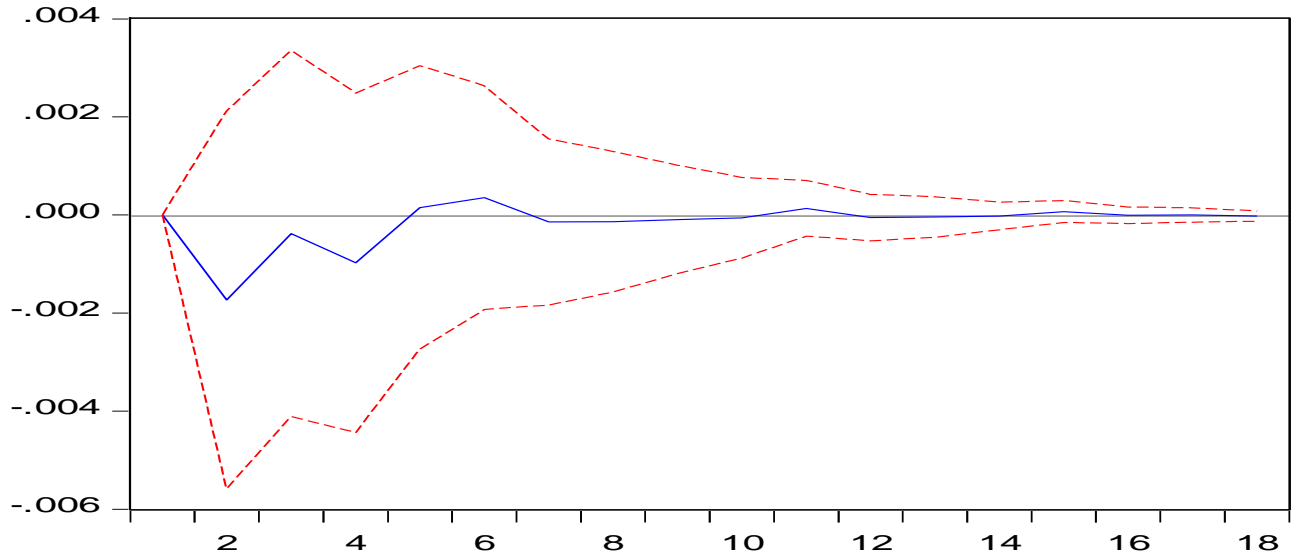
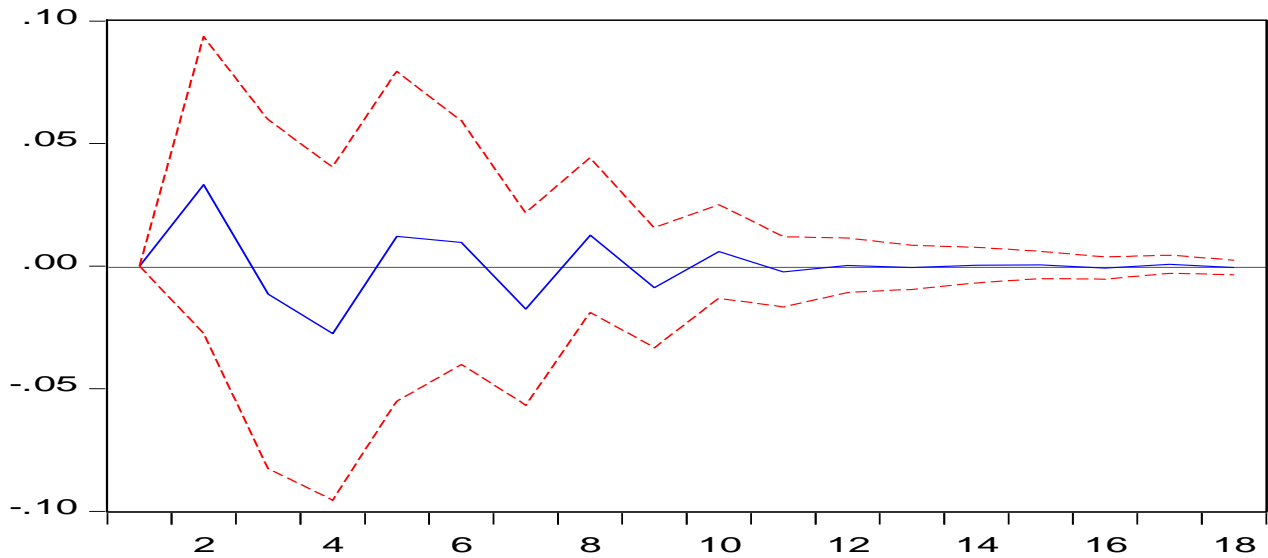


Chart 2: Response of FDLENDRATE to FDLRIFLOW



Source: EViews outputs

A.1 Figure 2: Responses from Real GDP Growth and Inflation Rates to one SD shock to Inward Workers' Remittances

Response to Cholesky One S.D. Innovations ± 2 S.E.

Chart 1: Response of FDRGDP_GROWTH to FDLRIFLOW

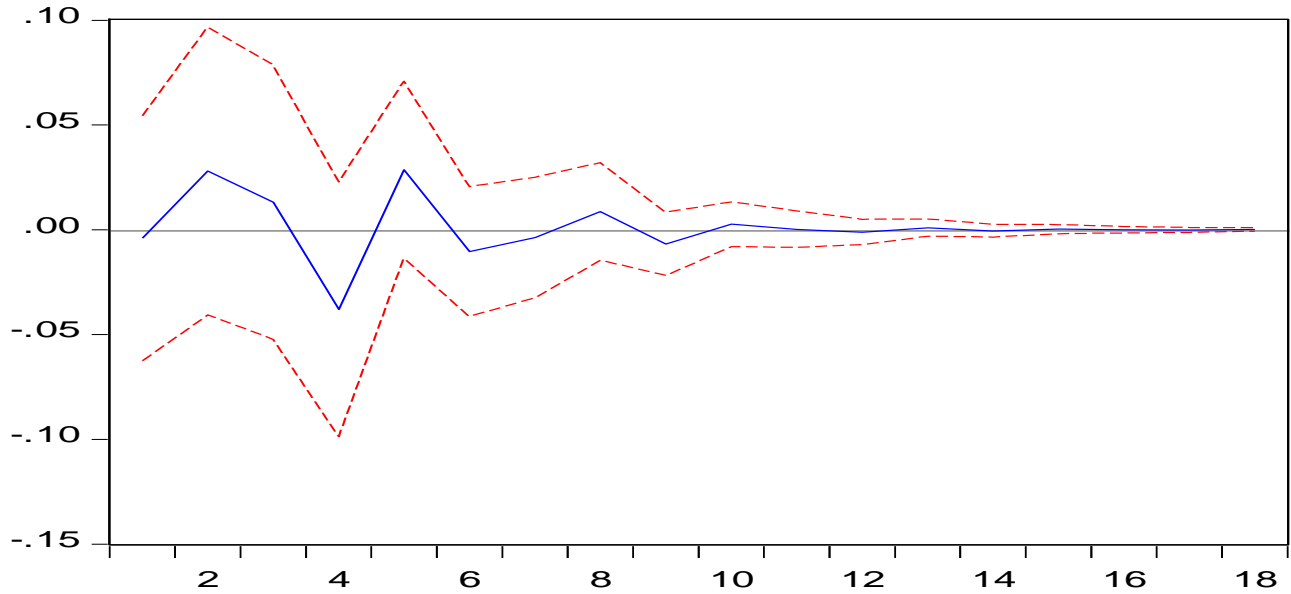
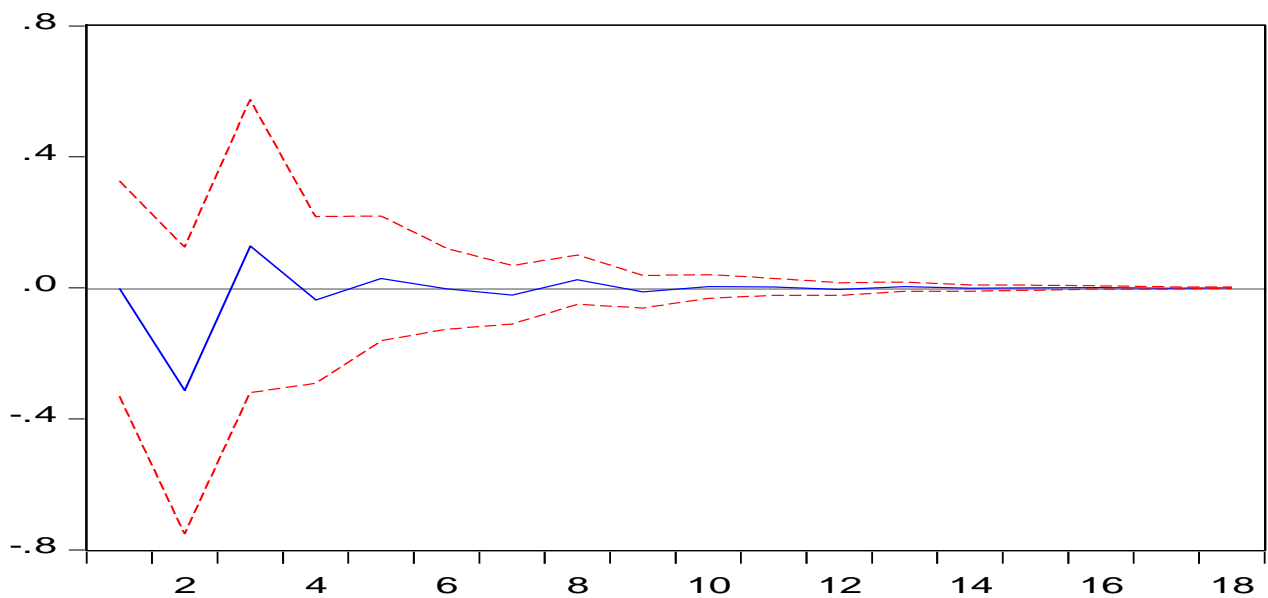


Chart 2: Response of INFL to FDLRIFLOW



Source: EViews outputs

A.1 Figure 3: Responses from Broad Money Supply (M2) and Gross FX Reserves (Excluding SDR holdings) to one SD shock to Inward Workers' Remittances

Response to Cholesky One S.D. Innovations ± 2 S.E.

Chart 1: Response of FDLM2 to FDLRIFLOW

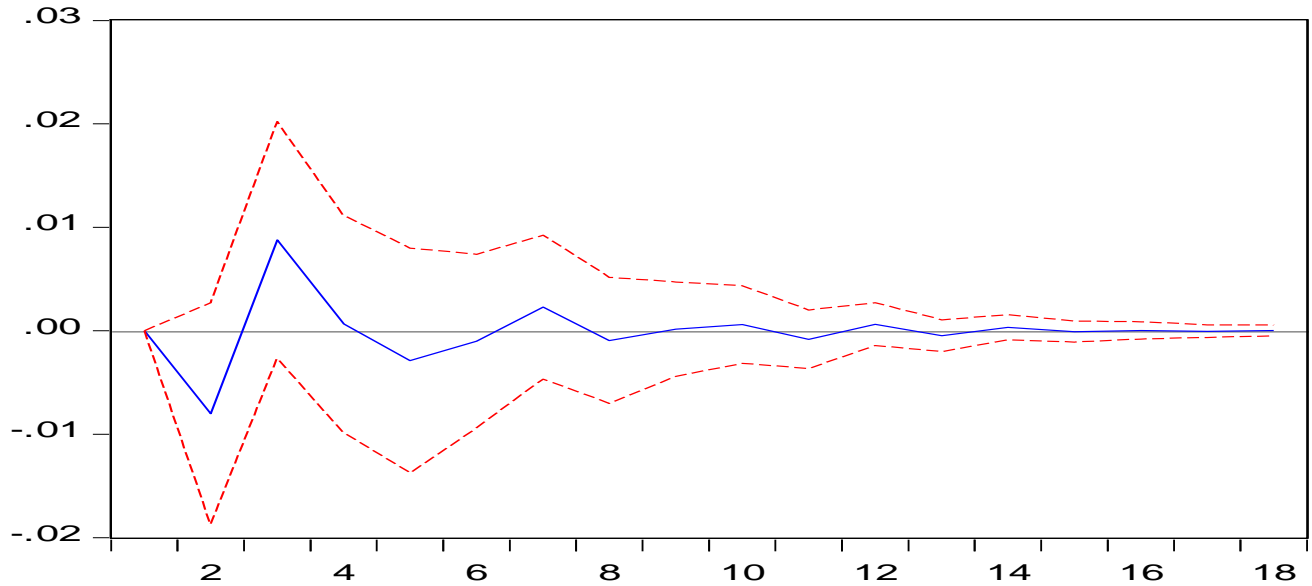
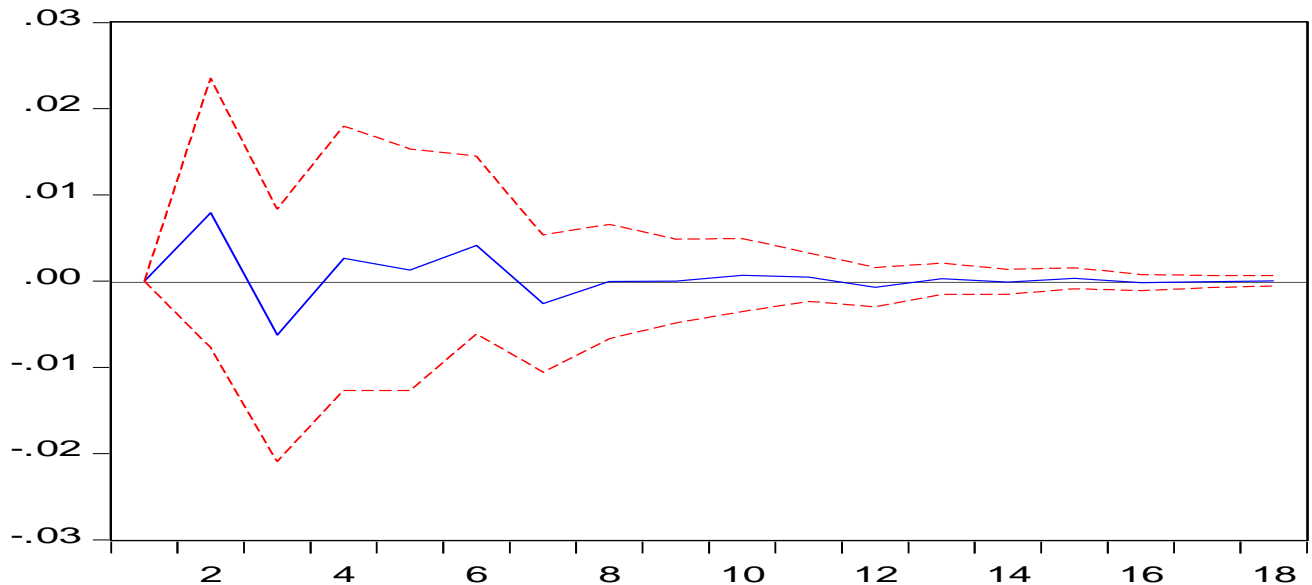


Chart 2: Response of FDLGFXRES to FDLRIFLOW



Source: EViews outputs

A.2. Pair-wise Granger Causality Test Result

Pairwise Granger Causality Tests

Date: 05/26/17 Time: 11:06

Sample: 2009M01 2016M06

Lags: 10

Null Hypothesis:	Obs	F-Statistic	Prob.
FDRGDP_GROWTH does not Granger Cause FDLRIFLOW	78	0.71421	0.7075
FDLRIFLOW does not Granger Cause FDRGDP_GROWTH		2.53809	0.0132
INFL does not Granger Cause FDLRIFLOW	78	0.45069	0.9143
FDLRIFLOW does not Granger Cause INFL		1.44697	0.1834
INFL does not Granger Cause FDRGDP_GROWTH	78	0.90144	0.5379
FDRGDP_GROWTH does not Granger Cause INFL		0.56012	0.8391

A.3: Costs of Remittances from Liberia, 2015, from Western Union, MoneyGram, SWIFT and GTMT

Western Union		MoneyGram (All Countries other than USA)		MoneyGram (USA Only)		SWIFT	
Amount	Fee	Amount	Fee	Amount	Fee	Amount	Fee
US\$ 1-100	US\$15.00	US\$0.01-100	US\$12.00	US\$0.01-100	US\$13.00	US\$1.00-10,000	US\$40
US\$101-200	US\$22.00	US\$100.01-200	US\$15.00	US\$100.01-200	US\$19.00	US\$10,001-50,000	US\$50
US\$201-300	US\$29.00	US\$200.01-400	US\$20.00	US\$200.01-300	US\$26.00	US\$50,000-100,000	US\$100
US\$301-400	US\$34.00	US\$400.01-600	US\$30.00	US\$300.01-400	US\$30.00	US\$100,001-200,000	US\$150
US\$401-500	US\$42.00	US\$600.01-800	US\$40.00	US\$400.01-500	US\$38.00	US\$200,000-300,000	US\$175
US\$501-750	US\$47.00	US\$800.01-1,000	US\$50.00	US\$500.01-750	US\$42.00	US\$300,001-400,000	US\$200
US\$751-1000	US\$52.00	US\$1,000.01-1,200	US\$60.00	US\$750.01-1,000	US\$47.00	Guaranty Trust Money Transfer (GTMT)	
US\$1001-1500	US\$78.00	US\$1,200.01-1,500	US\$70.00	US\$1,000.01-1,500	US\$70.00	Amount	Fee
US\$1501-1750	US\$83.00	US\$1,500.01-1,800	US\$80.00	US\$1,500.01-1,700	US\$75.00	US\$1.00-300.00	US\$10.00
US\$1751-2000	US\$93.00	US\$1,800.01-2,500	US\$100.00	US\$1,750.01-2,000	US\$84.00	US\$300.00 and ABOVE	3% of amount
US\$2001-2500	US\$113.00	US\$2,500.00-5,000	US\$150.00	US\$2,000.01-2,500	US\$102.00		
US\$2501-3000	US\$123.00	US\$5,000.01-7,500	US\$250.00	US\$2,500.01-3,000	US\$110.00		
US\$3001-3500	US\$143.00	US\$7,500.01-10,000	US\$300.00	US\$3,000.01-5,000	US\$150.00		
US\$3501-4000	US\$163.00			US\$5,000.01-7,500	US\$250.00		
US\$4001-4500	US\$183.00			US\$7,500.01-10,000	US\$300.00		
US\$4501-5500	US\$203.00						

Source: Central Bank of Liberia.

A.4: Liberia's Bilateral Remittance Estimates: 3 Top Sending and Receiving Countries to and from Liberia, 2010-15 (US\$ million, unless indicated otherwise)

	2010	2011	2012	2013	2014	2015	Total
Inward Remittances	31.4	360.0	372.0	383.4	466.3	693.2	2,306.3
Outward Remittances	70.0	74.5	74.0	146.3	146.3	159.7	670.8
3 Top Senders to Liberia and Shares of Total							
USA	14.4	160.3	165.8	190.9	231	159.7	922.1
<i>USA's Share</i>	45.8	44.5	44.6	49.8	49.5	23.0	40.0
Guinea	6.5	77.1	79.8	58.1	70.1	104	395.6
<i>Guinea's Share</i>	20.7	21.4	21.5	15.2	15.0	15.0	17.2
Ivory Coast	3.04	35	36.24	57.3	72.1	107	310.7
<i>Ivory Coast's Share</i>	9.7	9.7	9.7	14.9	15.5	15.4	13.5
3 Top Recipients from Liberia and Shares of Total							
Nigeria	23.2	24.5	24.4	74	73.8	72.8	292.7
<i>Nigeria's Share</i>	33.1	32.9	33.0	50.6	50.4	45.6	43.6
Ivory Coast	0.0	0.0	0.0	48.7	49.4	50.9	149.0
<i>Ivory Coast's Share</i>	0.0	0.0	0.0	33.3	33.8	31.9	22.2
Lebanon	27	26.6	26.4	7.9	7.4	7.2	102.5
<i>Lebanon's Share</i>	38.6	35.7	35.7	5.4	5.1	4.5	15.3

Source: World Bank Bilateral Remittance Estimates, 2010- 2015

A.5 Table 1: Bilateral Remittances (Inward and Outward) in ECOWAS 2010 (US\$ Millions)

		Receiving Countries															Total Sent
		Benin	Burkina Faso	Cape Verde	Côte d'Ivoire	The Gambia	Ghana	Guinea	Guinea Bissau	Liberia	Mali	Niger	Nigeria	Senegal	Sierra Leone	Togo	
Sending Countries	Benin	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.7	549.6	0.0	0.0	32.8	608.0
	Burkina Faso	1.9	0.0	0.0	228.4	0.0	4.6	0.0	0.0	23.6	5.7	0.0	0.0	0.0	14.6	279.0	
	Cape Verde	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	2.0	1.2	0.0	0.0	3.5	
	Côte d'Ivoire	18.7	109.3	0.1	0.0	0.8	10.6	12.3	0.1	3.0	164.4	26.7	449.2	49.8	0.1	37.2	882.5
	The Gambia	0.0	0.0	0.0	0.0	0.0	0.0	5.4	4.9	0.0	4.9	0.0	0.0	265.7	0.5	0.0	281.4
	Ghana	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Guinea	0.7	0.0	0.0	0.7	0.7	0.1	0.0	0.6	6.5	5.0	0.4	10.3	10.0	18.4	0.8	54.1
	Guinea-Bissau	0.0	0.0	0.2	0.0	0.8	0.0	0.4	0.0	0.0	0.0	0.0	0.0	14.7	0.0	0.0	16.1
	Liberia	0.1	0.0	0.0	0.8	0.0	1.5	4.0	0.0	0.0	0.5	0.0	23.1	0.4	1.3	0.3	32.1
	Mali	0.2	1.7	0.0	21.0	0.6	0.2	1.3	0.0	0.0	0.0	1.6	19.5	17.8	0.2	0.5	64.7
	Niger	8.0	2.3	0.0	0.5	0.0	0.2	0.0	0.0	0.0	22.8	0.0	347.4	0.0	0.0	8.6	389.8
	Nigeria	74.5	0.7	2.0	1.2	6.1	18.4	0.6	1.2	0.8	51.9	29.0	0.0	7.3	0.5	79.5	274.0
	Senegal	0.0	0.0	4.5	0.0	5.4	0.0	7.5	5.9	0.0	6.6	0.0	0.0	0.0	0.0	0.0	30.0
	Sierra Leone	0.0	0.0	0.0	0.1	2.5	0.1	5.5	0.0	0.8	0.3	0.0	27.2	1.1	0.0	0.0	37.6
	Togo	21.6	0.0	0.0	0.0	0.0	3.6	0.0	0.0	0.0	0.9	4.7	223.8	0.0	0.0	0.0	254.6
	Total Received	125.7	114.9	6.9	252.8	17.0	39.5	37.1	13.1	11.2	280.9	92.9	1,652.1	368.0	21.0	174.4	3,207.5

Source: World Bank Bilateral Remittance Estimates

A.5 Table 2: Bilateral Remittances (Inward and Outward) in ECOWAS 2011 (US\$ Millions)

		Receiving Countries															Total Sent
		Benin	Burkina Faso	Cape Verde	Côte d'Ivoire	The Gambia	Ghana	Guinea	Guinea Bissau	Liberia	Mali	Niger	Nigeria	Senegal	Sierra Leone	Togo	
Sending Countries	Benin	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	24.6	581.6	0.0	0.0	32.9	640.1	
	Burkina Faso	1.9	0.0	0.0	225.6	0.0	5.4	0.0	0.0	23.7	5.7	0.0	0.0	0.0	14.7	277.1	
	Cape Verde	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	2.1	1.2	0.0	0.0	3.7	
	Côte d'Ivoire	18.4	108.8	0.2	0.0	0.6	12.0	15.9	0.1	35.0	162.4	26.2	475.4	49.8	0.2	36.7	941.6
	The Gambia	0.0	0.0	0.0	0.0	0.0	0.0	7.0	4.9	0.0	4.8	0.0	0.0	265.4	0.6	0.0	282.8
	Ghana	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Guinea	0.7	0.0	0.0	0.7	0.5	0.1	0.0	0.6	77.1	5.0	0.4	10.9	10.0	24.8	0.8	131.6
	Guinea-Bissau	0.0	0.0	0.3	0.0	0.6	0.0	0.5	0.0	0.0	0.0	0.0	0.0	14.7	0.0	0.0	16.1
	Liberia	0.1	0.0	0.0	0.8	0.0	1.7	5.2	0.0	0.0	0.5	0.0	24.5	0.4	1.8	0.4	35.4
	Mali	0.2	1.7	0.0	20.8	0.4	0.3	1.7	0.0	0.3	0.0	1.6	20.7	17.8	0.2	0.5	66.2
	Niger	8.0	2.3	0.0	0.5	0.0	0.3	0.0	0.0	0.0	22.8	0.0	367.6	0.0	0.0	8.6	410.2
	Nigeria	74.7	0.7	2.8	1.2	4.7	21.2	0.8	1.3	9.9	52.5	29.2	0.0	7.4	0.7	80.2	287.5
	Senegal	0.0	0.0	6.1	0.0	4.1	0.0	9.8	6.0	0.0	6.6	0.0	0.0	0.0	0.0	0.0	32.7
	Sierra Leone	0.0	0.0	0.0	0.1	1.9	0.2	7.2	0.0	9.6	0.3	0.0	28.7	1.1	0.0	0.0	49.2
	Togo	21.5	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.0	0.9	4.7	236.8	0.0	0.0	0.0	268.2
	Total Received	125.5	114.5	9.4	249.7	13.0	45.5	48.1	13.3	132.0	279.5	92.5	1,748.5	367.8	28.3	174.9	3,442.4

Source: World Bank Bilateral Remittance Estimates

A.5 Table 3: Bilateral Remittances (Inward and Outward) in ECOWAS 2012 (US\$ Millions)

		Receiving Countries														Total Sent	
		Benin	Burkina Faso	Cape Verde	Côte d'Ivoire	The Gambia	Ghana	Guinea	Guinea-Bissau	Liberia	Mali	Niger	Nigeria	Senegal	Sierra Leone		Togo
Sending Countries	Benin	0.0	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	22.4	580.2	0.0	0.0	31.4	634.8
	Burkina Faso	1.8	0.0	0.0	196.4	0.0	5.4	0.0	0.0	0.0	22.3	5.2	0.0	0.0	0.0	14.0	245.2
	Cape Verde	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	2.1	1.1	0.0	0.0	3.6
	Côte d'Ivoire	17.9	101.6	0.2	0.0	0.6	12.0	15.1	0.1	36.2	152.7	23.8	474.2	46.0	0.2	35.0	915.6
	The Gambia	0.0	0.0	0.0	0.0	0.0	0.0	6.6	4.5	0.0	4.5	0.0	0.0	245.5	0.7	0.0	261.9
	Ghana	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Guinea	0.6	0.0	0.0	0.6	0.5	0.1	0.0	0.6	79.8	4.7	0.3	10.9	9.2	25.3	0.8	133.5
	Guinea-Bissau	0.0	0.0	0.3	0.0	0.6	0.0	0.5	0.0	0.0	0.0	0.0	0.0	13.6	0.0	0.0	15.0
	Liberia	0.1	0.0	0.0	0.7	0.0	1.7	5.0	0.0	0.0	0.5	0.0	24.4	0.4	1.8	0.3	34.9
	Mali	0.2	1.6	0.0	18.1	0.4	0.3	1.6	0.0	0.3	0.0	1.5	20.6	16.5	0.2	0.5	61.8
	Niger	7.8	2.2	0.0	0.4	0.0	0.3	0.0	0.0	0.0	21.4	0.0	366.7	0.0	0.0	8.2	407.1
	Nigeria	72.6	0.7	2.8	1.1	4.7	21.2	0.7	1.2	10.3	49.3	26.6	0.0	6.8	0.7	76.4	275.1
	Senegal	0.0	0.0	6.1	0.0	4.1	0.0	9.4	5.5	0.0	6.2	0.0	0.0	0.0	0.0	0.0	31.3
	Sierra Leone	0.0	0.0	0.0	0.1	1.9	0.2	6.9	0.0	10.0	0.3	0.0	28.7	1.0	0.0	0.0	49.0
	Togo	20.9	0.0	0.0	0.0	0.0	4.2	0.0	0.0	0.0	0.9	4.3	236.2	0.0	0.0	0.0	266.6
	Total Received	121.8	106.9	9.3	217.3	12.8	45.4	45.9	12.2	136.5	262.8	84.3	1744.2	340.2	29.0	166.7	3335.4

Source: World Bank Bilateral Remittance Estimates

A.5 Table 4: Bilateral Remittances (Inward and Outward) in ECOWAS 2013 (US\$ Millions)

		Receiving Countries														Total Sent	
		Benin	Burkina Faso	Cabo Verde	Cote d'Ivoire	The Gambia	Ghana	Guinea	Guinea-Bissau	Liberia	Mali	Niger	Nigeria	Senegal	Sierra Leone		Togo
Sending Countries	Benin	0.0	0.6	0.0	4.2	0.0	1.1	0.0	0.0	0.0	0.9	30.7	611.5	0.0	0.0	23.5	672.6
	Burkina Faso	1.4	0.0	0.0	180.6	0.0	3.8	0.0	0.0	0.0	33.3	5.4	52.9	5.3	0.0	7.9	290.5
	Cabo Verde	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.0	0.0	0.0	0.0	9.8	3.3	0.0	0.0	15.2
	Cote d'Ivoire	21.7	104.2	0.3	0.0	0.1	5.5	19.3	0.1	57.3	335.8	26.8	628.6	41.4	0.1	32.2	1,273.3
	The Gambia	0.0	0.0	0.0	0.0	0.0	0.0	5.5	3.0	0.0	5.9	0.0	0.0	184.4	0.3	0.0	199.1
	Ghana	7.4	7.1	0.0	15.8	1.8	0.0	0.0	0.0	13.6	7.0	4.8	819.5	0.2	0.3	87.2	964.7
	Guinea	0.5	0.0	0.0	2.2	0.6	0.1	0.0	0.5	58.1	7.2	0.3	8.3	7.9	32.8	0.4	118.9
	Guinea-Bissau	0.0	0.0	0.4	0.0	1.6	0.0	0.7	0.0	0.4	0.0	0.0	0.0	13.6	0.1	0.0	16.8
	Liberia	0.0	0.0	0.0	48.7	0.8	0.8	5.4	0.0	0.0	1.0	0.0	74.0	0.7	1.9	0.2	133.6
	Mali	0.2	1.5	0.0	26.0	0.7	0.3	2.7	0.0	0.3	0.0	2.5	25.1	22.5	0.2	0.5	82.4
	Niger	6.0	1.2	0.0	0.4		0.2	0.0	0.0	0.0	34.1	0.0	288.2	2.2	0.0	4.6	336.9
	Nigeria	92.9	0.7	3.1	1.5	8.9	21.6	1.3	1.8	14.1	123.3	48.6	0.0	9.9	0.7	74.4	402.8
	Senegal	0.9	0.0	0.0	0.7	4.7	0.2	6.7	7.0	0.0	20.9	0.6	9.4	0.0	1.8	0.7	53.6
	Sierra Leone	0.1	0.0	0.0	0.1	2.8	0.2	9.9	0.0	12.0	0.6	0.1	30.0	1.2	0.0	0.0	57.0
	Togo	17.7	0.0	0.0	1.7	0.0	4.3	0.0	0.0	0.0	1.7	6.1	232.5	0.0	0.0	0.0	264.0
	Total Received	148.8	115.2	3.8	281.9	22.0	38.1	51.6	14.5	155.8	571.7	126.0	2,789.8	292.5	38.2	231.6	4,881.5

Source: World Bank Bilateral Remittance Estimates

A.5 Table 5: Bilateral Remittances (Inward and Outward) in ECOWAS 2014 (US\$ Millions)

	Receiving Countries																
	Benin	Burkina Faso	Cape Verde	Cote d'Ivoire	The Gambia	Ghana	Guinea	Guinea Bissau	Liberia	Mali	Niger	Nigeria	Senegal	Sierra Leone	Togo	Total Sent	
Sending Countries	Benin	0.0	0.6	0.0	4.3	0.0	1.1	0.0	0.0	0.9	30.6	609.8	0.0	0.0	24.5	671.9	
	Burkina Faso	1.4	0.0	0.0	183.0	0.0	3.8	0.0	0.0	33.4	5.4	52.7	5.2	0.0	8.3	293.3	
	Cabo Verde	0.0	0.0	0.0	0.0	0.0	0.0	0.1	2.0	0.0	0.0	9.8	3.3	0.0	0.0	15.2	
	Cote d'Ivoire	22.3	104.6	0.3	0.0	0.1	5.5	19.5	0.1	72.1	342.3	27.5	626.8	42.1	0.1	34.2	1,297.4
	The Gambia	0.0	0.0	0.0	0.0	0.0	0.0	5.3	3.1	0.0	5.8	0.0	0.0	183.6	0.3	0.0	198.1
	Ghana	7.4	6.9	0.0	15.7	1.7	0.0	0.0	0.0	16.4	6.9	4.7	817.3	0.2	0.3	89.7	967.4
	Guinea	0.5	0.0	0.1	2.2	0.6	0.1	0.0	0.5	70.0	7.3	0.3	8.3	7.8	32.9	0.5	131.0
	Guinea-Bissau	0.0	0.0	0.4	0.0	1.5		0.7	0.0	0.5	0.0	0.0	0.0	13.5	0.1	0.0	16.8
	Liberia	0.0	0.0	0.0	49.4	0.8	0.8	5.3	0.0	0.0	1.0	0.0	73.8	0.7	1.9	0.2	133.9
	Mali	0.2	1.4	0.0	26.3	0.7	0.3	2.6	0.0	0.4	0.0	2.5	25.0	22.4	0.2	0.5	82.7
	Niger	6.0	1.2	0.0	0.4	0.0	0.2	0.0	0.0	0.0	34.4	0.0	287.4	2.2	0.0	4.9	336.7
	Nigeria	92.7	0.6	3.3	1.5	8.8	21.5	1.2	1.8	17.0	121.8	48.0	0.0	9.8	0.7	76.0	404.8
	Senegal	0.9	0.0	0.0	0.7	4.6	0.2	6.6	7.1		20.8	0.6	9.3	0.0	1.8	0.7	53.4
	Sierra Leone	0.1	0.0	0.0	0.1	2.8	0.2	9.8	0.0	14.6	0.6	0.1	30.0	1.2	0.0	0.0	59.3
	Togo	17.8	0.0	0.0	1.7	0.0	4.3	0.0	0.0	0.0	1.7	6.2	231.8	0.0	0.0	0.0	263.6
	Total Received	149.3	115.4	4.1	285.4	21.6	38.0	51.2	14.7	191.0	576.9	126.0	2,782.1	292.1	38.3	239.5	4,925.4

Source: World Bank Bilateral Remittance Estimates

A.5 Table 6: Bilateral Remittances (Inward and Outward) in ECOWAS 2015 (US\$ Millions)

	Receiving Countries																
	Benin	Burkina Faso	Cape Verde	Cote d'Ivoire	The Gambia	Ghana	Guinea	Guinea Bissau	Liberia	Mali	Niger	Nigeria	Senegal	Sierra Leone	Togo	Total Sent	
Sending Countries	Benin	0.0	2.0	0.0	4.4	0.0	18.7	0.0	0.0	0.9	29.4	601.7	0.0	0.0	28.2	685.3	
	Burkina Faso	2.0	0.0	0.0	188.5	0.0	63.9	0.0	0.0	33.4	5.2	52.0	5.2	0.0	9.5	359.8	
	Cabo Verde	0.0	0.0	0.0	0.0	0.0	0.1	0.1	2.8	0.0	0.0	9.7	3.3	0.0	0.0	15.9	
	Cote d'Ivoire	32.6	343.8	0.3	0.0	0.1	92.4	19.5	0.2	107.0	342.2	26.4	618.4	42.1	0.1	39.4	1,664.6
	The Gambia	0.0	0.0	0.0	0.0	0.0	0.0	5.3	4.3	0.0	5.8	0.0	0.0	183.5	0.3	0.0	199.2
	Ghana	10.8	22.7	0.0	16.1	1.7	0.0	0.0	0.0	24.4	6.9	4.6	806.3	0.2	0.3	103.4	997.6
	Guinea	0.7	0.1	0.1	2.3	0.6	1.6	0.0	0.7	104.0	7.3	0.3	8.2	7.8	32.2	0.5	166.3
	Guinea-Bissau	0.0	0.0	0.5	0.0	1.5	0.0	0.7	0.0	0.8	0.0	0.0	0.0	13.5	0.1	0.0	17.1
	Liberia	0.0	0.0	0.0	50.9	0.8	14.2	5.3	0.0	0.0	1.0	0.0	72.8	0.7	1.9	0.2	147.8
	Mali	0.3	4.7	0.0	27.1	0.7	5.3	2.6	0.0	0.6	0.0	2.4	24.7	22.4	0.2	0.6	91.6
	Niger	8.8	4.1	0.0	0.4	0.0	3.3	0.0	0.0	0.0	34.4	0.0	283.5	2.2	0.0	5.7	342.3
	Nigeria	135.8	2.1	3.5	1.5	8.7	362.0	1.2	2.5	25.2	121.8	46.1	0.0	9.8	0.7	87.6	808.5
	Senegal	1.4	0.0	0.0	0.7	4.6	2.6	6.6	10.0	0.0	20.8	0.6	9.2	0.0	1.7	0.8	59.1
	Sierra Leone	0.1	0.0	0.0	0.1	2.7	2.6	9.8	0.0	21.7	0.6	0.1	29.5	1.2	0.0	0.0	68.5
	Togo	26.1	0.0	0.0	1.7	0.0	72.6	0.0	0.0	0.0	1.7	6.0	228.7	0.0	0.0	0.0	336.8
	Total Received	218.6	379.5	4.3	293.9	21.5	639.2	51.2	20.5	283.8	576.8	121.0	2,744.7	292.0	37.5	275.9	5,960.4

Source: World Bank Bilateral Remittance Estimates