

Determinants of Capital Flight in Post War Sierra Leone: An Empirical Analysis

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ABSTRACT

The objective of this paper is to investigate the determinants of capital flight in Sierra Leone and the direction of causality between capital flight and key variables, within the context of the autoregressive distributed lag (ARDL) estimation technique and the granger causality framework. The study utilizes quarterly data spanning the period 2000:Q1 to 2019:Q1. The bound test result confirms the existence of cointegration. The long run result reveals that real effective exchange rate, corruption and external debt are the main determinants of capital flight in Sierra Leone. Specifically, the finding indicates that real effective exchange rate, high level of corruption and accumulation of external debt cause an increase in capital flight. Furthermore, the result reveals that lagged capital flight, corruption, external debt and financial deepening are the main drivers of capital flight in the short run. Whilst lagged capital flight, corruption and external debt accumulation increase capital flight, the result reveals that a well-developed financial system reduce capital flight. The finding asserts that any disequilibrium in the model is corrected at the 26% adjustment speed annually. The diagnostic test confirms that the coefficients are stable, given that the CUSUM and CUSUMSQ lie within the critical band. The granger causality test results reveal that, external debt and capital flight exhibits bi-directional causality. However, both inflation and exchange rate demonstrate uni-directional causality, given that these variables granger cause capital flight, with no feedback effect. The study therefore urges the Government to take measures to strengthen the Anti-corruption Commission and the judiciary with a view to intensify the fight against corruption, and reduce capital flight. Also, government should put in place modalities to ensure strict capital controls, deepen the financial market and maintain broad macroeconomic stability as recipe to reduce capital flight.

Keywords: ARDL, Granger Causality, Capital Flight, Sierra Leone, Quarterly Data

JEL Classifications: C 32, F 21, F 40

1. INTRODUCTION

The issue of capital flight is an important concept in development and financial economics, and has been a major concern for Developing countries, with limited resources for development. The discussion on capital flight is centred around the causes, magnitude and consequences of capital outflows and its spillover effect. Capital flight has been defined in different ways in the literature. According to Cuddington (1986), capital flight is defined as a short-term private capital outflow which occurs in response to political crisis and economic policy failure. Thus, capital flight

refers to the movement of capital out from a resource-scarce developing country to avoid social control. Capital flight is also defined as the unrecorded movement of funds between a country and the rest of the world (World Bank, 1985). It is also considered as the part of domestic savings that is sent abroad. Capital Flight is measured as net unrecorded capital outflow or the residual between officially recorded sources and recorded uses of funds (Beja, 2006). The global interest on capital flight especially for developing economies, including Sierra Leone, derives largely from its adverse effects on macroeconomic stability and economic growth as scarce economic resources lost through capital flight do

not contribute to enhance social welfare of residents (Škare and Sinković, 2013). Capital flight has the tendency to undermine a country's domestic resource mobilization strategy by eroding the tax base. Also, it causes a decline in domestic investment, weakens the domestic currency, exacerbates external debt, increases interest rate on domestic debt, worsens the balance of payment position and subsequently results in slower economic growth. Furthermore, capital flight heightens inequality between the rich and the poor, on account of the fact that wealthy people usually suffer smaller tax burdens than poor people who do not have the opportunity to transfer their wealth abroad. The main channels of capital flight include unreported remittances, currency smuggling (concealing cash or cheques within suitcases), trade misinvoicing (including export misinvoicing and import misinvoicing), Balance of Payments leakages, and E-transfers from private banking services.

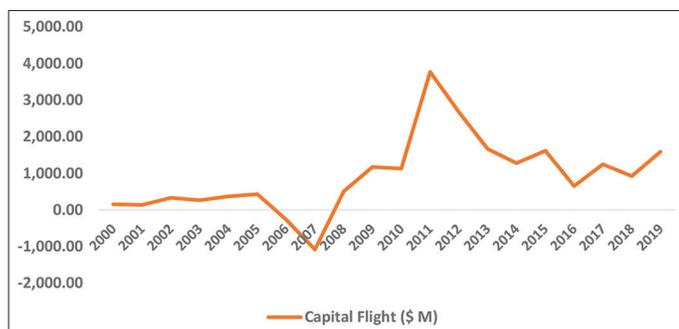
The size and volume of capital flight in developing countries continues to pose serious challenges on macroeconomic stability and sustainable growth, with particular reference to Africa. It is believed that developing countries are losing more resources through capital flight than debt servicing (Ndikumana and Boyce, 2003). Estimates show that Africa is a net creditor to the rest of the world largely due to the fact that private assets held abroad far outweigh the external debt stock of Africa. Hence, the paradoxical situation of buildup of external debt and the simultaneous accumulation of external assets by residents in developing countries continues to draw interest on the issue of capital flight.

The literature on capital flight is predicated on four theoretical paradigms: the portfolio choice theory, investment diversion thesis, the debt-driven thesis, and the tax-depressing theory. The portfolio choice theory posits that capital flight occurs as a result of agents' desires to optimize yields on capital for a given level of risk (Collier et al., 2001). The theory also argues that the occurrence of capital flight is due to the unstable macroeconomic and political environment in developing countries and the concurrent existence of better investment opportunities in advanced countries including high foreign interest rates (Dim and Ezenekwe, 2014). Thus, a rational profit maximizing agent will invest abroad if the risk-adjusted returns are higher abroad than in the domestic economy. In this regard, capital flight is considered as a response to changes in an investor's portfolio bundle arising from factors such as the fear of political and economic uncertainty (Mohamed and Finnoff, 2004). The investment diversion theory postulates that individuals will transfer funds meant for the domestic economy to advance nations largely as a result of macroeconomic and political instability in developing economies. It is widely acknowledged that funds are transferred abroad in order to take advantage of better investment opportunities and high foreign interest rates coupled with political and macroeconomic stability. As a result, the asset and capital base of the home country is eroded, with negative spillover effects on investment, employment and economic growth. The debt-driven thesis emphasizes that a country experiences capital flight in order to respond to changing economic conditions largely ascribed to external debt (Boyce, 1992). The theory also posits that the accumulation of external debt that would not generate sufficient foreign exchange for repayment may have adverse consequences on the exchange rate in the long-run. The

tax depressing theory postulates that there is a significant loss of tax revenue due to capital flight predicated on the doctrine that domestic government has little or no control over wealth held abroad by domestic residents, therefore such wealth cannot be taxed. The loss of revenue due to capital flight, limits the fiscal space for government to generate revenue and implement programs for economic growth and development. Furthermore, it reduces government's debt-serving capacity, and consequently increases the debt burden and its negative spillover effect on the domestic economy.

The empirical literature has produced mixed results on the drivers of capital flight. Some researchers hold the view that real GDP growth, interest rate differential, uncertainty and exchange rate are the main determinants of capital flight (Ndikumana and Boyce, 2003; Fedderke and Liu, 2002). Others suggest that the main determinants of capital flight include high inflation, domestic tax, budget deficit and trade policies (Henry, 1996; Olopoenia, 2000; and Cuddington, 1986). Another line of literature postulates that corruption and institutional governance (including regime durability and rule of law) are the key drivers of capital flight (see Osei-Assibey et al., 2018; North, 1990).

Sierra Leone, a small open economy in West Africa, witnessed 10 years of civil conflict (1991-2000), which devastated the economic and social fabrics of the country. The country is endowed with natural resources including minerals like diamonds, gold, bauxite, and rutile; agricultural and marine resources; and considerable tourism potential. However, endowment in natural resources is considered as a recipe for theft, embezzlement, and trade misinvoicing due to the large volumes of transactions involved in the extraction and export of these resources. Discussion on capital flight within the Sierra Leone context is relevant and timely taking into consideration the positive impact that external assets kept abroad can have on the domestic economy if such assets are left in Sierra Leone. Thus, the paradox and severity on the issue of capital flight is that for a small open economy like Sierra Leone that is plagued with chronic poverty, heavy debt burden, exchange rate shortages, high inflation and sluggish economic growth, capital flight results to a greater proportion of the resources needed to leapfrog the economy and boost economic growth, create employment as well as promote broader macroeconomic stability. The country is considered as one of the poorest in the World. With a Human Development Index of 0.452 in 2019, the country is in the bottom human development category, ranked 182 out of 189 countries. During the war period, Sierra Leone experienced severe exchange rate depreciation, high inflation, large trade deficit, depletion of foreign reserves, huge budget deficit and low economic growth. However, economic activities rebounded during the post-war era as the country witnessed positive economic growth, moderate inflation and lower budget deficit. Notwithstanding the positive gains during the post-war period, the country experienced huge capital flight between 2000 and 2019. Figure 1 presents the capital flight estimates in Sierra Leone. For the period between 2000 and 2019, capital flight from Sierra Leone totaled US\$ 19,867.7 million, largely due to macroeconomic instability, coupled with the dynamics of the political landscape, endemic corruption by political elites and

Figure 1: Capital flight (US\$ Millions)

Source: Authors' computation

the experience from the civil conflict. This situation is worrisome and pose serious challenge for a small open economy like Sierra Leone, with an average yearly nominal GDP of US\$ 3,900 million. Capital flight peaked in 2012, possibly due to the robust economic growth rate (15.2%) triggered by increased iron ore production. The country also experienced reversal in capital (capital inflow) in 2006 and 2007 amounting to US\$ 1,343.4 million, due largely to relative macroeconomic stability.

Based on the ensuing discussion, the important question for policy makers and government is; why is the Sierra Leone economy experiencing significant level of capital flight, when such resources would have been used for domestic investment with a view to increase employment and boost economic growth. Against this background, the main focus of this study is to investigate the determinants of capital flight and to establish the direction of causality between capital flight and key variables in Sierra Leone, using quarterly data for the period 2000:Q1 to 2019:Q1. This paper contributes to the existing literature in diverse ways. The study combines both the autoregressive distributed lag (ARDL) model and the granger causality framework to identify the drivers of capital flight and the causal relationship between capital flight and key variables of interest. Furthermore, despite the large volume of empirical literature on the issue of capital flight and its determinants, the authors are not aware of any country specific study on Sierra Leone, whose economy has been besieged with massive capital outflows during the past two decades. Most of the studies involving Sierra Leone are based on panel data analysis with generalized inference drawn on the given set of countries (example - Ndikumana and Boyce, 2003). Thus, this study will provide a guiding framework for policymakers in formulating policies and initiatives with respect to capital flight in Sierra Leone. The rest of the paper is structured as follows: section 2 discusses the empirical literature on the determinants of capital flight, and section 3 addresses the methodology. Section presents the empirical result and discussion, while section 5 concludes the paper and suggest some policy recommendations arising from the study.

2. LITERATURE REVIEW

The empirical literature is replete with studies on the determinants of capital flight. While some researches focus on country specific

studies (Ljungwall and Zijian, 2008; Forson et al., 2017), others utilize panel data (Kant, 1996; Raheem, 2015; Nyong, 2003). Despite the large volume of empirical studies, the literature suggests that identifying the determinants of capital flight remains an unresolve issue, and the findings have produced mixed results. Using the ordinary least squares (OLS) technique, Han et al. (2012), conducts a study to investigate the determinants of capital flight in Hong Kong. The empirical evidence reveals that, over-valuation of the currency, currency account deficit, and the dummy variable representing Chinas Open Door Policy of 1979 are the key determinants of capital flight in Honk Kong. Employing similar methodology, Kipyegon (2004) investigates the drivers of capital flight in Kenya. Using time series data for the period from 1971 to 2001, the findings indicate that external borrowing, inflation, real exchange rate, real economic growth, and financial development are the main determinants of capital flight. In a related study, Aziz et al. (2014) examines the determinants of capital flight in Bangladesh for the period 1972-2013. Employing the OLS method, the result reveals that Foreign Direct Investment, external debt, and foreign reserves are the major causes of capital flight. Also, Al-Basheer et al. (2016) employs the OLS technique to investigate the causes of capital flight in Jordan for the period 2000-2013. The finding shows that external public debt, economic openness, taxes, and the lagged capital are the main determinants of capital flight in Jordan. Uddin et al. (2017) investigates the determinants of capital flight in Bangladesh spanning 1973-2013. Using the OLS technique, study confirms that, the main determinants of capital flight are foreign direct investment, external debt, interest rate differentials, foreign reserves, and current account surplus.

Utilizing a combination of the OLS and the generalized method of moments (GMM) estimation techniques, Salandy and Henry (2018) examines the determinants of capital flight in Trinidad and Tobago for the period 1971 and 2011. The empirical finding indicates the key determinants of capital flight are the lagged external debt, lagged capital flight, external debt, GDP growth, interest rate differential, and excess liquidity. Ljungwall and Zijian (2008) investigate the causes of capital flight in China, using quarterly data for the periods 1993:Q1-2003:Q4. Employing co-integration and innovation accounting techniques the result shows that external debt, real GDP growth and foreign investors' confidence are the main causes of capital flight. Nyoni (2000) employs time series data spanning 1973-1992 to identify the determinants of capital flight in Tanzania. The study confirms that lagged capital flight, real growth rates, interest rate and exchange rate differentials are the main determinants of capital flight in Tanzania.

Using panel data, Egbulonu and Bhattarai (2020) examines the determinants of capital flight in 25 sub-Saharan African countries (SSA) over the period 1986-2010. Using dynamic panel data estimation method, the findings indicate that capital flight is largely driven by corruption, lag capital flight, external debt, foreign direct investment, and macroeconomic uncertainty. In a related study, Brafu-Insaidoo and Biekpe (2014) conducted a study to examine the macroeconomic determinants of capital flight in sub-Saharan African (SSA) countries during the period 1981-2015, and using the ARDL approach. The results reveal that the main determinants of capital flight in SSA are economic

growth external debt. Furthermore, Kant (1998) carried out a study to investigate relationship between FDI and capital flight in developing countries, using time series data from 1974 to 1992. The study finds a negative relationship between FDI and capital flight in developing countries. The find also shows that, mismanagement by the government leads to capital flight. Furthermore, Antzoulatos and Sampaniotis (2002) examines the determinants of capital flight in 17 Eastern Europe countries, using quarterly data from 1993 to 1999. Their result reveals a positive relationship between FDI and capital flight. Cuddington (1986) employs time series analysis from 1974 to 1984 to examine the relationship between capital flight and key macroeconomic variables Latin American countries. The findings show that interest rate differentials, external debt flows, lagged capital flight, inflation and exchange rates are the main determinants of capital flight. Ndikumana and Boyce (2003) investigate the determinants of capital flight for 30 sub-Saharan African countries, including 24 countries classified as severely indebted low-income countries, using data covering the period from 1970 to 1996. Their findings show that external borrowing has a positive impact on capital flight. It also reveals that capital flight exhibits a high degree of persistent. Al-Fayoumi et al. (2012) examines the determinants of capital flight in seven Middle East and North Africa (MENA) countries for the period 1981 to 2008. Utilizing the OLS, Fixed effects, Random Effects, and Seemingly Unrelated Regression Models, the findings reveal that lag capital flight, external debt, foreign direct investment, real GDP growth rate and uncertainty are the main determinants of capital flight. Osei-Assibey et al. (2018) investigates the effect of corruption and institutional governance indicators on capital flight for 32 countries in Sub-Saharan Africa over the period 2000-2012. Using the Generalized Method of Moment and Fixed Effect Regression within the portfolio choice framework, the findings reveal that corruption, regime durability and rule of law are the main variables that influence capital flights in SSA.

Employing the ARDL model, Forson et al (2017) investigates the long-run and short-run determinants of capital flight in Ghana for the period 1986-2015. Their findings show that higher domestic real interest rate in relation to foreign interest rate, good governance, financial development, real GDP growth rate, and strong property right, and ratio of external debt to GDP are the main determinants of capital flight in Ghana. Using similar methodology, Liew et al. (2016) investigates the macroeconomic determinants of capital flight in Malaysia. Employing time series data spanning the period 1980-2010, within the ARDL framework, the findings show that political risk and financial crisis positively influence capital flight in the long-run. In a similar context, using annual data for Malaysia for the period 1992 and 2012, Auzairy et al. (2017) investigates the dynamic relationship between capital flight and macroeconomic fundamentals in Malaysia between 1992 and 2012. Utilizing co-integration and vector autoregression methods of estimation, the study noted that consumer price index (CPI), GDP, interest rate and exchange rate constitute the macroeconomic fundamentals determining capital flight. Alam and Quazi (2003) investigate the determinants of capital flight in Bangladesh using time series data from 1973 to 1999. The study employs the ARDL bound testing framework. The findings reveal

that political instability is the most significant variable influencing capital flight.

3. METHODOLOGY

To investigate the determinants of capital flight in post-war Sierra Leone, the study utilizes the autoregressive distributed lag (ARDL) estimation technique. Also, the study employs the granger causality test to establish the direction of causality between capital flight and key variables. The model specification is largely informed by review of the empirical literature and theoretical foundation on capital flight. The model specified in this paper is akin to the empirical work of Obeng (2017). However, a key variant of this current model is the inclusion of corruption and inflation as determinants of capital flight. The choice for including inflation is based on the fact that, the Sierra Leone economy is typified with high inflationary pressure, with inflation rate in double digit. The literature suggests that higher level of inflation reflects macroeconomic instability which can create investment risks, as well as risks for holding domestic financial assets (Dooley, 1988). Furthermore, the government can use the level of inflation to gauge how much to tax domestic assets (Harrigan et al., 2002). Also, corruption is included as an explanatory variable on account of the endemic corruption that continues to besiege the Sierra Leone economy during the post-war era. Empirical evidence suggests that corruption reduces investment quality, which creates uncertainty and insecurity (Tanzi and Davoodi, 1997). Besides, corruption-driven funds normally move out of a country in fear that the corrupt government will be unable to provide a conducive investment climate (Osei-Assibey et al., 2018).

Thus, the model is specified in the form of a multiple linear regression form as follows:

$$CF_t = \beta_0 + \beta_1 INF_t + \beta_2 ER_t + \beta_3 CORR_t + \beta_4 ED_t + \beta_5 FD_t + \beta_6 RGDP_t + \varepsilon_t \quad (1)$$

Where: *CF* is capital flight, *INF* is inflation rate, *ER* is real effective exchange rate, *CORR* is corruption index, *ED* is external debt expressed as a percent of GDP, *FD* is financial development defined by broad money as a percent of GDP, and *RGDP* is real GDP growth rate. Also, β_i with $i=0\dots6$ represent parameters to be estimated and ε is the error term, that is identically and independently distributed with zero mean and constant variance. Capital flight, external debt and financial deepening are expressed in natural logs, whilst all other variables are expressed in levels.

Furthermore, this study uses the broad measure approach (indirect approach) to measure capital flight. The advantages of the broad measure approach over the Hot Money measure, is based on the fact that broad money measure covers a wide range of transactions; can be treated as a measure of resident capital outflows; it reduces the potential biases; and does not include in its computation elements that might not include in capital flight (Schneider, 2003; Osei-Assibey et al., 2018; Ndikumana and Boyce, 2018). The broad-based method used in this study to calculate capital flight is given as follows:

$$CF_t = \Delta DEBT_t + FDI_t + OI_t - (CA_t + NR_t) \quad (2)$$

Where: $\Delta DEBT$ is change in debt stock, FDI is Net foreign direct investment, OI is Other Investments, CA is current account and NR is net additions to reserves.

In terms of the estimation technique, the autoregressive distributed lag (ARDL) estimation framework is used in this study in order to estimate the capital flight model for the Sierra Leone economy. This approach has the advantage of performing better and being more robust for small sample data size, hence, suitable for this study. Also, the ARDL has the advantage of allowing variable relationships to be tested even when the variables are of $I(1)$ or $I(0)$ (Pesaran et al., 2001). Its popularity can be traced to the fact that a cointegration of non-stationary variables is equal to an error correction process. To proceed with the ARDL estimation framework, this study specified an unrestricted ARDL model for capital flight by transforming equation (1) as follows:

$$\begin{aligned} \Delta CF_t = & \delta_0 + \sum_{i=0}^q \gamma_{1it} \Delta INF_{t-i} + \sum_{i=0}^q \gamma_{2it} \Delta ER_{t-i} \\ & + \sum_{i=0}^q \gamma_{3it} \Delta CORR_{t-i} + \sum_{i=0}^q \gamma_{4it} \Delta ED_{t-i} + \sum_{i=0}^q \gamma_{5it} \Delta FD_{t-i} \\ & + \sum_{i=0}^q \gamma_{6it} RGDP_{t-i} + \beta_1 INF_{t-1} + \beta_2 ER_{t-1} + \beta_3 CORR_{t-1} \\ & + \beta_4 ED_{t-1} + \beta_5 FD_{t-1} + \beta_6 RGDP_{t-1} + \varepsilon_t \end{aligned} \quad (3)$$

Where q represents the maximum lag of the independent variables; Δ denotes the first difference operator; and $t-1$ is the level lag. The long-run relationship is captured by the β_i 's, $i=1 \dots 6$, reflecting the long-run coefficients in the model, while the remaining component reflects the short-run dynamics of the model.

Following the specification of equation (3), the study proceeds to test for cointegration premised on the ARDL bound testing technique. A pre-condition for conducting the cointegration test is to establish the optimal lag length using the SBC, AIC, and the H-Q statistics. Testing for cointegration is predicated on setting up of the null and alternative hypothesis. The null hypothesis assumes there is no cointegration, which involves subjecting the coefficients of the long-run variables to zero. The alternative hypothesis asserts the existence of cointegration on grounds that the long run coefficients are not equal to zero. The null and alternative hypotheses are given as follows:

$$H_0 = \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = 0 \quad (\text{No cointegration})$$

$$H_0 \neq \alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq \alpha_6 \neq 0 \quad (\text{Cointegration})$$

The literature on the ARDL cointegration framework gives two asymptotic critical values; the lower bound values- suggests that the variables are stationary hence integrated of order zero, and the upper bound values- assumes that the variables non-stationary, therefore integrated of order one. Thus, in a situation where the computed F-statistic is larger than the upper critical value, we

accept the alternative hypothesis that there is cointegration, thereby rejecting the null hypothesis. However, in a situation that the computed F-statistic is below the lower critical value, we accept the null hypothesis and conclude there is no cointegration.

Given that the study establishes the existence of cointegration, we then proceed to estimate a restricted short-run ARDL error correction model of the form specified as follows:

$$\begin{aligned} \Delta CF_t = & \delta_0 + \sum_{i=0}^q \gamma_{1it} \Delta INF_{t-i} + \sum_{i=0}^q \gamma_{2it} \Delta ER_{t-i} + \sum_{i=0}^q \gamma_{3it} \Delta CORR \\ & + \sum_{i=0}^q \gamma_{4it} \Delta ED_{t-i} + \sum_{i=0}^q \gamma_{5it} \Delta FD_{t-i} + \sum_{i=0}^q \gamma_{6it} \Delta RGDP_{t-i} + \delta ECT_{t-1} + \varepsilon_t \end{aligned} \quad (4)$$

In Equation 4, all the variables are in first difference, which illustrate the short run scenario. Furthermore, the short run model includes the error correction term (ECT) and the coefficient of the ECT, δ is the speed of adjustment, which indicates the direction of change to the long run equilibrium.

The study also employs the granger causality framework to test for any bivariate linear causality between capital flight and key variables. The literature suggests that granger causality is a probabilistic method that is used to investigate causality between two variables in a model. The method clearly and unambiguously measures the causal effect of stationary multivariate autoregressive. In line with Granger (1969), a bivariate autoregressive model is defined as;

$$CF_t = \sum_{j=1}^s a_j CF_{t-j} + \sum_{j=1}^s b_j X_{t-j} + e_t \quad (5)$$

$$X_{i,t} = \sum_{j=1}^s c_j CF_{t-j} + \sum_{j=1}^s d_j X_{t-j} + \varepsilon_t \quad (6)$$

Where: e_t and ε_t are assumed to be two uncorrelated white-noise series. In equation (5) and (6), s is the maximum number of lagged observations in the model and X represents any explanatory variable that is tested against CF. By the definition of causality shown in equation (5) and (6), X is causing CF if b_j is not equal to zero. Similarly, CF is causing X if c_j is not equal to zero. However, if both events occur, then a feedback relationship is said to exist between CF and X (Granger, 1969). This test is conducted through the use of the F -test. Thus, the granger causality tests in equations (5) and (6) are used to establish the causal relationship between capital flight and its determinants.

The study utilizes quarterly data spanning the period 2000:Q1-2019:Q1. Whilst capital flight, external debt and financial deepening are expressed in natural logs, all other variables are expressed in levels. Data for the study were sourced from the United Nations Conference on Trade and Development (UNCTAD), International Financial Statistics (IMF) and the Balance of Payment and International Investment Position Statistics (BOP/IIP), and World Bank's World Development

Indicators (WDI), World Governance Indicators (WGI) and International Debt Statistics (IDS).

4. EMPIRICAL RESULTS AND DISCUSSIONS

4.1. Unit Root Test

All the variables were subjected to unit root test to ascertain the stationarity of the individual time series, using both the Augmented-Dickey Fuller (ADF) and Philip-Perron (PP) test. The results as presented in Table 1 reveal that all the variables are non-stationary in levels, except capital flight and real effective exchange rate which are stationary in levels. However, when the variables are difference once and subjected to unit root test, the result indicate that all the variables became stationary in first difference. The conclusion of the unit root result shows that, while capital flight and real effective exchange rate are integrated of order zero, i.e. $I(0)$, all other variables are integrated of order one, i.e., $I(1)$. The combination of both $I(0)$ and $I(1)$ series provide a strong justification for the application of the ARDL bound testing technique.

4.2. The ARDL Bounds Test for Cointegration

The study employs the ARDL bound test to ascertain the existence of cointegration, that is, whether there is a long run relationship (Nkoro and Uko, 2016). To proceed with the bound test, we specified the null hypothesis of no cointegration, against the alternative hypothesis of cointegration. The rule of thumb is that, if the F-statistics is greater than the 1% and 5% upper limit, we accept the alternative hypothesis and conclude the existence of cointegration. Results from the ARDL bounds test for cointegration is reported in Table 2. The outcome from the table confirms that, the F-Statistics value of 6.14 is above the upper-bound at the 1%, 5% and 10% significance level, respectively. The result therefore establishes the existence of cointegration, hence there is a long-run relationship between the variables of interest.

4.3. The Long-run ARDL Model

The study proceeded to estimating the long-run ARDL model having determined the existence of a long-run relationship. The results are presented in Table 3. The result reveals that real effective exchange rate, corruption and external debt are the main determinants of capital flight in Sierra Leone. The result confirms a positive relationship between real effective exchange rate and capital flight. The result shows that a unit increase in exchange rate will increase capital flight by 0.05%. Intuitively,

an increase in real effective exchange rate indicates a loss in trade competitiveness as a consequence of an appreciation. This tends to increase the country's vulnerability to financial crisis, as well as worsening the current account, thus increasing the risk of capital flight (Pettinger, 2019). This result is consistent with the empirical findings by Harrigan et al. (2002). Therefore, the study concludes that higher real effective exchange rate is likely to induce capital flight from Sierra Leone.

Furthermore, the result reveals a positive relationship between corruption and capital flight. Thus, if corruption increase by one unit, capital flight will increase by 0.17%. The literature posits that corruption creates business insecurity and uncertainty, which therefore leads to capital flight. Also, corruption-driven funds normally move out of a country in fear that the corrupt government will be unable to provide a conducive investment climate. The findings concur with empirical work of Osei-Assibey et al. (2018) and Tanzi and Davoodi (1997).

The empirical result also confirms a positive relationship between external debt and capital flight in Sierra Leone. The result shows that a one percentage point increase in external debt will cause capital flight to increase by 0.39%. This finding is consistent with the empirical work of Makochekanwa (2007). Generally, rising external debts creates expectation about the depreciation of the exchange rate and for taxation increase, thus, stimulating capital flight (Harrigan et al., 2002; Kipyegon, 2014).

4.4. Short-run ARDL Model

The ARDL short-run result is presented in Table 4. From the result, the speed of adjustment term was negative and highly significant which further reinforces the existence of a long-run relation among the variables. The result shows that any disequilibrium in the model is corrected at the 26% adjustment speed annually. The result presupposes a slow speed of adjustment. The results reveal that the lagged capital flight, corruption, external debt and financial deepening are the short-run determinants of capital flight in Sierra Leone. In the short-run, the lagged capital flight was found to have a positive impact on capital flight. The results show that for a one percentage point increase in the lagged capital flight, capital flight will increase by 0.53%. This suggests that the previous year's capital flight can influence positively on current year's capital flight.

Furthermore, the short run result confirms a positive relationship between corruption and capital flight, consistent with the long run findings. Thus, a one unit increase in the level of corruption

Table 1: Unit root test results

Variable	Augmented Dickey-Fuller		Philips-Peron		Order of integration
	Level	First difference	Level	First difference	
Capital flight	-3.032**	-	-2.983**	-	I (0)
Inflation	-2.536	-4.870**	-2.582	-5.934*	I (1)
Real effective exchange Rate	-3.318**	-	3.047**	-	I (0)
Corruption	-0.462	-3.330**	-0.858	-3.649**	I (1)
External Debt	-2.059	-2.919**	-2.253	-3.054**	I (1)
Financial deepening	-1.750	-3.168**	-0.804	-3.297**	I (1)
Real GDP	-1.902	-3.309**	-1.357	-3.494**	I (1)

* and ** indicate significance at 1% and 5% levels, respectively

would increase capital flight by 0.06% in the short-run. The finding is consistent with the work of Osei-Assibey et al. (2018). Also, external debt was found to have a positive effect on capital flight in the short-run, a result similar to the long run finding. The results show that a one percentage point increase in external debt will cause capital flight to increase by 0.61%. The finding is in line with the empirical result of Salandy and Henry (2018) and Anetor (2019). The result also confirms a negative relationship between financial deepening and capital flight with significant coefficient in the short run. The findings indicate that a one percentage point increase in financial deepening decrease capital flight by 0.13%. A result that corroborates with the findings by Raheem (2015). Intuitively the literature posits that with a well-developed financial system, the transaction and information cost of economic activity will be lower. As such, investors are encouraged to invest in the domestic economy thereby reducing capital flight. The diagnostic result posits that 75% of the variations in capital flight were explained by the explanatory variables. Also, the Durbin Watson value (2.04) indicates the absence of any first-order serial correlation.

4.5. Stability Test

The study carried out the stability test to ensure the stability of the parameters using both the cumulative sum (CUSUM) and the cumulative sum of square (CUSUMSQ). As reported in Figures 2 and 3, the results indicate that, the coefficients are stable, given that the CUSUM and CUSUMSQ lie within the critical band.

4.6. Granger Causality Test

The granger causality test results are shown in Table 5. Critical analysis of the result indicate that only external debt and capital

flight exhibits a bi-directional causality. However, both inflation and exchange rate demonstrate uni-directional causality, given that both variables granger cause capital flight, with no feedback effect. Therefore, in this study causality was not observed for corruption, financial deepening and real GDP against capital flight.

Table 2: ARDL bounds test result

Test Statistics	Value	Significance	I (0)	I (1)
F-statistic	6.135			
K	4	1%	3.29	4.37
		5%	2.56	3.49
		10%	2.2	3.09

Asymptotic: n=1000. Source: Authors' computation using Eviews 11

Table 3: ARDL long-run result

Variable	Coefficient	Std. Error	P-value
ER	0.047	0.009	0.002
INF	-1.032	0.974	0.197
CORR	0.173	0.058	0.028
ED	0.391	0.103	0.001
FD	-0.205	0.185	0.268
RGDP	-0.213	0.185	0.127
Constant	10.321	4.973	0.041

Source: Authors' computation using Eviews 11

Table 4: Short run ARDL (2, 0, 0,1, 1, 1,0)

Variable	Coefficient	Std. Error (Robust)	P-value
D (lnCF_1)	0.527	0.169	0.002
D (CORR)	0.064	0.019	0.001
D (lnED)	0.605	0.238	0.032
D (lnFD)	-0.134	0.042	0.000
ECT(-1)	-0.261	0.041	0.000
R-squared	0.751		
Adjusted R-squared	0.724		
Durbin watson statistic	2.043		

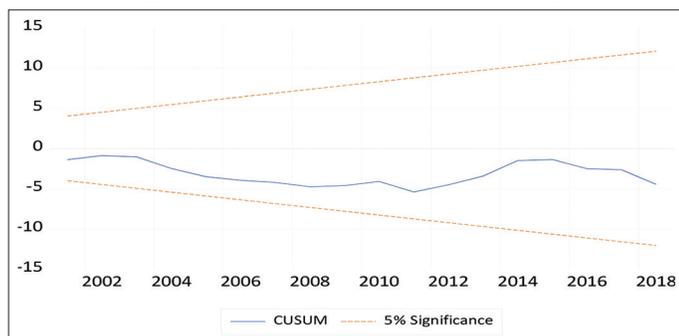
Source: Authors' computation using Eviews 11

Table 5: Granger causality results

Null hypothesis	Obs	F-Statistic	Prob.
Inflation does not granger cause capital flight	75	3.300	0.047
Capital Flight does not granger cause inflation	75	0.315	0.731
Real effective exchange rate does not granger cause capital flight	75	2.731	0.051
Capital flight does not granger cause real effective exchange rate	75	1.104	0.337
Corruption does not granger cause capital flight	75	2.163	0.123
Capital flight does not granger cause corruption	75	0.295	0.745
External Debt does not granger cause capital flight	75	2.593	0.082
Capital flight does not granger cause external debt	75	4.954	0.010
Financial deepening does not granger cause capital flight	75	2.042	0.138
Capital flight does not granger cause financial deepening	75	0.520	0.597
Real GDP does not granger cause capital flight	75	1.578	0.214
Capital flight does not granger cause real GDP	75	0.370	0.692

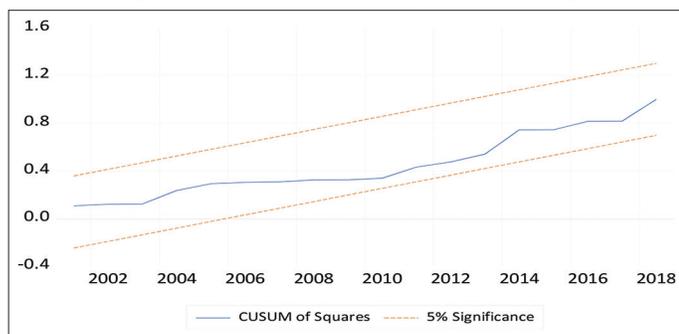
Source: Authors' compilation using Eviews 11

Figure 2: Result of CUSUM Test for stability



Source: eviews 11 output

Figure 3: Result of CUSUMSQ test for stability



5. CONCLUSION

The objective of this paper was to investigate the determinants of capital flight and establish the direction of causality between capital flight and its determinants in Sierra Leone. The ARDL estimation technique and granger causality framework were employed, with quarterly data for the period 2000:Q1-2019:Q1. The result from the bound test confirmed the existence of cointegration. The long run results showed that real effective exchange rate, corruption and external debt were the main determinants of capital flight in Sierra Leone during the study period. Specifically, the finding showed that real effective exchange rate, high level of corruption and accumulation of external debt increase capital flight. Furthermore, the findings revealed that lagged capital flight, corruption, external debt and financial deepening were the main drivers of capital flight in the short run. Whilst lagged capital flight, corruption and external debt accumulation cause capital flight, the result revealed that a well-developed financial system reduces capital flight. The result also showed that any disequilibrium in the model is corrected at the 26% adjustment speed annually. Also, the findings confirmed that the coefficients are stable, given that the CUSUM and CUSUMSQ lie within the critical band. Results from the granger causality test indicated that only external debt and capital flight exhibits a bi-directional causality. However, both inflation and exchange rate demonstrate uni-directional causality, given that both variables granger cause capital flight, with no feedback effect.

In line with the findings of the study, it is recommended that the Government should strengthen the Anti-corruption Commission and the judiciary with a view to intensify the fight against corruption, ensure transparency and accountability in order to reduce capital flight. Furthermore, government should reduce the level of external borrowing in order to avoid creating uncertainty and by extension capital flight. Rather government should focus more on domestic revenue mobilization and domestic borrowing for investment. Also, government should put in place modalities to ensure strict capital controls, deepen the financial market and maintain broad macroeconomic stability as recipe to reduce capital flight.

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