

**DETERMINANTS OF PRIVATE SAVINGS IN THE COMMERCIAL  
BANKING SECTOR OF LIBERIA**

**BY**

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## DECLARATION


This research project is my original work and has not been submitted for an award of degree at any other university/ institution of Learning.

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## **DEDICATION**

I dedicate this project to my family and friends who have supported me throughout my studies. I would personally thank my son, Eriato B. Gbah, for the moral supports accorded me during the entire time of study.

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## LIST OF ABBREVIATIONS

<b>ABLL</b>	Access Bank Liberia Limited
<b>AFBLL</b>	Afriland First Bank Liberia Limited
<b>ADF</b>	Augmented Dickery Fuller
<b>ATM</b>	Automatic Teller Machines
<b>BoG</b>	Bank of Ghana
<b>CBL</b>	Central Bank of Liberia
<b>CBL</b>	Central Bank of Liberia
<b>CB</b>	Current Budget
<b>CPI</b>	Consumer Price Index
<b>EBLL</b>	EcoBank Liberia Limited
<b>ECM</b>	Error Correction Method
<b>FIA</b>	Financial Institution Act
<b>FDI</b>	Foreign Direct Investment
<b>GBLL</b>	Global Bank Liberia Limited
<b>GDP</b>	Gross Domestic Product
<b>GMM</b>	Generalized Method Moments
<b>GNBLL</b>	Group Nduom Bank Liberia Limited
<b>GTBLL</b>	Guaranty Trust Bank Liberia
<b>IBLL</b>	International Bank of Liberia Limited
<b>IDC</b>	Industrialized Countries
<b>IMF</b>	International Monetary Fund
<b>LBDI</b>	Liberia Bank for Development and Investment
<b>LCH</b>	Life Cycle Hypothesis
<b>LDC</b>	Least Developed Countries



<b>MDI</b>	Deposit-taking Microfinance Institution
<b>MFI</b>	Microfinance Institution
<b>NBFI</b>	Non-Bank Financial Institutions
<b>NBCI</b>	The Non-Bank Credit Institution
<b>NFIS</b>	National Financial Inclusion Strategy
<b>OLS</b>	Ordinary Least Square
<b>PIH</b>	Permanent Income Hypothesis
<b>RCFIs</b>	Rural Community Financial Institutions
<b>SIBLL</b>	Sapelle International Bank Liberia Limited
<b>SME</b>	Small Medium Enterprise
<b>SPSS</b>	Statistical Package for Social Science
<b>SSA</b>	Sub-Sahara Africa
<b>UBALL</b>	United Bank of Liberia Limited
<b>VSLA</b>	Village Saving and Loan Association
<b>WB</b>	World Bank

## ABSTRACT

Liberia is a developing nations with a challenging savings rates that have persisted for decades. Gross savings as a percent of GDP was -39.11% as of 2019 (The World Development Indicator, 2021). The rate of saving in Liberia for 2016 was 2.027% per annum (pa) from a 2.002% pa in 2015 (CEIC, 2021). The commercial banking sector in Liberia has been confronted for years endeavouring to mobilize savings deposits. The major objective of the study was to investigate factors that determine private savings in the commercial banking sector of Liberia spanning from 2010- 2020. Private saving is money set aside by businesses (non-financial and financial institutions) and households in the private sector. It is a total household plus business savings. Private savings determinants considered in the study include Deposit Interest Rate, Age Dependency Ratio, Gross Domestic Product, Inflation Rate, Population Density, and Private Sector Credit. The study employed both correlation and regression analysis to analyze an Ordinary Least Squares model. Secondary quarterly time-series data spanning 41 quarters obtained from the Central Bank of Liberia and the World Development Indicators were used for the study. Several related diagnostic tests including normality, autocorrelation, and heteroscedasticity tests were done to ascertain robust estimates. Findings indicate that Private Savings over the period remained positive but at a low growth pace. The Deposit Rate, Inflation, GDP, and Private Sector Credit are four variables that negatively affect private savings in Liberia. It was established that high rates of these variables would decrease the rate of private savings. The Age Dependency Ratio and the Population Density both were positively associated with private savings. The results are essential for policies and strategies formulation that are targeted towards increasing private savings in the commercial banking sector of Liberia.



## CHAPTER ONE: INTRODUCTON

### 1.1 Study Background

The significance of private savings to economic growth is a well-researched topic in the academic and political world (Ribaj & Mexhuani, 2021). Not only does savings play an important part in the revenue generating efforts of governments, but achieving and maintaining a high rate of private savings provide the needed resources necessary to achieve private sector growth which ensures fiscal independence, sustained growth and eventually social welfare (Athukorala & Sen, 2004). Nevertheless, in many developing nations, the quest to realize sustainable growing private savings rate has been proven quite challenging despite the adoption of sound macroeconomic and financial liberalization policies (Athukorala & Sen, 2004). In the context of this study, Private Savings constitute household and business savings. The private savings deposit is the main variable understudy which depends on the outcomes of the predictor variables this study intends to investigate. The role of commercial banks is vital in developing countries' economy as they provide support to individuals, and organizations to meet their ever growing credit needs.

The private saving determinants such as the deposit interest rate has empirically proven to ignite the willingness of the private sector to reduce cash holding by saving (Nishat & Bilgrami, 1989). The study's theoretical approach was on the basis of Friedman (1957) Permanent Income Hypothesis (PIH), Modigliani and Brumberg's (1954) Life Cycle Hypothesis (LCH), and Deaton (1992) and Christopher's (1991) Buffer-stock theory. These hypothesis support private savings mobilization efforts as their findings are empirically well studied. The value of a lifetime annuity of income and wealth is known as permanent income. A permanent income is not seen as expected lifetime earnings but regarded by the consumer unit as a mean income at any age because of its

prospects. Altonji and Villanueva (2007) and Dynan et al. (2004) study of the permanent income and private savings empirically established that saving rate increase with permanent income. The Life Cycle Hypothesis of Modigliani and Brumberg (1954) asserts that a person is a "net borrower" in their early years and a "saver" in their later years to pay debts and put money aside for retirement in the middle years of life, and a "dissaver" in the later years of life. An average saver will hold much of their portfolio in fixed nominal valued assets which might experience a negative real return on their assets during inflation. The Buffer-stock theory by Deaton (1991) and Christopher (1992) emerges out of the consumers' significant income uncertainty that is sufficiently impatient.

Liberia has a cash based economy that used both Liberian dollar and the US dollar as legal tender to carry out transactions which put Liberia categorically as a dollarized economy. The population with access to an account or electronic payment instrument is trivial causing most transactions to be done with direct cash payments. The dollarized nature of the economy may have had its own impact on private saving mobilization. The economy is majorly informal as evidenced by the broad usage of cash for transaction purposes. There exists limited access to the formal financial sector that may account for individuals as well as businesses from having access to traditional or formal savings, or having access to credit. Of the nine commercial banks, only four have Automatic Teller Machines (ATMs). There was no ATM machine for any deposit taking Microfinance Institutions (MFIs). Notable, MFI from the banking side without an ATM machine was Access Bank Liberia (FIB, 2013) and (CBL NFIS, 2020). Kenya for example had 2,401 Automated Teller Machines (ATM) in operation throughout the country compared to 117 ATM machines total for Liberia according to Liberia's payment system data as from 2016-2018 (Faria, 2021) and (CBL, 2018). The situation

impeded the prospect of interoperability of the financial system and also may have contributed to dissaving. Prevalent in the sector was commercial banks' branches concentrated in the main capital city that host one quarter of the population. As with most African countries, Liberia's mobile money locations made up 93 percent of access points, MFI 0.2 percent, bank branches 1 percent, and Point-of-sale (POS) accounted for 4 percent (CBL NFIS, 2020). Many empirical studies have been done to determine private savings in other countries but no such literature was available for Liberia.

### **1.1.1 Determinants of Private Savings**

Most household savings are carried out by bank deposits. Savings, according to Keynes (1936), is "extra income over consumption expenditure." The determinant of an individual's saving behaviour is majorly by preferences. The non-standard and "behavioural factors" are noteworthy descriptions for the difference nexus to savings or dissaving across individuals (Bernheim et al, 2000; Madrian & Shea, 2001).

The private savings determinants like the deposit Interest rates predicted that saving rates increased with the disposal income growth rate and the bank's deposits real interest rate. Haron and Wan-Azmi (2006) discovered that profit rates, deposit interest rates, base lending rates, money supply, consumer price index (CPI), and gross domestic product (GDP) all have a major impact on deposits in the Malaysian economy when a study of deposit rates was conducted. Also, GDP per capita/Income Growth predicts that younger age groups have higher lifetime incomes and savings than older age groups. The countries with faster GDP growth and, more importantly, quicker per capita growth will have greater savings ratios than those with slower growth (Edwards, 1996; Dayal-Ghulati & Thimann, 1997; Loayza et al, 1999 & Metin-Ozcan & Ozcan, 2000).

Population density or population demographic distribution has an impact on saving behaviour. The elderly and young tend to save less, but the working population is seen saving to pay off debt and save for retirement. Dependency ratio as propounded by the life cycle theory predicts that when dependency ratio rises, saving rate falls. The private sector credit predicted that the banking sector in other region are faced with the same sovereign barriers as domestic banks lend to sovereigns whose revenues are vulnerable to uncertain outcomes in oil prices (Besso & Feubi, 2016; Omolade et al, 2019; Assoumou-Ella, 2019).

Private saving is the total of household plus business savings. The life-cycle hypothesis proposes that saving behaviour is linked to various schooling stages, greater earnings, and retirement (Modigliani & Brumberg, 1954; Modigliani & Ando, 1957). Aggregate saving is raised by a higher growth rate because higher rate of growth increased the working population's total income in comparison to non-labour income earning population. The study by Modigliani (1970) on high growth countries with high saving rates like Japan or Korea found that there exists a positive correlation of saving to income growth. Private saving is defined as money set aside by businesses (non-financial and financial institutions) and households in the private sector.

Private savings is a well-researched topic in finance with several empirical literatures available from countries around the world. Despite the enormous available literature on saving behaviour, many unresolved empirical issues like the real interest rate effect, income per capita and demographic factors on private saving are prevalent. Aghevli et al (1990) and Deaton (1992) studied the link between growth and saving, as well as the extent to which private savings counters savings and investment movements. The

evidence from the time series estimation found that demography affects private saving in Japan and with no effect in the United States as cross-sectional assessments generated large effects (Horioka, 1993; Carroll & Summers, 1991; Modigliani, 1970 & Graham, 1987).

As with the theoretical uncertainty, actual study has yielded mixed outcomes. Data on savings for industrial countries based on each country time-series estimation found a positive correlation on the rate of interest while a cross-country calculation, however, found a negative coefficient (Bosworth, 1993). Giovannini (1985) made the conclusion that the real interest elasticity is zero in most cases for developing countries, while there exists no clear effect on saving as found in the study by Schmidt-Hebbel et al (1992). A study done by Ogaki et al. (1995) discovered that interest rates are affected positively though differs with income marginally.

These variables have been operationalized by other researchers like Gambacorta (2008) that established a higher GDP per capita income/income growth increasing deposits supply which led to deposit interest rate decreased. The increment in real income contributed to economic growth, which may have a beneficial impact on the demand for loans among bank clients. This might trigger the loan rate increase and an increase in the demand for deposits at the bank; similarly, a negative relationship on the rates of deposit and GDP growth (Peristiani, 1998). The interest rate earned on deposits' accounts held by depositors at a bank or savings institution is called deposit interest rate. The various types of deposits accounts are savings, interest-bearing checking, and certificate of deposits (Lake & Foreman, 2020). Haron et al (2006) found interest rates and other variables to impact deposits significantly. Real GDP and inflation negatively



influenced by deposits Interest rate. Wachtel (1974) empirical study found that time deposit and savings account interest rates were all favourably related to the market rate, inflation rate, and its volatility, whereas the concentration index and economic growth were inversely related.

### **1.1.2 Savings and Private Savings**

Savings, according to Keynes (1936), is the surplus of income over spending. The determinant of an individual's saving behaviour is majorly by preferences. Private Savings are household and business savings. The rate of saving and growth had a bi-directional and positive relationship. Inflation affects growth negatively but positively affected the rate of saving. Inflation was largely determined by its past values though it doesn't affect growth as the rate of saving was not affected by interest rate (Chaturvedi et al., 2009).

The non-standard and "behavioural factors" are noteworthy descriptions for the difference between nexus savings or dissaving across individuals (Bernheim et al., 2000; Madrian & Shea, 2001). Saving effect on inflation both in theory and in practice have some ambiguity (Heer & Suessmuth, 2006; Deaton & Paxson, 1993). The empirical data on the inflation-growth relationship is inconsistent, with some studies indicating that inflation has no influence on GDP (Chari et al, 1996), while others discovered Inflation to have a significant negative influence on economic growth (Chopra, 1988; Fischer, 1993; Gylfason and Herbertsson, 2001). The study by Dholakia (1995) and Mallik and Chowdhury (2001) discovered evidence of inflation having a positive influence on growth. This calls for further investigation in the Liberian context.

There are other studies that have measured savings by looking at average monthly net deposits and deposit frequency at banks as they relied on the outcomes of the predictor

variables as indicated above. The disparities in per capita income in emerging nations could explain the large variety of saving rates. Increasing savings rates may result from higher per capita income. The extent of this benefit may decrease as it may even be harmful for rich countries with limited investment and growth alternatives as per capita wealth rises (Masson, et al, 1998). Ogaki et al (1995) study showed that the potential for saving to be significant and as small at subsistence levels as it is almost a conventional fact as the development process involves low rates of saving initially and followed by a high growth period accompanied by high saving rates.

### **1.1.3 Household and Business Savings and its Determinants**

The study by Buiter (1991) indicated the two most important factors that influence economic growth to be the efficiency of saving behaviour which accumulated finances were invested. The empirical confirmation indicated that economic growth rate required satisfactory sufficient rate of investment and adequate savings supply (Prinsloo, 1994). The guarantee of security is saving as investment assures rising incomes or growth through productivity, which created the inevitability of saving and investment for a given economy to ensure the future is secured (Cole, 2016). A low rate of saving limited investment in an economy and makes the economy reliant on foreign capital inflow that is usually used to respond to Changes in the earning potential of people in different countries for high investment and economic growth (Tunc & Yavas, 2017).

The study dependent variable was private saving and it includes banks' saving deposits, term/fixed deposits, and demand deposits while the independent variables were GDP per capita income/income growth, deposit interest rate, dependency ratio by age, population density, private sector credit, and inflation rate as predictors of private saving in the commercial banking sector.

#### **1.1.4 Commercial Banking Sector of Liberia**

The banking industry has been through significant changes to meet profit targets since Liberia's civil war ended. The operations of commercial banks have grown steadily as their number increased from three banks to nine between 2004 and 2016. Total commercial bank branches across the country was 81 at 2018 (CBL NFIS, 2020). There were nine commercial banks with microfinance departments at the commercial banks level. There were eight (8) foreign commercial banks in the Liberia's commercial banking sector out of the nine (9) banks with the only domestic bank being the Liberia Bank for Development and Investment (CBL, 2020). The following are the nine commercial banks: The Liberia Bank for Development and Investment (LBDI), Access Bank Liberia-The Microfinance Bank (ABLL), United Bank of Africa Liberia Limited (UBALL), EcoBank Liberia Limited (EBLL), AfriLand First Bank Liberia Limited (AFBLL), Guarantee Trust Bank Liberia Limited (GTBLL), International Bank Liberia Limited (IBLL), Global Bank Liberia Limited (GBLL) and Groupe Nduom Bank Liberia Limited (GNBLL) now renamed as the Sapelle International Bank Liberia Limited (SIBLL) (CBL, 2020). The operation of most commercial banks was generally private with Afriland First Bank concentrated on agricultural financing and Access Bank on microfinance/SME lending, (CBL NFIS, 2020).

The country had about 35.7 percent of its population who have a bank account or a mobile money provider account compared to 18.8 percent in 2011 (Findex report, 2017). Prior to the introduction of mobile money, the country had 13 percent account ownership relative to other countries in the Sub-Saharan Africa (SSA) that average 42.6 percent with comparator countries like Ghana and Nigeria with 57.7 percent and 39.7 percent respectively (CBL NFIS, 2020). About 21.6 percent of the country's population

had accounts at financial institutions in 2017 which justified a 2.8 percentage point increment from 2011. Digital payments accounted for 27.6 percent of transactions using mobile money services. The mobile money services available in all the fifteen counties of the country (Global Findex report, 2017).

The country's history of 14 years of civil conflict may have weakened efforts to mobilize private savings in the commercial banks as the economy was either shut down entirely or partially in parts of the country during the heat of the war. The saving rate at 35.7 percent might seem like progress considering the conflict periods but more seemed required to breach the gap comparative to the sub regional performance. Saving Account holders were between the ages of 15 years and older. Most of the commercial banks' branches were limited outside of the main capital. There were non-bank financial institutions (mostly weak) that provided financial services in the rural counties majorly due to bad roads network, lack of electricity, communication and increasing operational costs (CBL NFIS, 2020). The commercial banks had a combined total of 53 agents banking operators providing banking services for customers living in remote areas with limited accessibility (CBL, 2020). The CBL is the only centralized regulator and supervisor of the financial sector in Liberia with a mandate to maintain general price stability and sound monetary environment as provided for by the Financial Institution Act (FIA) Act (1999) and the CBL Act (1999).

The issue of gender gap continues to show up in the banking sector as women are less likely to own accounts compared to men. The percentage of women owing accounts compare to their male counterparts is 28.2 percent and 43.7 percent respectively (CBL NFIS, 2020). The account ownership gap at the regional level was far better than what existed in Liberia. Mobile money account ownership in Liberia between male and

female was 18.3 percent and 23.5 percent respectively. This gap aligned with what was at the regional level (CBL NFIS, 2020).

There were about 36.1 percent of Liberian youth (age 15 -24) that had transaction accounts compared to 35.5 percent of the aging population (age 25 above) (Global Findex, 2017). The central bank report indicated that 27.2 percent of the country's population was unable to meet documentation requirements to open accounts. Savings done in Liberia were mostly informal as 68.1 percent of the population reported saving with only 10.9 percent doing actual saving in financial institutions (CBL NFIS, 2020). All the above combined with other factors may have created the significance to further investigate the determinants of private savings in the commercial banking sector of Liberia.

## **1.2 Research Problem**

The realization of sustainable growing private savings rate has proven quite challenging for many developing nations despite the adoption of sound macroeconomic and financial liberalization policies (Athukorala & Sen, 2004). The significance of private savings to the economy and development has been well-researched by economists and financiers for ages (Ando & Modigliani, 1963; Fisher, 1982; Friedman, 1957). Private savings provide the funds needed for investments as financial intermediary like the commercial banks play a vital role in developing countries' economy as they provide support to individuals, and organizations to meet their ever growing credit and investment needs. The rate of increase in private savings was ignited by the willingness of the private sector (households and businesses) to reduce cash holding by saving (Nishat & Bilgrami, 1989).

Liberia is a developing nations with a challenging savings rates that have persisted for decades. Gross savings as a percent of GDP remains -39.11% as of 2019 (The World Development Indicator, 2021). The commercial banking sector in Liberia has been confronted for years endeavouring to mobilize savings deposits. The rate of saving in Liberia for 2016 was 2.027% per annum (pa) from a 2.002% pa in 2015 (CEIC, 2021). Liberia's saving rate has an annual update averaging 5.533% pa from Dec 1982 to 2016 (CEIC, 2021). Liberia's saving rate reached an all-time high of 8.092% pa in 1985 and dropped a record low of 1.999% pa in 2014 (CEIC, 2021). The banking sector experienced a significant liquidity squeeze at the early part of 2019 and up to the end of 2020 mostly attributed to 97% of the local currency being unregulated and outside the banking system majorly due to low savings in the banking sector (Yates, 2020). These indicators among several others explained in this study proves that the Liberian economy faced numerous challenges with mobilizing savings (of which private savings is a component) and the reality continued to adversely affect the economy in many areas (Yates, 2020).

The indicated statistics point to low rates of savings or private savings in the commercial banking sector in Liberia. The liquidity challenge in the banking system has persisted for years but the problem became pervasive in the early part of 2019 and to the end of 2020 when the commercial banks started experiencing significant liquidity problems (both USD and Liberian Dollar-LRD). Withdrawals from commercial banks were conditioned on other clients making deposits prior to others cashing out. This trend became prevalent forcing the central bank to change its monetary policy from exchange rate to interest rate targeting setting the central bank bill rate at 30% as a motivation to attract savings of local currency in the banking system to reduce currency outside the banks (CBL, 2019). However, regardless of all the attempts to stimulate

more savings or private savings, the banking sector experienced low levels of savings and the associated complications continued to derail government attempts to revive the local economy. The country has fifteen counties with four of the fifteen counties having no banks in operations as people in the rural counties were totally excluded from the formal financial sector. Private savings and transactions in the four counties were done through mobile money and other forms of savings. The existence of commercial banks worldwide has ensured the provision of saving opportunities to clients by devising financial products and services aimed at encouraging clients to save more as a form of precaution and investment. However, in most developing economies as the case with Liberia, realizing conducive levels of private savings remained a hurdle. The Covid-19 pandemics along the way, the fall in real wages could further impact private savings rates.

Fallah (2012) studied the Determinants of Interest Rate Spread in Liberian Financial Sector. The gap in the study was that credit risk (the level of non-performing loans), Market power, Transaction costs, Bank adjustment strategies at the end of the period, risk on interest rate as reflected in loan-term structure and available deposit facilities, an in-depth study on institutions, and risk analysis are all factors that require disaggregated financial data, particularly for the banking subsector. Fallah also suggested investigating the spread's information content in terms of forecasting macroeconomic variables such as investment, inflation, and growth; the relationship between the bank interest rate margin and economic growth; and the impact of widening spreads on investment and savings mobilization for future research. Sowah and Kirikkaleli (2020) studied the Modelling Effects of Financial Liberalization and Economic Growth in Liberia, with the goal of determining the long-run relationship between financial liberalization, savings mobilization, and investment, as well as the

effect on economic growth in the Liberian economy, as articulated by McKinnon and Shaw's hypothesis. The gap noted in the study was to extend the study by using quarterly data instead of an annual data to collect more specific information about policy changes. Nwachukwu and Odigie (2011) investigated the Drivers of Private Saving by examining the deposit interest rate, private saving rate, and growth rate of real per capita GNDI, as well as the real interest rate, fiscal balance, and degree of financial depth concentrating on Nigeria. The study is applied to Liberia knowing how the current rush to increase private savings mobilization is intensifying with policymakers learning a lot. Haron et al (2006) study found that interest rates and other variables impacted deposits significantly. Real GDP and inflation were negatively influenced by deposits Interest rate.

The study focused on private savings using deposit interest rates, inflation rate, population density, age dependency ratio, private sector credit and GDP per capita as predictor variables to determine private savings instead of savings generally as seen in the above studies. To the researcher knowledge, no studies have investigated the determinants of private saving in Liberia. The empirical literature on the state of private savings or its determinants in Liberia was limited. Savings literature in Liberia was marginal compared to what could be seen from other countries in the sub region. The research intended to answer the question: What determines private savings in the commercial banking industry of Liberia?



### **1.3 Research Objective**

The research's major goal was to look into the factors that influence private savings in Liberia's commercial banking industry.

#### **1.3.1 Specific Objectives**

The research's precise goals were to accomplish the following:

1. To examine how deposit interest rate determines private savings.
2. To understand how GDP per capita income (income growth) determines private savings.
3. To examine the effect of population density on private savings.
4. To understand how age dependency ratio determines private savings.
5. To understand the effect of private sector credit on private savings.
6. To understand how inflation rate determines private savings.

### **1.4 Value of the Study**

The study's results would be utilized to help shape policy decisions in Liberia as well as the emerging markets and low income countries with related historical and institutional similarities desirous to improve the performance of private savings. Moreover, it is expected that banks' managers and boards develop strategies that focused on encouraging private savings mobilization from the findings. The research adds to what is already known and provided the needed literature to scholars wishing to study private savings mobilization in Liberia. Policy makers would use the findings to plan the country's economic policies specifically regarding private savings mobilization.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

Theoretical literature evaluation/review, determinants of private savings by commercial banks, empirical studies, conceptual framework, and summary of literature review of the project were discussed in this chapter.

### **2.2 Theoretical Literature Review**

The life-cycle hypothesis proposed by Modigliani and Brumberg (1954), the permanent income hypothesis proposed by Friedman (1957), and the buffer-stock theory proposed by Deaton (1991) and Christopher (1992) were three standard models of savings from the depositor's perspective according to Haron and Wan-Azmi (2006) used in the study. These theories were chosen because they explained why an individual depositor might choose to save a portion of his or her money. The life cycle model has been tested to explain the changes in private saving overtime. It gains tractions as it explained interest rates and growth impact on saving. The three theories were chosen because individuals and households were treated as being concerned with long-term consumption options, and saving and spending were expected to explain predicted future income. The selection of the three theories was justified in that a single theory like the life cycle hypothesis alone could not capture or explain all the selected variables for the study, but the combination of the Life-Cycle, Permanent Income and Buffer-Stock models did.

The theories considered saving as a valuable tool for balancing consumption in the face of fluctuating income.

### **2.2.1 The Hypothesis of Permanent Income**

The Permanent Income Hypothesis was developed by Modigliani and Brumberg (1954) and Friedman (1957) which defined permanent income as the value of annuity of a lifetime income and wealth. Because it depended on the horizon and foresight, permanent income was defined as revenue that was considered permanent at any age by the consumer unit in question. Income increase represented increased future growth, resulting in increased consumption with no change in saving, according to the permanent income theory, but temporary growth led to higher saving. According to Dynan et al (2004) and Altonji and Villanueva (2007) findings indicated that steady income increased the rate of saving. The permanent and transitory consumption are both independent of transitory income. According to Friedman (1957), transitory consumption in any era was independent of permanent income. Permanent changed in income was a long-term income fluctuations that have a significant influence on consumption in the permanent-income model.

The PIH model's main criticism was that it ignores risk aversion, despite the fact that markets were never proven to be completed in the face of uninsurable shocks in the aggregate (Cochrane, 1991; Attanasio & Davis, 1996).

Because all future terms on the income side of the budget constraint climbed in nexus during the term, according to both the life-cycle and permanent-income models, a permanent rise in income led to a long-term increase in income that will result in a permanent increase in gain of lifetime wealth. Campbell (1987) argued that people save to avert the consequence of the decline in their income. According to the hypothesis, individuals spend a fraction of their income as a result, the average propensity to consume matched the marginal tendency to consume each period. The tendency itself could be influenced by a variety of things, such as interest rates and taste shifter variables, or it could be just be a reflection of uncertainty.

Individuals stretched over the course of their lifetimes, they consumed, according to the PIH model, by amassing money during their working years, they consumed at the same amount that they did in retirement. Kelley and Williamson (1968), Leff (1969), Gupta (1971), Ouliaris (1981), and Koskela and Viren (1982) investigated the age groups, birth rates, dependence ratios, and financial variables like interest rates and inflation rates.

### **2.2.2 The Life Cycle Hypothesis**

The concept was suggested by Modigliani and Brumberg (1954) to explain how saving could help purchasing power from one period of life to the next. Early on in one's career, one's earnings were often lower than later in one's career. Income often increased in the latter years of working life before declining after retirement. Consumers borrowed to pay off their loans and saved money during their early low-income years, then spent off

their savings in retirement. In retirement, retirees sold their assets to cover their living expenses, such as food, housing, and entertainment.

The total amount of money saved by the young outnumbered the amount of money lost by the elderly, resulting in a positive net saving in the end. However, by middle age, income has increased while consumption has remained stable or has increased in a smaller proportion. This means that a person is a "net borrower" in his early years, a "saver" in his middle years to pay off debts and put money aside for retirement, and a "dissaver" in his older years. Banks et al (1998) criticized the LCH, claimed that investigators in their thousands have discovered that the elderly do not sell their possessions in the market in the manner expected by the theory, but that many elders appeared to retain a portion of their salaries long after retirement.

The LCH was criticized for being a bachelor's theory, as it disregards both the presence of children at a young age and their bequest intentions at retirement. The theory predicted that during inflationary periods an average saver would hold much of their portfolio in fixed nominal valued assets which might experience a negative real return on their assets.

Population expansion or density, according to the hypothesis, has an effect on private savings. High growth rates can, in extreme situations, result in a negative link between growth and saving rates, which can have an impact on young parents with children who spent more money than they made. Consumption was effectively controlled by present incomes under uncertainty, according to the theory.

### **2.2.3 The Buffer-Stock Theory**

The buffer-stock theory was developed by Deaton (1991) and Carroll (1992) in response to consumers' significant income unpredictability and impatience. Tastes determined consumption increased in the classic paradigm. Consumers in the buffer-stock, on the other hand, regardless of preferences, established the average rate of consumption growth to be the same as the average rate of labour income growth. Consumers have a precautionary saving incentive, according to Kimball (1990), and they are also "impatient" in the sense that they do like to be able to estimate future earnings with certainty, they would spend more than they do today. These circumstances encouraged consumers to save as Kimball said it, "buffer stock." Meaning, in the Buffer-stock model, if the consumer's wealth was less than the target, the precautionary saving incentive will win out over impatience, and the consumer would save; if the consumer's wealth was larger than the target, eagerness would win out over caution, and the consumer would spend.

The buffer-stock idea has been criticised for not being able to account for all customer behaviour. The buffer-stock model did not clearly and convincingly represent the behaviour of wealthy consumers with large financial assets, as many other consumers in this group clearly participated in life-cycle saving activities, such as pension programs.

According to the theory, a positive permanent income shock lowers the "wealth-to-permanent-income ratio" in comparison to its goal by promoting increased saving, which lowers the consumption reaction. Permanent income hypothesis for a given wealth (Carroll & Toche, 2009). At least as well as the PIH model, the pattern of

consumption and wealth responses to income shocks were captured by a buffer-stock saving model. As the instrument appropriate for the predicted growth rate of labour income, the model predicts the rate of growth in household labour wage for working families (Carroll & Summers, 1991). When compared to their wealthier counterparts, Consumers with less wealth have a harder time buffering their spending against income fluctuations, which increased their saving behaviour (Zeldes, 1989 & Kimball, 1989).

### **2.3 Determinants of Private Savings**

After households and businesses have met their spending needs, the amount of disposable income left over was called private saving. The distinction between corporate and individual/family savings is narrow and subjective (Gale & Sabelhaus, 1999). Certain forms of income, such as dividend payments from corporations, stock purchases, and capital gains, for example, aren't often counted as personal income, despite the fact that they all involve the transfer of money transferred from the corporate sector to the private sector (Gale & Sabelhaus, 1999).

The argument was that not all corporate income flows to individuals because businesses may reinvest in order to grow. In most economies, corporate saving rates were higher than family rates of saving. The business saving rate influenced the private saving rate more than the household saving rate. According to empirical research, the corporate veil is not often breached by the households. This indicated that a shift in corporate saving constituted a unit change somewhat offset by a change of less than one unit in family saving, rather than being completely diminished (Bebczuk & Cavallo, 2016).

#### **2.3.1 Interest Rate on Deposit**

The rate of interest paid on deposits' accounts held by depositors at a bank or saving institution. Saving rates rise with the disposal income growth rate and the bank's

deposits real interest rate. Types of deposit accounts are savings, interest-bearing checking, time/fixed, demand, and certificate of deposits (Lake & Foreman, 2020). Haron and Wan-Azmi (2006) discovered in a study of deposit rates that profit rates, deposit interest rates, base lending rates, money supply, consumer price index (CPI), and gross domestic product (GDP) and GDP all have a significant impact on deposits in the Malaysian economy. Deposit interest rates were found to be negatively influenced by real GDP and inflation.

### **2.3.2 GDP Per Capita Income (Income Growth)**

Because younger age groups have higher lifetime incomes and savings than older age groups, GDP per capita/income growth will enhance the aggregate savings rate. As a result, countries with faster GDP growth and, more importantly, quicker per capita growth will have greater savings ratios than those with slower growth. Another point of view says that as per capita wealth rises, the magnitude of this effect would reduce, and that it could even be detrimental to wealthy countries with limited investment and growth prospects.

Increased deposit availability as a result of higher real income will result in interest rate being lower, which created more lending and investment, and resulted in economic growth and a favourable impact on more bank clients' loans demand. This cycle may result in an increase in the lending rate, as well as an increase in deposit demand at the bank. The decision to save was influenced by one's expectations for future earnings.

Nations with greater income levels to save more than low-income countries (Edwards, 1996; Dayal-Ghulati & Thimann, 1997; Loayza et al, 1999; Metin-Ozcan & Ozcan, 2000).



### **2.3.3 Population Density**

The life-cycle hypothesis of Modigliani and Brumberg (1954) suggested that population demographic distribution has an impact on saving behaviour. The elderly and young tend to save less, but the working population is seen saving to pay off debt and save for retirement. Economic growth, like population growth, leads to increased savings, and the faster the growth, the higher the savings rate. The rate of growth rise with total income, whether it be population growth or per capita income growth.

Economic growth, like population growth, leads to increased savings, and the faster the growth, the greater the savings rate. Whether it is population growth or per capita income growth, the rate of growth to total income is the most important component.

### **2.3.4 Age Dependency Ratio**

Although the effect of age dependence ratio was statistically small, the negative sign supported Loayza et al. (2000) and Chaturvedi et al. (2008)'s findings on the life cycle theory that as dependency ratio rises, saving rate falls. Kibet et al. (2009) employed the OLS regression method to analyze the factors of household saving in rural Kenya utilizing entrepreneurs, smallholder farmers, and teachers. The results demonstrated that the family income, gender, and age of the head of household, dependence ratio, education level, transportation cost, service charge, credit availability, and type of work all have impacted household savings.

### **2.3.5 Private Sector Credit**

The effort to pursue financial stability served as a precautionary motive to alleviate or lessen the negative effects of stress in the banking sector. The indispensable role played by financial institutions in providing essential deposits, insurance and savings services were imperative to private savings mobilization efforts. The banking sector in other

region were faced with the same sovereign barriers as domestic banks lend to sovereigns whose revenues were vulnerable to uncertain outcomes in oil prices (Besso & Feubi, 2016; Omolade et al, 2019; Assoumou-Ella, 2019). The short-term liquidity payments from borrowing parties and the attempts to balance short and long-term liabilities by ensuring sufficient cash flow, profitability, and interest- payment provide the money needed in the banking sector for savings and lending purposes (Kouam, Henri, et al, 2020).

### **2.3.6 Inflation Rate**

The empirical findings for the market rate, volatility, and inflation rate were all favourably connected with interest rates on time deposits and savings accounts, whereas the concentration index and economic growth were not related (Wachtel, 1974). Inflation had a negative impact on economic growth, but it could be beneficial to saving rates in some instances. As a result of the uncertainty connected with future revenue streams, inflation led to larger precautionary saving.

There existed evident among developing-country households, whose earnings prospects were considerably more uncertain than those of industrialized countries-country households. Consumers who strived to keep an objective level of wealth or liquid assets compared to their income saw their savings grew in line with inflation if they aimed to keep a specific amount of cash or liquid assets as a percentage of their income. The rate of inflation has been added to the list of explanatory factors for private saving, as it played a substantial role in saving.

## **2.4 Empirical Literature Review**

This section was used to provide literature about research that were relevant to the current study both in concept and context. This section discussed studies from the global perspective and narrowed down to the local perspectives.

### **2.4.1 Global Studies**

Rashid (2011) used the Bankscope database, more than 95 percent of all commercial banks in 81 developing countries were included in the study. The study covered 1995 to 2009, looking at loans to the private sector, interest spreads, and credit-flow volatility. The analysis included developing and emerging nations with populations of at least 5 million people in 2008 and data in the Bankscope database for at least three (three) commercial banks. The Ordinary Least Squares (OLS) approach was used to analyze the data. The findings show that increased visibility of foreign bank activity was connected to a greater reliance on non-deposit financing, resulted in greater interest rate margins, less private sector lending, and more bank loan volatility. Foreign banks often lend a smaller percentage of their assets and deposits than domestic banks. Therefore, the introduction of a foreign bank was expected to dramatically diminish the share of domestic bank deposits. Domestic banks' loss of deposit base forced them to be reliant on non-deposit financing, which was usually more expensive and uncertain. The findings were tested to discover how well they applied to Liberia.

Kudaisi (2013) studied from 1980 to 2006 in West Africa, researcher looked into the factors that influence household savings. The study used a Panel data for analysis. The African Development Indicators (ADI), the African Development Bank (ADB), the International Financial Statistics (IFS), and the World Development Indicators (WDI) data were used. Inflation, real interest rate, GDP per capita growth, dependency ratio, and GDP growth rate were all indicators considered in the study. The findings showed that the magnitude of the dependence ratio and the interest rate had a negative and insignificant impact on domestic savings, but GDP growth is positive but statistically unimportant, while inflation and the government budget surplus were statistically significant. The findings also showed that the level of income in a country may fully

explained variance both the pace of saving and the responsiveness of saving to changes in the variables in cross-country comparisons. Since the 1980s, the rate of growth in gross domestic savings in West African countries has been low. The study used some of the variables like GDP growth rate, inflation and dependency ratio to see how the results reflected the Liberian case.

Keat et al (2015) studied the factors that influence private saving in Malaysia referencing past research due to how private savings were extremely important to a country's economic stability and conditions. Previous research by Khan and Abdullah (2010) were used to study GDP per capita (GDP), inflation rate (INF), government current budget (CB), and private savings (PS). The study included the years 1985 to 2010. To address the model's common assumptions, the regression analysis (OLS) was performed, as well as many diagnostic tests. The findings showed that the rate of inflation in Malaysia has a strong and positive relationship with private savings, supporting the theory that inflation increases uncertainty in consumers, causing them to save. This study follows the Life Cycle Model in that people save more as their per capita income rises. The finding was replicated to Liberia considering that such research has not been done in the Liberian context.

Aizenman et al. (2019) looked into the relationship between interest rates and personal savings. The study employed panel data from 23 industrialized countries (IDCs) and 113 underdeveloped nations/least developed countries (LDC). From 1995 to 2014, 136 nations were included in the panel data. The estimating model for the system generalized method of moments (GMMs) was chosen to match the estimated dynamic panel. The OLS was used in conjunction with random effects regression techniques. The findings suggested that in different economic contexts, a low interest rates can have a variety of effects on private savings. Despite the fact that the estimate was marginal

in the baseline model, the estimation baseline findings showed a favourable influence in general, of the real interest rate on private savings. The results were investigated to further understand how it played out in the Liberian context.

Chaturvedi et al (2009) in Southeast Asia and South Asia, investigated the interrelationships between saving rates, inflation, and economic growth. The study covers 13 countries for the east- south and south Asia region for the period of 15 years that is from 1989 to 2003. Panel data with two least squares was used. The model used for the study is a 2SLS estimation procedure to jointly estimate the three simultaneous equations to analyse the panel data. The data revealed that the rate of saving and growth were related bi-directionally and positively. Inflation was found to negatively affect growth but positively affect saving rate. These findings were interesting especially that a variable like the dependency ratio was not investigated due to the lack of data which this research investigated in the Liberian context.

#### **2.4.2 Local Studies**

Onwuasoeze and Kirori (2016) looked into the factors that influence private savings in Kenya. From 1993 to 2013, the study was conducted over a 21-year period. Financial deepening, the dependency ratio, the inflation rate, and the real interest rate were all factors considered as determinants. Using a World Bank time series data bank, the desk research methodology was used. The OLS regression technique was used as the analytical model, which was suitable for short term relationships. Diagnostic tests for OLS estimation were performed on the model. The findings suggested that rising inflation reduces private savings, which contradicts the hypothesis of precautionary saving incentives. The result indicated that Kenya's GDP increased as a result of decreasing inflation, which increased savings. Except for the real interest rate, which has been proven to be statistically insignificant, the other determinants were found to

be statistically significant in accordance with theoretical assumptions. The study was replicated to see how the test of the inflation variable confirmed or rejected the finding.

Nwachukwu (2013) investigated the trend in Nigerian saving behaviour and looked at policy possibilities for boosting domestic savings. The study looked at the factors that influenced private savings in Nigeria from 1970 to 2010. The amount and direction of the effects significant on income growth, interest rates, fiscal policy, and financial development which have policy and non-policy influences on private saving were assessed in the study. The Error-Correction modelling approach was used, which lowers the probability of estimating false relations while yet keeping long-run data. The Phillips-Perron and Dickey-Fuller tests were also performed in the study. The results show that saving rates increased in sequence with the bank's real deposit interest rate and the growth rate of disposable income. The deposit interest rate and growth rate variables were studied in the Liberian context to see how the results appeared as indicated in this study.

Siaw and Lawer (2015) looked at the shifting effect of inflation, deposit interest rates, and growth of the money supply, as well as the monetary policy rates and stock prices, on bank deposits level in Ghana. They used data from the monetary time series database of the Bank of Ghana (BoG) and the World Development Indicator (WDI) database from 2000 to 2013. Fully Modified Ordinary Least Squares Analysis and Co-integration Analysis were utilized as the models (FMOLS). Inflation and the increase in the money supply of bank deposits were both on the rise and notably have a negative short-term impact, according to the findings. The two variables identified to be relevant in understanding the short run dynamics of bank deposits were inflation and money supply increase. This meant that firms and people were forced to increase their spending during periods of high inflation by withdrawing monies from their bank accounts, which

resulted in dissaving or a decrease in bank deposits. Inflation, which is measured by the consumer price index (CPI), has a negative short- and long-term impact on bank savings. The research looked at the relationship to determine how it was confirmed or disproved in Liberia.

Jude (2019) studied the factors that influence banks' ability to mobilize savings in Nigeria. The study included the years 1981 to 2017. The study employed the Engel and Granger technique to co-integration, as well as the ECM (Economic Error Correction Method). In the short run, the findings revealed that the rates of interest are negative on domestic savings, which was correlated with the positive effects on domestic savings, foreign exchange rates, investment rates, and per capita income were all important factors. Long-run feedback from the determinants was accounted for by the error correction term. All variables were statistically significant, according to the data.

The study contradicted Onwuameze and Kirori's (2016) study on private savings determinants in Kenya which results showed that rising inflation reduced private savings. Since there was a cushion effect on income for the dependent variable, Jude (2019) found that the rate of inflation was perceived as irrelevant in exerting an effect on banks' savings. It created doubts, which was investigated in the Liberian context to evaluate how well they performed.

The study by Nwachukwu and Odigie (2011) examined policy choices as well as the trend in Nigerian saving behaviour in order to improve domestic savings. The research looked into the factors that influenced private savings in Nigeria between 1970 and 2007. The data for the study came from the Central Bank of Nigeria (CBN), the International Monetary Fund (IMF) Statistical Bulletin 2006, Annual Report, Statement of Accounts 2007, and the Financial Statistics (IFS) Year book 2006 and 1999. To

reduce spurious relationships, the Error-Correction Modelling (ECM) approach was used. The findings revealed that both the growth rate in disposable income and the rate of growth in bank real deposit interest rates increased the saving rate. In Nigeria, it was discovered that financial depth has been proven to have a negative insignificant effect on saving behaviour. The findings of the study was replicated to investigate how income growth and bank deposit interest rates affected private savings in Liberia.

## **2.5 Summary of the Literature Review**

The theories investigated in the study were summarized in this chapter. The theories were essential in explaining the determinants of private saving in the commercial banking sector of Liberia. The Permanent Income Hypothesis, Life Cycle Hypothesis and the Buffer Stock Theories served as the study's foundation. There has been a good trunk of research studies done in the area of private savings in countries around the world. The studies were done in global and local context and have provided mixed results with predictor variables providing results that were not consistent.

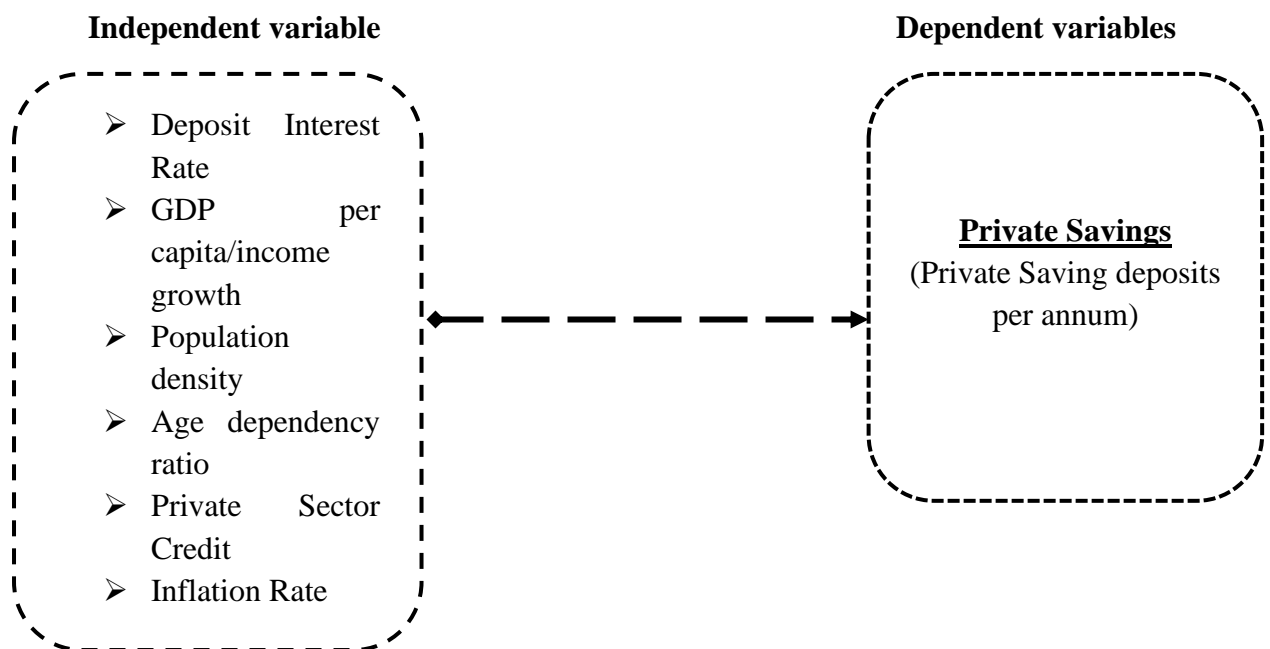
The Literature review has established that saving was not only essential for securing individuals against impulses of economic changes (Plessis, 2008) but was also invaluable for economic growth in a country (Njung'e, 2013). A number of studies such as Rashid (2011), Kudaisi (2013), Keat et al (2015), Aizenman et al (2019), Chaturvedi et al (2009), Onwuasoeze and Kirori (2016), Nwachukwu (2013), Siaw and Lawer (2015), Jude (2019) and Nwachukwu and Odigie (2011) were reviewed and proven that GDP per capita income/income growth rate, deposit interest rate, population density, private sector credit, inflation and dependency ratio were related to the increase and decrease in private savings. The empirical evidence that established the relationship of private saving was scarced in Liberia. Many empirical studies have been done to determine private savings in other countries but no such literature was available for



Liberia. Some of the empirical studies reviewed have provided mixed findings for what constitute determinants of private savings. The evidence indicated that some determinants were proven to be significant in determining private savings in some countries and insignificant in other countries.

## 2.6 Conceptual Framework

The diagrammatical variables in the study were the independent and dependent variables linked by a conceptual framework. The conceptual framework was essential in the research because it permitted the researcher to plainly establish the existed link between diverse research variables.



**Fig 2.1 conceptual framework**

**Source: Author (2021)**

## **CHAPTER THREE: RESEARCH METHODOLOGY**

### **3.1 Introduction**

This chapter examined the methods that were used to complete the research.

Secondary data was collected for the study. Data Collection, Diagnostic Tests, Data Analysis, Analytical Model, Operationalization of Study Variables, Significance Tests, References, and Appendices were all covered.

### **3.2 Research Design**

The strategy that was utilized when conducting the research in order to establish an acceptable standard that has been effectively validated and performed for a long period of time that was regarded as significant by various researchers in the field was a research design (Khaldi, 2017). The study used descriptive research design to describe the study variables characteristics. The study design planned and conducted the processes and strategies used to address the research question and improve the validity of the study findings by limiting potential sources of bias that seem to skew the results. The methodology was chosen because it enabled the researcher investigated the entire commercial banking sector in identifying the determinants of private savings.

### **3.3 Data Collection**

The study's data was sourced solely from secondary sources. For the period between January 2010 and December 2020, the researcher used data collection sheets from secondary data sources such as annual publications from the World Bank (WB) and the International Monetary Fund (IMF), as well as monthly data from the Liberian Central

Bank (CBL) to investigate the determinates of private savings in the nine (9) commercial banks of Liberia. For the investigation, the researcher used time series data. Annual data for age dependence ratio, private sector credit, population density, deposit interest rate, GDP per capita income/income growth, monthly inflation, and private savings data were obtained from the WB, IMF, and CBL, respectively. The CBL was chosen as the primary data source because, according to the financial institution act FIA (1999) and the CBL Act (1999), it controls the financial sector, which includes the nine (9) commercial banks considered for the study.

### **3.3.1 Diagnostic Tests**

The researcher used diagnostic testing to determine the model's viability and effectiveness fitness of data before any further analysis. The study employed diagnostic tests for normality, regression and correlation. The normality test was utilized to determine if the data was normally distributed, while the kurtosis and skewness of normality s were used to determine the assumption. The regression analysis was used to look at the fitness/explanatory power of the mode. It's a correlational analysis that determines how changes in the independent variable explained variations in the dependent variable. The correlation analysis was used to determine whether the dependent and independent variables had a relationship.

### **3.4 Data Analysis**

According to Cole and Trinh (2017), the act of packing the acquired information, placing it in order, and organizing its primary components in such a way that the findings may be easily and properly communicated is call data analysis. Descriptive statistics, frequencies, percentages, means, and qualitative analysis were used to analyze the data. The Econometric Views (Eviews) and the Microsoft Excel package

were used to code and to investigate the determinants that influence private savings in the commercial banking sector of Liberia and the percentages generated for the descriptive statistics.

The study used correlation and regression to affirm the influence of a particular factor on private savings determinants. The strength of relationship was tested at 5% significance level. Findings was presented in tables to ease visualization and interpretation and given in the form of frequency tables. The data was statistically displayed in tables using percentages, frequencies, central tendency measurements, and dispersion. Inferential statistics such as Pearson correlation, multiple regressions, ANOVA, and coefficient of determination were used.

### 3.5 Analytical Model

The analysis was carried out using the multiple linear regression model below:

$$LPS = \beta_0 + \beta_1DR + \beta_2ADR + \beta_3LGDP + \beta_4INF + \beta_5PD + \beta_6PSC + \varepsilon$$

Where:

LPS= the dependent variable represented private savings deposit per annual

$\beta_0$ = represented a constant term, i.e. The value of LPS when all DR, ADR, LGDP, PD, and PSC were zero.

L=Natural Logarithm

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$  = were the regression coefficients or change in LPS caused by each of the variables.

$\varepsilon$  = represented the random error term, which included all other aspects that the model did not account for.

DR= Deposit Interest Rate

ADR= Age Dependency Ratio

GDP= GDP

INF= Inflation Rate

PD= Population Density

PS= Private sector credit

The following assumptions underpinned the multiple regression model: the error variable ( $\epsilon$ ) has a fixed variance with an unknown value, and it is normally distributed with a mean value of zero were independent of one another, and the relationship between private savings and demographic variables was linear.

### 3.6 Operationalization of Study Variables

The study concepts was converted into measurable observations as below;

<b>Concept</b>	<b>Variables</b>	<b>Measurement</b>
<b>Private Savings</b>	Private Savings	Natural log of Private saving deposits
<b>Determinants of Private Savings</b>	Deposit Interest Rate	Interest rate on customer deposit in commercial banks
	GDP Per Capita Income/Income Growth	Log of GDP/Total Population
	Population Density	Log per number of people per 1000 square kilometre)
	Dependency Ratio by Age	Dependents (young) as a percentage of the working-age population
	Credit from Private Sector	Domestic credit to private sector ( percent of GDP)
	Inflation Rate	Average consumer prices.

**Table: Operationalization of study variables**

**Source: Author (2021)**

### **3.7 Significance Tests**

The researcher employed the statistical significance parametric tests of the data to determine the findings as well as the importance of a specific parameter. The t-test was used to determine the overall model's significance, and the f-test was used to determine the model's significance of the individual variables using the Variance Analysis (ANOVA). To see if predictor variables have an impact on private savings behavior in Liberia, the test of significance was utilized, as well as the coefficient of determination ( $R^2$ ). The regression model's level of significance was set at 5%, with a 95% confidence interval.

## CHAPTER FOUR: RESEARCHING FINDINGS AND DISCUSSIONS

### 4.0 Introduction

Chapter 4 had a primary objective of reporting the findings of the study and discussion of results. It had five sections – descriptive review of the data, Pearson’s Correlation analysis results, diagnostic test and ANOVA. The last section covered discussion of regression coefficients.

### 4.1 Descriptive Analysis

In this section, the basis features of the sample data were presented in tabular form. It gives information on the central position of each series, how spread out their data points are and where the data is skewed. Table 4.1 provide a summary of the series.

**Table 4.1: Descriptive Statistics Result**

Variable	Mean	Max.	Min.	Std. Dev.	Skewness	Kurtosis	Obs.
LPS	12.084	12.341	11.545	0.172	-1.336	4.720	44
DR	2.066	2.433	2.000	0.089	1.857	7.584	44
ADR	82.225	86.486	76.762	3.051	-0.195	1.760	44
LGDP	21.775	21.913	21.325	0.172	-1.384	3.625	44
PD	46.918	53.446	40.400	3.850	0.014	1.826	44
PSC	13.512	18.828	8.302	3.391	0.307	1.650	44
INF	12.458	30.697	4.230	7.130	1.184	3.139	44

Table 4.1 displays the statistical summary of the data used in the study. The data covered 44 observations which is a small, yet acceptable number of observations required for quarterly time series analysis of this nature according to Friedman (1962), Ahmad (1988) and others. The descriptive analysis provides useful insights into the statistical nature of the data where aspects including the mean, media, maximum and minimums values are identified. Additional aspects of the data also include the skewness and kurtosis.



The results shows that the Mean value of the variables lie between the maximum and minimum values. This shows a good measure of central tendency within the dataset.

The results suggest that the variables exhibit high level of consistency given that the mean and median values are concentrated between the maximum and minimum values.

The private savings rate, for instance, has maximum and minimum values of 12.341 and 11.545 respectively with a mean value of 12.084 suggesting a favourable level of central tendency. A low standard deviation of 0.172 on the other hand indicates that values are clustered around the mean value. Unlike Private Savings, LGDP, and Deposit Rates which all have low standard deviations values, Population Density, Inflation, Private Sector Credit, and Age Dependency Ratio all have high standard deviations indicating more dispersed values.

Despite its slow pace, the rate of Private Savings saw growth between the period under review (2010 – 2020) reaching a maximum value of 12.340 in the last quarter of 2020. The average interest rate between 2017 and 2020 resulted that savings and deposit rates moved slowly, indicating that domestic savings mobilization plays a limited role in funding the private sector.

GDP registered a maximum value of 21.913 in the fourth quarter of 2017 as projected by the CBL. This, 2.55% growth from the previous year was mainly associated with favourable spikes in the mining and panning sectors outputs (CBL, 2019). Inflation's maximum value was 30.697 in the third quarter of 2019 due to subdued performances of the secondary and tertiary sectors (CBL, 2019). Private Sector Credit and Population Density show an upward trend, thus suggesting that these variables increase with time.

Deposit Interest Rate, Population Density, Population Density, and Private Sector Credit are positively skewed which shows that the means of these variables are greater than the median. Most of the distributions are at the right. Private Savings, Age Dependency Ratio, and GDP are negatively skewed. In addition, Private Savings, Deposit Rate, LGDP, and Inflation have kurtoses of 4.720, 7.584, 3.625, and 3.139. Therefore, they have heavier tails than a normal distribution as compared to the others.

#### 4.2 Pearson Correlation Coefficients

The measurement of the strength of the linear association between two variables, say Private Savings and Deposit Interest Rate, the Pearson Product-Moment Correlation is utilized. The value of the test ranges from +1 to -1. A coefficient of 0 implies no relationship between the variables. A coefficient greater than 0 suggests a positive relationship. Coefficients that range from 0.1 to 0.3 are weak. Those that are 0.3 to 0.5 are moderate and 0.5 to 1.0 are strong. The reverse holds for negative coefficients. Table 4.3 reports the correlation coefficient at a 5 percent level of significance.

**Table: 4.3 Pearson’s Correlation Coefficients Result**

	LPS	DR	ADR	LGDP	PD	PSC	INF
LPS	1.000						
DR	0.173	1.000					
ADR	-0.856***	-0.312	1.000				
LGDP	0.897***	0.069	-0.716***	1.000			
PD	0.896***	0.296*	-0.996***	0.769***	1.000		
PSC	0.839***	0.391***	-0.980***	0.687***	0.977***	1.000	
INF	0.505***	0.356**	-0.757***	0.400***	0.737***	0.809***	1.000

Note: \*, \*\* and \*\*\* denotes 10%, 5% and 1% significance levels

From Table 4.3, the associations between private saving and all the variables are positive, excluding Age Dependency Ratio. The majority of the variables have a

statistically significant relationship with Private Savings except for Deposit Interest Rate. Private Savings and Deposit Interest Rates have a weak positive coefficient of 0.175. Contrary to Deposit Interest Rate, the relationship between Private Saving and Age Dependency Ratio is negatively strong and statistically significant. Therefore, an increase in Age Dependency Ratio by 1 percent will trigger a fall in Private Saving by 0.856 or 87 percent.

A coefficient of 0.897 implies that the relationship between Private Savings and Gross Domestic Product is strong and positive. As individual and private firms' income increases, the amount saves also increases. Additionally, Private Savings and Inflation have a positive strong relationship, evident by the coefficient of 0.505. The co-relationship between Private Saving and Population Density is positive and strong. A 1 percent increase in Population Density will lead to a rise in private savings by 89.6 percent. These variables move in the same direction. As for Private Sector Credit, it shows a strong positive relationship with Private Sector Credit. Contrary to Deposit Rate, this association is statistically significant.

#### **4.2 Diagnostic Tests Results**

The coefficients of an empirical model are reliable for forecasting and policy recommendations when a series of tests are conducted to prove reliability. In this section, the estimated model is validated by four important post-estimation time-series diagnostic tests. These tests result and inferences are indicated in table 4.2.

**Table 4.2: Diagnostic Tests Results**

Test	Test Statistic	P-value	Null Hypothesis	Inferences
Autocorrelation	Obs*R-squared=1.073	0.585	No Series Correlation	Fail to Reject Ho
Heteroscedasticity	Obs*R-squared=8.988	0.343	Constant Variance	Fail to Reject Ho
Normality	J-B Stats=2.608	0.271	Normal Distribution	Fail to Reject Ho
Specification	F (1,32) =1.120	0.298	No Omitted Variable	Fail to Reject Ho

The Lagrange multiplier test for residual autocorrelation has a probability value that is more than a 5 percent significant level. For this reason, we fail to reject the null hypothesis. As such, there is no autocorrelation in the residuals. To make sure the error term's volatility is not time-variant, the Breush-Pagan-Godfrey test for heteroscedasticity was adopted. It shows that the variance is constant. The Jarque-Bera test confirms that residuals follow a normal distribution. The Ramsey RESET test the estimated model is well-specified as shown by the probability value of 0.298. The study, therefore, concludes that no omitted variable might create a biased estimate.

#### **4.4 Regression Analysis**

Although Correlation allows for measuring the relationship between two variables, it has its limitations. For instance, Correlation does not capture causality. For this reason, a Log-Log Multiple Regression Analysis is used to measure how Inflation, Dependency Ratio, Population Density, among others affect Private Savings. Also, Private Savings is regressed on their first and second lags to eliminate the problem of autocorrelation in the residuals.

**Table 4.4.1: Coefficient of Determination**

<b>Model Summary</b>				
<b>Model</b>	R-Squared	Adjusted R-Squared	S.E. of regression	Sum squared residuals
<b>1</b>	0.998	0.997	0.007	0.001

Table 4.4.1, the coefficient of determination R-square was .998. This shows that 99.8% of the private savings in Liberia's commercial banking industry is influenced by the factors studied in this study. The R-squared or Coefficient of Determination indicates that the estimated model is a well fitted model explaining 99.8 percent of variations in the Rate of Private Savings. The Coefficient of Determination explains that the estimated model is a well fitted model for the study.

#### 4.4.2 ANOVA Results

<b>ANOVA</b>				
Model	Log likelihood	F-statistic	Prob.(F-statistic)	Durbin-Watson stat
	145.476	1716.206	0	1.819
a. Dependent Variable: Private Savings				
b. Predictors: (Constant), inflation rate, deposit interest rate, GDP, population density, private sector credit, age dependency ratio				

The table 4.4.2 captures the Analysis of Variance (ANOVA). The p-value of the F-Statistics is 0.000, implying that the explanatory variables jointly determined Private

Savings in Liberia for the period of the study. The tables 4.4.3 and 4.4.4 present results of the coefficients and the regression analysis.

Table 4.4.3 as shown below.

**Table 4.4.3: Regression Coefficients Results**

<b>Dependent Variable: LPS</b>			
<b>Method: Least Squares</b>			
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>Prob.</b>
C	-6.132	2.317	0.012
LPS (-1)	1.034	0.150	0.000
LPS (-2)	-0.331	0.121	0.010
DR	-0.005	0.013	0.715
ADR	0.102	0.028	0.001
LGDP	-0.148	0.035	0.000
INF	-0.001	0.000	0.010
PD	0.099	0.026	0.001
PSC	-0.002	0.002	0.281

#### **4.4.4 Regression Analysis**

At the 0.05 alpha level, the constant is considerably distinct from 0. However, having a significant intercept is seldom interesting as a focus for this analysis is drawn toward the study's main explanatory variables. The elasticity of the first period lag of Private Savings (1.034) is positive and statistically significant at the 1% level because its p-value of 0.000 is smaller than the 1 percent significance level. It indicates that Private

Savings is positive and depends significantly on Private Savings in the first period. The Private Savings elasticity (-0.331) in the second period is negative and statistically significant at a 1 percent level. An increase in Private Savings in the second period will cause a fall in Personal Savings by 0.331.

The coefficient for Deposits Rate Interest (-0.005) is negative and not statistically significant within the model. Whether deposit interest rate increases or decreases have no significant bearing to ignite private saving in Liberia. Age Dependency Ratio (0.102) is shown to have a positive and significant relationship with Private Savings Rate. A coefficient of 0.102 indicates that a one percent increase in ADR results in a 10.2% increase in Private Savings in the banking sector of Liberia. The ADR finding support the Life Cycle theory by Modigliani and Brumberg (1954).

The income elasticity which -0.148 demonstrates a negative but there is a considerable nexus between the two variables. A one percent growth in GDP results in 0.148 reduction in the Private Savings.

The income elasticity which -0.148 demonstrates a negative but significant relationship between the two variables. A one percent growth in GDP results in a 0.148 reduction in Private Savings. The coefficients for Inflation and Population Density both proved significant at the 1% levels with negative and positive correlations with Private Savings. A one percent change in Inflation reduced Savings by -0.001 and a one percent change in Population Density increases the Private Savings rate by 0.099 or 9.9 percent. Also, Private Sector Credit negatively determined Private Savings. As Private Sector Credit increase by 1 percent, Private Saving Rate reduces by 0.002, this relationship however proved insignificant in the model.

#### **4.5 Discussion of Findings**

The study concludes that Deposit Interest Rate negatively influence Private Saving in the Commercial Banking Industry in Liberia. However, this influence is not statistically significant. This finding compliment results from Kudaisi (2013) who established a negative and insignificant correlation between the variables. Siaw and Lawer (2015), and Nwachukwu and Odigie (2011) also found negative correlation, but their results were significant within the model unlike other findings.

Age Dependency Ratio has a direct association with Private Savings at the highest level of significance. This finding does not align with other empirical results reviewed for this study. For instance, Onwuasoeze and Kirori (2016) and Aizenman et al. (2019) both found significant correlation between the Age Dependency Ratio and Private Savings Rate, but both their findings established negative relationships. Kudaisi (2013) also established a negative relationship between the variables, but the variable was insignificant. The finding supports the Life Cycle Hypothesis by Modigliani and Brumberg (1954) which states that a person is a "net borrower" in his early years, a "saver" in his middle years to pay off debts and put money aside for retirement, and a "dissaver" in his older years. The findings also support the Buffer-stock theory by Deaton (1991) and Carrol (1992). The theory indicates that due to the consumer significant income unpredictability and impatience, consumers regardless of preferences will establish the average rate of consumption growth to be the same as the average rate of labour income growth. Kimball (1990) indicated that the consumer will buffer-stock if the consumer's wealth is less than the target, the precautionary saving motive will win out over impatience, and the consumer will save, if the consumer wealth is larger than the target, eagerness will win out over caution, and the consumer will spend.



Income which is denoted by GDP has a negative determinant of Private Saving in the Commercial Banking Sector in Liberia. Other results reviewed established significant positive relationship between the two variables consistent with theories. Kudasi (2013) had a positive but insignificant relationship whereas Nwachukwu and Odigie (2011), Nwachukwu (2013), Keat et al (2015), Jade (2019) results are positive and significant. These results are consistent with the Life Cycle Hypothesis by Brumberg (1954) and the Buffer-stock theory by Deaton (1991) and Carrol (1992). The GDP finding indicates that a one percent increase in GDP will reduce private savings by 14.8 percent. The result means people tend to save less in Liberia when income increased and save more with less income which justifies the conclusion of the Buffer-Stock theory that the consumer will buffer-stock if the consumer's wealth is less than the target, the precautionary saving motive will win out over impatience, and the consumer will save, if the consumer wealth is larger than the target, eagerness will win out over caution, and the consumer will spend. According to Gale and Samwick (2014), increased per capita gross domestic product seem to increase saving at low-income levels countries but decrease at higher rate in high income countries. The findings by Gale and Samwick (2014) supports the Permanent Income Hypothesis by Modigliani and Brumberg (1954) and Friedman (1957).

Inflation rate proved insignificant in the model. Growth in Inflation levels reduces private savings, but not at a considerable magnitude. This finding aligns with Kudaisi (2013), Onwuasoeze and Kirori (2016), and Siaw and Lawer (2015) who proxies the variable with CPI. These results on inflation conforms to the Life Cycle and Permanent Income Hypotheses. On the other hand, studies including Keat et al (2015), and Chaturvedi et al (2009), established that the rate of inflation has a strong and positive nexus with private savings. Inflation positively associated with private savings,

supporting the idea that inflation generates uncertainty in household's consumption, hence inducing savings. The result supports the permanent income hypothesis by Modigliani and Brumberg (1954) and Friedman (1957). The theory argue that individuals spend a fraction of their income as a result, the average propensity to consume each period could be influenced by uncertainty like inflation.

The population density was seen to positively influence private savings, comforting to the Life Cycle Hypotheses. The total amount of money saved by the young outnumbered the amount of money lost by the elderly, resulting in a positive net saving in the end. Private Sector credit established a negative relation with Private Savings but with insignificant estimates. The negative finding is in line with Rashid (2011) though the study found a significant coefficient.

## **CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS**

### **5.1 Introduction**

This chapter summarizes the study's findings. It further provides a detailed conclusion of the study and its findings and methodologies. It suggests crucial policy recommendations geared towards increasing private savings as a development approach. Lastly, areas for further studies are highlighted for further investigations.

### **5.2 Summary**

The primary objective of this study was determining factors that influence private savings in Liberia's Commercial Banking Industry. Private Savings remains crucial for economic growth of every economy. With Liberia's unfavourable private savings level, coupled with several macroeconomic challenges, the author sought to empirically investigate the economic variables influencing the rate of private savings. Supported by economic theory and empirical literature, the author identified suitable economic variables to consider in studying this economic phenomenon along with various methods that could be employed in the process.

The study employed both correlation and regression analysis to analyze an Ordinary Least Squares model. Secondary quarterly time-series data spanning 11 years at 44 quarters datasets obtained from the Central Bank of Liberia and the World Development Indicators were used for the study. With Private Savings as the dependent, the model incorporated variables including Deposit Interest Rate, GDP per capita, Population Density, Age Dependency Ratio, Private Sector Credit and Inflation Rate as explanatory variables. Several time series related diagnostic tests including normality, autocorrelation, and heteroscedasticity tests were done to ascertain robust estimates.

Preliminary findings were obtained from descriptive, correlation and other analysis of the data. From descriptive statistics, it was established that the Mean value of the variables lie between the maximum and minimum values. This indicated a good measure of central tendency within the dataset. This results further suggest that the variables exhibit high level of consistency and hence its suitability for analysis.

Findings from the study established that Private Savings over the period investigated remained positive but at a low growth pace. Four variables negatively affecting private savings in Liberia were identified including Deposit Rate, Inflation, GDP and Private Sector Credit. It was established that high levels or rates of these variables would decrease the rate of private savings. The Age Dependency Ratio and the Population Density both were favourable associated with private savings.

### **5.3 Conclusion**

Private Savings is crucial to macroeconomic stability and economic growth. Not only does savings play an important part in the revenue generating efforts of governments, but achieving and maintaining a high rate of private savings provide the needed resources necessary to achieve private sector growth which ensures fiscal independence, sustained growth and eventually social welfare. With low-income levels, high Deposit Interest Rates, high rates of Inflation, and low Private Sector Credit, the level of Private Savings in Liberia is still surviving even though at a very low growth rate.

The study concludes that Deposit Interest Rate negatively influence Private Saving in the Commercial Banking Industry of Liberia. However, this influence is not statistically significant. Besides Deposit Interest Rate, three other variables negatively influence private savings in Liberia. The GDP, Inflation and Private Sector Credit negatively

affect private savings in Liberia, same as the Deposit Interest Rate. It was established that high levels or rates of these variables would decrease the rate of private savings. The Age Dependency Ratio and the Population Density both were favourably associated with private savings. The ADR and PD positively impacted private savings in Liberia. An increase in any of these variables will automatically increase private savings in Liberia.

#### **5.4 Recommendations of the Study**

The investigation of Private savings in Liberia over the period revealed a positive relationship but at a low growth pace. The findings show that four variables including Deposit Interest Rate, Inflation, GDP and Private Sector Credit negatively affect private savings in Liberia. This means that any increment in these variables would decrease the private savings rate. Similarly, two variables including Age Dependency Ratio and the Population Density both were identified to have a favourable or positive relationship to private saving rate. Meaning that private saving would increase if the population density and age dependency ratio increase.

The government and banks executives should avoid any policy that raise the deposit interest rate in the short-run as doing so would rather decrease private savings and as well reduce the banks' profits margin. The government should ensure that inflation is kept at a moderate rate at all times if the goal of increasing private savings is to be realized.

The role of commercial banks is vital in developing countries' economy as they provide support to individuals, and organizations to meet their ever growing credit needs. The boosting of savings are critical if banks are to maintain their intended growth rate while also increasing their investment rate. Banks' executives in Liberia can provide credit to

the private sector but with the understanding that high private sector lending would impact their saving mobilization efforts. Monetary policy should be consistent with the goals of financial-sector reform and supportive of financial-sector growth.

The government should focus on devising policy that focus on increasing population and economy activities in rural counties which would enabling banks to expand their operations aim at inducing more private savings mobilization that eventually leads to more investment and economic growth. Though the ADR Ratio finding contradicts other empirical studies that were looked at in this research, it supports the buffer-stock theory that when income is less than the target, consumers tend to save and with more income above the target, consumers tend to consume more as impatience surpass precautionary saving motive.

The findings reflect Liberia's developing economy reality as people tend to save and buffer-stock majorly in a highly populated environment than places with poorer occupancy and with region whereby income is low below their targeted income. Another key element influencing private savings in Liberia's economy is the dependency ratio. Focusing on boosting life expectancy, which would improve the dependence ratio, would be an essential policy move by the government. This would imply improving health care for the entire Liberian population.

### **5.5 Limitations of the Study**

The study was limited to factors that influence private savings in Liberia's commercial banking industry. The study specifically focused on Liberia's commercial banking industry. In total, 9 banking firms were studied covering 11 years. The study was limited to secondary data that was collected using data collection sheets. The study was

further limited to deposit interest rate, GDP, population density, age dependency ratio, private sector credit, and inflation rate as the independent variables. These limitations

The study period was short due to the non-availability of annual data covering a period of 40 years. This led to the use of quarterly data for a period of 11 years that accumulated into 44 data points. There were variables like unemployment, financial sector development, lending rate, monetary rate, growth of money supply, etc. that the study could not cover due to data limitations. There could be other relevant variables out there that could provide further insight that might have been omitted. The study was as well limited to macroeconomic variables but other bank specific variables could be investigated to see how savings or private savings are influenced or affected in Liberia.

### **5.6 Suggestions for Further Studies**

The current study focused on Liberia's commercial banking industry. Future studies should be carried out in other sectors like Insurance, Microfinance Finance Institutions, Village Savings and Loans Associates, Credit Unions, and Rural Community Financial Institutions in Liberia to determine factors influencing saving mobilization generally. There are registered Microfinance institutions highly undercapitalized and clustered in Montserrado County with few operating in the rural counties (CBL, 2021). The Credit Unions in Liberia play a key role in providing financial services to rural Liberia. The Rural Community Financial Institutions also perform services like savings mobilization, checking accounts, direct deposits, loans, and money transfer service and payment of government salaries in rural communities of Liberia. Studying the behaviours of savings or private savings in these areas would provide more empirical evidence on the condition of private savings or savings in Liberia.

The study focused on factors that influence private savings in Liberia's commercial banking industry. From the regression results, the study established that independent variables selected in this study only explain 99.8% change in private saving. This shows that there are other factors affecting private saving which the current study did not focus on. These factors could be unemployment, financial sector development, lending rate, monetary rate, growth of money supply, etc. Future researchers can investigate the impact of these variables on Private Savings in Liberia. Future researcher could also use primary data to investigate the supply side of savings by investigating factors influencing saving mobilizations by commercial banks in Liberia. The study could review specific banks policies and products offer to customers for which a customer would make a decision to save with a specific banking intuition in Liberia.



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## APPENDICES

### Appendix I: Data Collection Form

Quarter	LPS	DR	ADR	LGDP	PD	PSC	INF
2010Q1	11.54537	2	86.48574	21.32512	40.4003	8.301969	12.51333
2010Q2	11.63182	2.06666 7	86.40484	21.35613	40.72757	8.656974	7.476667
2010Q3	11.71139	2.2	86.32394	21.38621	41.05483	9.01198	4.23
2010Q4	11.78509	2	86.24304	21.41541	41.3821	9.366985	5.723333
2011Q1	11.85373	2	86.16214	21.46425	41.70936	9.618805	6.243333
2011Q2	11.88815	2.03333 3	86.01751	21.51081	42.0162	9.870624	7.916667
2011Q3	11.92144	2	85.87287	21.55531	42.32303	10.12244	9.026667
2011Q4	11.95365	2.43333 3	85.72824	21.5979	42.62986	10.37426	10.67
2012Q1	11.98485	2	85.58361	21.63102	42.93669	10.35757	9.293333
2012Q2	12.00878	2	85.37982	21.66308	43.22914	10.34088	7.146667
2012Q3	12.03216	2	85.17604	21.69414	43.52159	10.32419	4.503333
2012Q4	12.055	2	84.97225	21.72427	43.81404	10.3075	6.616667
2013Q1	12.07732	2	84.76847	21.75556	44.10649	10.792	7.286667
2013Q2	12.08131	2.03333 3	84.52356	21.78591	44.39503	11.2765	7.4
2013Q3	12.08529	2	84.27865	21.81536	44.68358	11.761	7.59
2013Q4	12.08925	2	84.03375	21.84397	44.97213	12.2455	8.023333

2014Q1	12.09319	2	83.78884	21.85022	45.26067	12.11851	8.15
2014Q2	12.08759	2	83.51857	21.85644	45.55324	11.99153	10.34
2014Q3	12.08196	2	83.2483	21.86262	45.84581	11.86455	11.78
2014Q4	12.07629	2	82.97802	21.86876	46.13838	11.73757	9.41
2015Q1	12.07059	2	82.70775	21.87138	46.43095	12.03963	7.853333
2015Q2	12.0911	2	82.48508	21.874	46.72829	12.3417	7.9775
2015Q3	12.11119	2	82.2624	21.8766	47.02563	12.64377	7.773333
2015Q4	12.13089	2	82.03973	21.8792	47.32297	12.94583	7.933333
2016Q1	12.15021	2	81.81706	21.88711	47.62031	13.0843	7.046667
2016Q2	12.15705	2	81.57191	21.89495	47.91992	13.22277	7.733333
2016Q3	12.16384	2	81.32677	21.90273	48.21954	13.36124	8.736667
2016Q4	12.17059	2.06666 7	81.08162	21.91045	48.51915	13.4997	11.50333
2017Q1	12.17729	2.13333 3	80.83648	21.91103	48.81877	14.44703	12.99333
2017Q2	12.18317	2.2	80.57393	21.91161	49.1218	15.39436	11.86333
2017Q3	12.18901	2.2	80.31139	21.91219	49.42483	16.34168	11.95
2017Q4	12.19482	2.2	80.04885	21.91277	49.72787	17.28901	12.94
2018Q1	12.20059	2.2	79.78631	21.91114	50.0309	17.41728	17.6
2018Q2	12.19487	2.13333 3	79.51339	21.9095	50.3382	17.54556	22.39333
2018Q3	12.18911	2.1	79.24047	21.90786	50.6455	17.67383	26.18
2018Q4	12.18331	2.1	78.96756	21.90622	50.95281	17.80211	27.39
2019Q1	12.17749	2.1	78.69464	21.89129	51.26011	17.93038	23.69

2019Q2	12.20248	2.1	78.41861	21.87613	51.57236	18.05866	27.31333
2019Q3	12.22687	2.1	78.14258	21.86074	51.88461	18.18693	30.69667
2019Q4	12.25068	2.1	77.86656	21.84511	52.19686	18.31521	25.80667
2020Q1	12.27394	2.1	77.59053	21.83525	52.50911	18.44348	23.68
2020Q2	12.29666	2.1	77.3145	21.82529	52.82135	18.57176	18.00333
2020Q3	12.31888	2.1	77.03847	21.81523	53.1336	18.70003	15.28667
2020Q4	12.34062	2.1	76.76244	21.80507	53.44585	18.82831	12.45333