THE EFFECT OF BANK REGULATION ON PROFITABILITY AND LIQUIDITY OF PRIVATE COMMERCIAL BANKS IN ETHIOPIA

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A THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY COLLEGE OF BUSINESS AND ECONOMICS DEPARTMENT OF ACCOUNTING AND FINANCE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR DEGREE OF MASTERS OF SCIENCE IN ACCOUNTING AND FINANCE.

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Declaration

I, Fanos Assefa, hereby declare that the thesis work entitled "The Effect of Bank Regulation On Profitability and Liquidity of Private Commercial Banks in Ethiopia" submitted by me for the award of the degree of Masters of Science in Accounting and Finance of Addis Ababa University at Addis, Ethiopia, is my original work and it has never been presented in any university. All sources and materials used for this thesis have been duly acknowledged.

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Certification

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This is to certify that the thesis prepared by Fanos Assefa entitles: **The Effect of Bank Regulation On Profitability and Liquidity of Private Commercial Banks in Ethiopia** and submitted in partial fulfillment of the requirements for the degree of masters of Science in accounting and finance compiles with the regulations of the university and meets the accepted standards with respect to originality and quality.

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Table of Contents

Content page

List of Acronyms

AIB	**Awash International Bank**
BOA	**Bank of Abyssinia**
BZ	**bank size**
CA	**capital adequacy**
CBO	**Cooperative Bank of Oromia**
CBA	**Cost and Benefit Analysis**
CLRM	**Classical Linear Regression Model**
CR	**Capital requirement**
DB	**Dashen Bank**
DB	**Deposit Fund**
DW	**Durbin–Watson**
EI	**Equity investment**
JB	**Jarque Bera**
LRR	**legal reserve requirement**
LIQU	**Liquidity**
NBE	**National Bank of Ethiopia**
NBEB	**NBE bill purchase requirement**
NIB	**Nib International Bank**
OLS	**Ordinary Least Square**
ROA	**Return on Assets Ratio**
ROE	**Return on Equity Ratio**
UB	**United Bank**
WB	**Wegagen Bank**
ZB	**Zemen Bank**

List of Tables

List of Figures and chart

ABSTRACT

Banking occupies one of the most important positions in the modern economic world. It is necessary for trade and industry. The objective of this study was to determine the relationship between bank regulations with bank financial performance and liquidity. Regulations are the independent variable while financial performance and liquidity are the dependent variable. Financial performance is measured using financial ratios of return on equity while liquidity is measured by current asset divided by current liability. The study used independent variables that are equity investment, legal reserve requirement, capital requirement, capital adequacy, management efficiency and NBE bill purchase requirement. The study used multiple linear regressions models to investigate bank regulations that have impact on the profitability and liquidity of commercial banks in Ethiopia. To obtain information relevant to the study, secondary data was used. Besides, in the study all operational commercial banks in Ethiopia were taken as study population and purposive sampling method was used to select sample from this population with in the period of study is between 2008 and 2017 with a total of 70 observations. The regression result showed that capital adequacy and management efficiency had negative and significant effect on profitability of private commercial banks in Ethiopia and the remaining regulatory variables legal reserve requirement, capital requirement, NBE Bill Purchase and equity investment had insignificant effect on profitability of private commercial banks. While a legal reserve requirement had positive and significant effect on liquidity of private commercial banks in Ethiopia. NBE Bill Purchase and equity investment had positive and insignificant effect on liquidity of private commercial banks in Ethiopia mean the pre and post policy periods comparison revealed that a relatively better liquidity record for private commercial banks during the time of post policy restriction and the remaining two regulatory variables capital adequacy and capital requirement had negative and insignificant effect on liquidity of private commercial banks. Therefore, the study recommends that National Bank of Ethiopia and Ethiopian private commercial banks should give due attentions on bank regulations to enhance private banks profitability significantly and to stable as whole the macro economy of the country.

Key words: NBE regulations, banking liquidity, banking profitability; private banks

1. INTRODUCTION

1.1. Background of the study

It cannot be denied that banks enjoy a dominant position in all economies and that they are the main driver of economic growth (King and Levine 1993 and Levine 1997). The primary role of financial institutions is to provide liquidity to the economy and permit a higher level of economic activity and growth than would otherwise be possible.

The structure of financial development of a country especially in developing countries has been widely discussed and highly debated. On the one hand the financial repression school noted that government intervention in the financial sector, especially through subsidizing interest rates and favored allocation of credits important for economic growth of developing countries. On the other hand, McKinnon (1973), Shaw (1973) World Bank and the International Monetary Fund, financial liberalization has been given greater emphasis for developing countries.

According to the micro prudential and the macro prudential theories there is a correlation between regulations and financial performance in financial institutions. These theories state that regulations must be put in place and enforced even though this may cause a bank to shrink its assets or seek fresh capital from the stock market (Hanson et al., 2011). The theories aim at achieving economic stability and protecting tax payers' interests. This may have the effect of slowing down the financial performance of commercial banks (Hanson et al., 2011).

The global economic recession of 2008 has taught us that there is a need to regulate financial institutions, (Sherman, 2009). The case of USA brings forward the relationship between financial regulations and financial performance. Before 2007 USA had been deregulating their financial sector which saw tremendous growth of the financial institutions only that the growth could not be sustained and the whole industry crushed. Since the financial crisis they have introduced regulations to bring about economic stability and as a result the growth of financial institutions including banks has slowed down, KPMG (2014).

The special role that banks play in the economic system implies that banks should be regulated and supervised not only to protect investors and consumers but also to ensure systemic stability. More specifically, bank regulations exist for safeguarding the industry against systemic risk, protecting consumers from excessive prices or opportunistic behavior and finally to achieve some social objectives, including stability (Llewellyn, 1999).

The most basic reason for introducing regulations is to protect depositors from undue risks to their deposits. Businesses and individuals alike hold significant portions of their funds in banks and there are valid concerns from them with regards to protection of their funds. As a result, authorities respond to such concerns with regulations attempting to protect the bank depositors.

On the other side liberalizing its financial sector may bring economic and social benefits with its certain risks. Going by the above platform upon which banks operates, the discussion of regulatory mechanisms in bank indicates that there are many avenues through which prudential regulations may distort banks return. Many of these mechanisms—including liquidity regulation, solvency regulation, capital adequacy regulation and legal reserve requirement have an impact on profitability of commercial Banks.

Since the 1980's the financial sector in most western countries has been going through the process of deregulation, whereby their governments either removed or reduced state regulations that were governing financial institutions, (Kumbhakar, Lozano-Vivas, Knox Lovell& Hassan 2005). This is because policy makers are convinced that deregulation is the only way they can increase the efficiency and performance of these institutions. These policies aim at increasing banks competition on prices, products and territorial rivalry.

Ethiopia's financial sector and its regulation begin with establishment of the Abyssinian bank in 1905 marked the start of modern banking in Ethiopia. The financial sector was dominated by foreign ownership until the Abyssinian Bank was nationalized in 1931 and renamed the Bank of Ethiopia, thereby becoming the first bank to be nationally owned in Africa (Belay Gedey 1990: 83, Befekadu Degefe 1995: 234).

The State Bank of Ethiopia operated as both a commercial and central bank until 1963when it was dissolved to form the central bank, the National Bank of Ethiopia (NBE),and the Commercial Bank of Ethiopia (CBE). A number of other private financial institutions were also established during the 1960s. The structure of Ethiopia's financial system therefore resembled that of other African countries at this time. All of this changed with the overthrow of the monarchy of Haile Selassie in 1974.Under the Derg regime all privately owned financial institutions including three commercial banks, thirteen insurance companies and two non-bank financial intermediaries were nationalized on 1 January 1975 (Befekadu Degefe 1995: 273, Harvey 1996).

During the era of state socialism (1974 to 1991), Ethiopia's financial institutions were charged with executing the national economic plan; state enterprises received bank finance in accordance with the plan's priorities. This system, based on the template of the Soviet Union, saw little need to develop the tools and techniques of financial regulation and supervision found in market-based financial systems. With the overthrow of the Derg Regime in 1991, Ethiopia began its transition to a market economy. This transition has had profound implications for the financial system. New financial institutions have emerged, the role of the private sector in the financial system has been expanded, and the role of the central bank is being reformulated (Tony Addison and Alemayehu Geda 2001).

Financial reform began in earnest in 1994. NBE's role in overseeing the commercial banks was codified. Sector-specific interest rates administered by NBE were also ended, and replaced with a minimum deposit rate (10 per cent) and a maximum lending rate (15 per cent). The domestic private sector was permitted to enter the banking and insurance business (foreign financial institutions are not yet permitted to invest). The response to these reforms has been promising. There are now 16 private banks; the largest, in terms of paid up capital, is the Dashen Bank (established 1997), followed by the Awash International Bank (established 1994). There are also 17 private insurance companies; Nyala Insurance (established 1995) has the largest number of branches.

The government's strategy for financial development is characterized by gradualism the financial sector currently consists of a mix of private and public entities and a strong emphasis

on maintaining macro-economic stability which is in contrast to Mozambique, where state banks were rapidly privatized (Addison and de Sousa 1999).

Measure NBE banking regulations

National Bank of Ethiopia issued proclamation NO. 592/2008 and define bank business as: receiving funds from the public, using the funds for loans or investment at the risk of the person undertaking banking business, buying and selling of gold and silver and foreign exchange; the transfer of funds to other local and foreign persons and the discounting promissory notes, drafts, bills of exchange and other debt instruments; are some of them.

- *Limitation of foreign bank entry* restricts foreign banks to enter the domestic banking through: (1) Acquisition ;(2) Subsidiary; (3) Branch. Regarding foreign ownership of domestic banks, the government clearly restricts foreign citizens or companies to; own banks fully or partially, open banks or branch offices or subsidiaries of foreign banks or purchase the shares of Ethiopian banks.
- *Interest rate regulation limits* only the minimum deposit rate at 7% per year.
- *Purchasing NBE bill requires* the NBE issued a directive requiring all private commercial banks to invest 27% of their every new loan disbursement in NBE bills with maturity of five years at a very low interest rate, 5%, far below from what banks pay as an interest for the deposit.
- *Capital requirement regulation* Since September 2011, new commercial banks shall raise birr 500 million as a minimum startup capital, which was 75 million birr (Directive No. SBB/50/2011) and existing commercial banks are also required to raise their minimum paid up capital to Birr 500 million in less than five years 'time, by 30 June 2016.
- *Reserve requirement* that national bank of Ethiopia increase the reserve requirement on commercial banks from 5% (Directive No. SBB/37/2004) to 10% effective from July 2007 (Directive No.SBB/42/2007) and further to 15% effective from April 2008 (Directive No. SBB/45/2008). According to (5th Replacement) Directives No. SBB/55/2013.any licensed bank shall maintain in its Reserve Account 5% of all Birr and foreign currency deposit liabilities held in the form total demand, saving and time deposits.

- *Liquidity requirement* has also increased following the revision of reserve requirement (it is always 10% plus to the reserve requirement). This means the liquidity requirement requires banks to hold a further 25% (this is from their total reserve which includes TBs, cash including foreign exchange, etc.) in liquid reserves (only cash deposit). Following the success in getting down the inflation in the country, the NBE revised the requirement downwards to 10% effective January 2012 (Directive No. SBB/46/2012) and the reserve requirement down to 5% effective March 2013.however, the liquidity requirement remained at 20% until directive No. SBB/57/2014 is issued.
- *Provisions for loss on loan or advance* the revised directive (directive No. SBB/32/2002), National Bank of Ethiopia require all banks shall maintain a provisions for loan losses account which shall be created by changes to provision expense in the income statement and shall be maintained at a level adequate to absorb potential losses in the loans or advances portfolio. In deeming the adequacy of the provisions for loan losses account, provisions may be attributed to individual loan or advances or groups of loans or advances. Therefore, banks shall maintain 1% for loan or advance with pass status, 3% for special mention, 20% for substandard, 50% for doubtful and 100% for loss.

The banking system around the globe has been in recent years going through some of the most intense criticism and scrutiny. In part many believe the lack of regulations and supervisory structures have brought the world to a brink of financial collapse, while on the opposite side of that coin many believed the years of prosperity the world had experienced just prior to the collapse were largely in part due to the deregulation or lack of regulation hence a near free market with regard to the financial sector (Reinhart et al, 2008; Brunnermeieret al, 2009).

Therefore, weighing its benefits and risks carefully is important in deciding whether or not to liberalize. Thus, the researcher is interested to examine the impact of NBE regulations on the banks performance and liquidity of Ethiopian private Banks.

1.2. Statement of the Problem

In fact, it was from the crisis of the financial market in 1929, due to the deflation of debts, that regulation of the banking sector became indispensable (Vittas, 1992, Haussmann et al., 1996, Rojas et al., 1997). Economists who have studied the banks consider them to be different and

distinct from other firms and possessing specific characteristics that require the intervention of the public power through the imposition of certain rules (Ogus 1994, Goodhart et al., 1998). As such, Barth, Caprio and Levine (2001) argue that all governments tend to regulate and control banks to ensure the stability of their economies.

Barth et al. (2001) found that the nationalization of banks was negatively correlated with the development of the banking sector and positively associated with measures of bank inefficiency.

As such, Arun and Turner (2002) point out that the inefficiencies associated with bank management, especially those arising from a lack of appropriate managerial motivation, combined with strong pressure from governmental agencies, have led governments to developing countries to gradually withdraw from the banking sector. Likewise, the interests of the shareholders of a bank, namely the maximization of the shareholder value, may not coincide with those of the central regulations in that the shareholders are risk-takers then Regulators are risk-averse and their main concern is the stability of the financial system (Capiro and Levine, 2002).

The process of deregulation has created good advantage for some countries for instance the deregulation of Norwegian banks gave them the permission to set their own lending rates as well as the amount of money they could lend out.

In Ethiopia, because of its importance for economic development, the Government has taken a cautious approach towards financial sector reform. In introducing financial liberalization, the Ethiopian government adopts a strategy of (a) gradualism: gradual opening up of private banks and insurance companies, and step by step liberalization of the foreign exchange market. (b) Intensification of domestic competitive capacity before full liberalization, strengthening the regulatory and supervisory capacity of the NBE, giving the banks autonomy, and strengthening the interbank money market (Geda& Tony 2001).

In relation to the above problem, Yodit (2012) assess the implication of NBE bill purchase requirement on the performance of private commercial banks in Ethiopia using qualitative research method and also Tesfaye (2014) conducted study case of NBE bill purchase

requirement with the performance of private banks using qualitative and quantitative research method. In the same year Eden (2014) examine the impact of National bank regulation on the performance of private banks using panel data from 2004 to 2013 of six private banks and she used NBE bill purchase requirement, Credit cap and reserve requirement as indicator of National bank regulation without incorporate the other regulations like equity investment limitation, capital and liquidity requirement.

This therefore, to the knowledge of the researcher, no study to date provides a comprehensive analysis of the impact of NBE regulations on profitability and liquidity of private commercial banks in Ethiopia. Thus, the deficiencies of the previous studies have discussed in the empirical study chapter along with the above discussed issues call for the current research.

1.3. Broad objective

The broad objective of this study is to examine the effect of NBE regulations on profitability and liquidity of private commercial banks in Ethiopia controlling the influence of bank specific variables.

1.4. Specific objective

Specifically, this study addresses the following objectives;

- To examine the effect of legal reserve requirement on profitability and liquidity of private Ethiopian commercial banks.
- To examine the effect of capital requirement on profitability and liquidity of private Ethiopian commercial banks.
- To examine the effect of equity investment limitation on profitability and liquidity of private Ethiopian commercial banks.
- To examine the effect of NBE bill purchase requirement on profitability and liquidity of private Ethiopian commercial banks.
- To examine the effect of Capital adequacy requirement on profitability and liquidity of private Ethiopian commercial banks.

1.5. Research question (RQ)

In line with the broad objective of this study described above, the following specific research question was formulated:

RQ. Which NBE regulations *significantly affect the profitability of private commercial banks in Ethiopia?*

RQ. Which NBE regulations *significantly affect the liquidity of private commercial banks in Ethiopia?*

1.6. Hypotheses of the study

In line with the broad objective describe above, the following hypotheses are also formulated for investigation based on theories and past related empirical studies.

Hypothesis 1: Requirement of NBE bill purchase has negative significant impact on the profitability of private commercial banks.

Hypothesis 2: Legal reserve requirement has negative and significant effect on profitability of Private commercial banks in Ethiopia.

Hypothesis 3: Capital requirement has positive and significant effect on profitability of Private commercial banks in Ethiopia.

Hypothesis 4: Equity investment has positive and significant effect on profitability of Private commercial banks in Ethiopia.

Hypothesis 5: Requirement of capital adequacy has negative significant impact on the profitability of private commercial banks in Ethiopia.

Hypothesis 6: Requirement of NBE bill purchase has negative significant impact on the liquidity of private commercial banks in Ethiopia.

Hypothesis 7: Legal reserve requirement has positive and significant effect on liquidity of Private commercial banks in Ethiopia.

Hypothesis 8: Capital requirement has positive and significant effect on liquidity of Private commercial banks in Ethiopia.

Hypothesis 9: Equity investment has positive and significant effect on liquidity of Private commercial banks in Ethiopia.

Hypothesis 10: Requirement of capital adequacy has negative significant impact on the liquidity of private commercial banks in Ethiopia.

1.7. Significance of the research

- The study identified and draws some conclusions about the impact of NBE regulations on profitability and liquidity of Ethiopian private commercial banks. Thus, it provides direction to the management of the banks and policy makers to take remedial action if needed.
- There is no sufficient research in Ethiopia with the objective of comprehensive analysis of the impact of NBE regulations on profitability and liquidity of private commercial banks in Ethiopia. As a result, this study makes a number of contributions to other researchers as a source of reference and as a stepping stone for those who want to make further study on the area afterwards.
- By establishing the effect of regulation on the growth of commercial banks it will help policy makers formulate new policies in that they will be informed about the effect of their policies will have on the banking sector and the economy as a whole. They will be able to ascertain which aspects of regulation can be geared towards the accomplishment of development goals without compromising on prudent regulation and the stability of the financial sector, Sinha et al. (2011). They will also know how they can supplement development objectives with other well designed financial sector policies.

1.8. Scope of the study

The scope of the study restricted to seven private commercial banks in Ethiopia that are registered by the NBE and operating in the Ethiopian banking industry and have at least ten years' data for the consecutive years (2007/08-2016/17). These banks are selected since they are older than the other private commercial banks and are expected to have more experience on the handling of liquidity problem and maximization of profitability.

1.9. Organization of the Paper

This paper consists of five chapters with different sections and sub-sections and it is structured as follows. Chapter one presents the introduction for the main part of the paper. Chapter two reviews the most significant theoretical and empirical studies including Ethiopian banking business environment. Chapter three focuses to presents methodology of the study. Chapter four also provide the interpretation and analysis of econometric model outcomes. Chapter five as usual gives conclusion and recommendation.

Chapter Two

2. Review of related literature

In this literature review part concepts related to profitability and liquidity, banking regulations, and their relationships and review of previous related studies which serve as background for this study and help to identify knowledge gaps are presented. Hence, this chapter is arranged into three sections. Section 2.1 presents theoretical review of profitability, liquidity and banking regulation. This is followed by a review of the relevant empirical studies which are related with this study presented in section 2.2. Finally, conclusion and identification of knowledge gap are presented in section 2.3.

2.1. Theoretical review

This section of the chapter presents theoretical review related to banking regulations, commercial banks profitability and liquidity with its measurement and the relation between banking regulation and profitability with liquidity. Accordingly, section 2.1.1 presents different banking regulations theory. Then section 2.1.2 presents banks profitability with liquidity and its measurement. Finally, section 2.1.3 presents the relation between financial risks and profitability with liquidity.

2.1.1. Prudential regulation in banks

In fact, it was from the crisis of the financial market in 1929, due to the deflation of debts, that regulation of the banking sector became indispensable and banks tend towards nationalization to guard against possible crises (Vittas, 1992, Haussmann et al., 1996, Rojas et al., 1997). In addition, economists who have studied the banks consider them to be different and distinct from other firms and possessing specific characteristics that require the intervention of the public power through the imposition of certain rules (Ogus 1994, Goodhart et al., 1998).

As such, Barth, Caprio and Levine (2001) argue that all governments tend to regulate and control banks to ensure the stability of their economies. The purpose of these regulations is to serve the public interest, in particular the interest of consumers in the banking service, which

is the overriding objective of the regulator (Visentini, 1997). In the same vein, Adams and Mehran (2002) argue that the specificities and peculiarities of the banking sector reinforce the need for bank regulation. In fact, through the main deposit guarantee mechanisms and the lender's last strategies, regulation acts as a depositor protection and risk avoidance mechanism. It also allows the resolution of the problems of agency, the discipline of the behaviors of the leader so that it acts in the interests of the shareholders.

2.1.2. Helping- hand theory

The helping-hand theory is motivated by prior academic research which has mostly argue that shareholder in financial institution with close ties to governments gain from political connections (shleiefer and Vishny, 1998). The government ownership of banks facilitates the mobilization of savings and the allocation of those savings toward strategic projects with long-term beneficial effect on an economy. According to this view, governments have adequate information and sufficient incentives to insure socially desirable investments. Lewis (1950), Myrdal(1968) and Gerschenkron (1962) specifically advocate government ownership of banks to promote economic and financial development, especial under developed countries. Consequently, government ownership of banks helps economic overcome private capital-market failures, exploit externalities and invest in strategic sectors.

2.1.3. Grabbing-hand theory

The grabbing hand view, in contrast, argues that the governments do not have sufficient incentives to insure socially desirable investments (Kornai, 1979). shleiefer and Vishny, 1998 government ownership in financial institution tends to politicize resource allocation, soften budget deficits and otherwise hinder economic efficiency. Thus, government ownership of banks facilitates the financing of politically attractive projects but not necessarily economically efficiency projects.

2.1.4. Cost and benefit of bank regulation

The most obvious reason is that we want regulations that advance the public interest, and regulations that produce gains greater than losses. Cost benefit analysis (CBA) also improves

transparency by forcing regulators to lay bare their assumptions about the effects of regulations on the public. Consistent use of CBA makes it easy for regulated parties to plan and predict how regulators will respond to new industrial practices.

Financial regulation would seem ideal for CBA, and it is indeed surprising that CBA began with environmental regulation rather than the other way around. In the case of environmental regulation, one must contend with hard-to-value effects like those to life, health, and wildernesses. By contrast, financial regulation is mostly about money. A good financial regulation does not save hard-to-measure lives; it saves easy-to-measure dollars (Revesz 2014).

Banks association commonly complain that regulatory requirements are costly; regulatory agencies often invoke high regulatory costs as an excuse for leaving matters unchanged or, conversely, carelessly assert that the cost of a particular requirement is trivial(Tesfaye 2015). The cost of regulation consists of opportunity and operating costs that arise from activities or changes in activities that are required by the regulation (Elliehausen 1998). For a bank, opportunity costs occur when a regulation prevents it from engaging in profitable activities. An example is the cost resulting when branching restrictions prevent a bank from taking advantage of profitable lending opportunities outside its local area and possibly make it vulnerable to downturns in local business conditions. Another opportunity cost is the interest forgone as a result of the prohibition on investing reserves in interest-bearing assets (Wallace 2013).

Operating costs arise from requirements that banks perform certain actions, for example, reporting to government agencies, and providing disclosures to customers, and meeting certain operating standards. In each case, employee time, material, and equipment must be devoted to performing specific acts; and managerial effort must be devoted to understanding the regulation ‘s requirements, implementing required actions, and ensuring compliance with the regulation (Ibid 2013).

There are two types of operating costs—start-up and ongoing. *Start-up costs* are the one-time costs of implementing changes to conform to the requirements of a regulation. They include

legal expenses for interpreting the regulation, advising managers, and reviewing procedures and forms; managerial expenses for reviewing and revising procedures and forms, coordinating compliance activities, and designing internal audit programs; training expenses; costs for modifying information systems and storing records; expenses for programming and testing of software; and costs for designing new forms and destroying obsolete forms.

Ongoing costs are the recurring costs of performing the activities required by a regulation. They include managerial expenses for monitoring employee compliance and for coordinating compliance examinations with regulatory agencies; labor expenses for preparing reports and disclosure statements and responding to customer questions; legal expenses for reviewing complaints; and printing and postage expenses to provide written disclosures to customers.

The distinction between start-up and ongoing costs is not always clear cut. Many regulations change frequently. The process of monitoring and implementing regulatory changes may, in itself, be an ongoing activity, and the cost of this activity may legitimately be considered an ongoing cost. The cost of implementing frequent changes may be substantial, possibly greater than other recurring costs (Elliehausen 1998).

2.1.5. Do banks need to be regulated?

The justification for any regulation usually stems from a market failure such as externalities, market power or asymmetry of information between buyers and sellers. In the case of banking, there is still no consensus on whether banks need to be regulated and, if so, how they should be regulated. This partly reflects the lack of consensus on the nature of the market failure that makes free banking not optimal. Nonetheless, there are two justifications that are often presented for regulating banks: the risk of a systemic crisis and the inability of depositors to monitor banks.

2.1.5.1. The systemic risk argument

Banks' provision of liquidity services leaves them exposed to runs (Diamond and Dybvig (1983)). The reason is that a bank needs to operate with a balance sheet where the liquidation value of its assets is less than the value of liquid deposits in order to provide liquidity

services. Under these circumstances, given that depositors' expectations about the value of their deposits depend on their place in line at the time of withdrawal because of the first come, first served rule, a run can occur without the release of adverse information about the bank's assets and even when there is perfect information about bank's assets. For example, if depositors panic, they may try to withdraw their funds out of fear that other depositors will do so first, thus forcing an otherwise sound bank into bankruptcy. If there were no aggregate uncertainty and if each bank's investment in the short–term asset was publicly observable, then depositors could be fully insured against the liquidity risk faced by their bank if banks could lend to each other (Bhattacharya and Gale (1987)).

However, when there is asymmetry of information about the banks' assets, as happens when banks provide monitoring services because this requires them to hold a large portion of their assets in the form of illiquid loans, the interbank market will not generally be able to provide depositors with full liquidity insurance. A possible reason is that under these conditions, banks are afraid of a "winner's curse" (that is, of lending only to other banks that have already been rejected loans because of their poor quality) and consequently lend less than they would under homogeneous information (Flannery (1996)). Asymmetry of information about banks' assets makes them susceptible to an additional source of runs, the release of information on the value of those assets, (Jacklin and Bhattacharya (1988)).

A bank run that is triggered by the release of information indicating poor performance by the bank may be beneficial because it is a source of discipline. In contrast, a run triggered by depositors' panic or by the release of information when there is asymmetry of information among depositors about bank returns will not be beneficial. In this case, the run is costly because it forces the premature liquidation of assets, thus disrupting the production process. Furthermore, it may trigger contagion runs, which may culminate in a system failure. It is this risk of a system failure that forms the basis of the classical argument proposing mechanisms to insure banks against liquidity shocks despite their interference in the free functioning of markets.

2.1.5.2. Proposals to insulate banks from runs

One of these proposals suggests the development of narrow banks, that is, banks that invest only in riskless securities, such as short–term government securities. Narrow banks are run–proof but this comes at a cost in that they do not perform one of banks' key functions, the creation of liquidity. Another drawback associated with narrow banking results from the inability of intermediaries to exploit the gains that result from combining deposit–taking with lending extended through commitments or credit lines (Kashyap, Rajan and Stein (1999)). Moreover, it is possible that the new firms that would move in to fill the vacuum left by banks would inherit the problem of runs (Diamond and Dybvig (1986) and Wallace (1996)).

Another proposal suggests funding banks with equity rather than demand deposits. This would make banks protected to runs but would be costly, as under certain conditions demand deposits dominate equity contracts in insuring consumers against random shocks to their inter temporal preferences for consumption (Jacklin (1987)). This proposal, therefore, yields a trade-off between stability and efficiency.

A third proposal builds on the suspension of convertibility. If banks could precommit not to liquidate more than the portion of their assets that is necessary to meet the liquidity demands of those consumers that wish to consume early then they would eliminate the other consumers' incentive to run on the bank. Suspension of convertibility, though, provides complete insurance only if liquidity shocks are perfectly diversifiable and if the portion of consumers that wish to consume early is known.

A fourth proposal, probably the oldest one, is associated with Bagehot (1873), who is usually credited with the first analysis of a central bank's role as lender of last resort (LLR) in preventing a bank run from turning into a panic. To that end, he argues that the central bank should make clear in advance its readiness to lend any amount to a bank that is having liquidity problems provided the bank is solvent. Lending should be done at a penalty rate (to reduce banks' incentives to use these loans to fund normal business) and only against good collateral (valued at pre-panic prices).

It appears, however, that the conditions set out by Bagehot for operating the LLR function delay the LLR from attaining its key objective. A bank with good collateral will be able to borrow from the market. It is when there is some uncertainty about the bank's financial condition that the bank may not be able to meet its liquidity needs in the interbank market and therefore an LLR becomes valuable (Flannery (1996)).In Bagehot's own words: "Every Banker knows that if he has to prove that he is worthy of credit, however may be his argument, in fact his credit is gone". The LLR could avoid this problem by committing to extend liquidity support to all the banks seeking it, but this would come at a cost, as it would lead to moral hazard.

A final proposal to protect banks from runs is for the government to offer deposit insurance (Diamond and Dybvig (1983)). A government scheme of full insurance guarantees banks complete protection from runs. However, such a scheme is not socially costless because the government will have to tax other sectors of the economy, and therefore leads to a possible deadweight loss, when it is asked to provide liquidity as a result of a bank's low return or of large early withdrawals. Deposit insurance, in addition, may lead to moral hazard.

2.1.5.3. Deposit insurance and moral hazard

Government deposit insurance has proven very successful in protecting banks from runs, but at a cost because it leads to moral hazard. By offering a guarantee that depositors are not subject to loss, the provider of deposit insurance bears the risk that they would otherwise have borne. As a result, it diminishes depositors' incentive to monitor banks and to demand an interest payment commensurate with the risk of the bank. Furthermore, when the insurance scheme charges the bank a flat rate premium, the bank does not internalize the full cost of risk and therefore it has an incentive to take on more risk.

Merton (1977) pioneered the use of the arbitrage pricing method, originally developed for pricing options on common stock, to analyses the deposit insurance distortion on banks' risk–taking incentives. He shows that deposit insurance can be viewed as a put option on the value of the bank's assets with a striking price equal to the promised maturity value of its debt. If the insurance premium is risk–insensitive, the bank can increase the value of the put option by

increasing the risk of its assets and/or decreasing its capital–to–assets ratio. A bank's appetite for risk is further increased with an increase in competition in the banking sector and a reduction in the value of the bank's charter (Marcus (1984) and Keeley (1990), Hellmann, Murdock and Stiglitz (1997), and Matutes and Vives (1998)).

The trade–off introduced by deposit insurance – ruling out bank runs at the expense of moral hazard –has motivated proposals to change the design of the deposit insurance scheme or introduce complementary regulations aimed at reducing the moral hazard while maintaining the protection to depositors. The most frequent proposals to deal with the moral hazard caused by deposit insurance are to charge banks risk–related insurance premiums and to regulate their capital structure.

2.1.5.4. Is fairly priced deposit insurance possible?

To eliminate the risk-shifting incentive it gives banks, deposit insurance needs to be fairly priced.

However, as we are about to see, asymmetry of information may make the computation of fair Premiums impossible or undesirable from a welfare point of view.

Starting with Merton (1977), a vast literature has used the arbitrage pricing method to determine the fair insurance premium. The arbitrage pricing method assumes that, among other things, the financial markets are complete, the provider of deposit insurance has perfect information about the risk of banks' assets, it can value accurately banks' assets, and moral hazard is explicitly or implicitly ruled out. Under these conditions, however, deposit insurance is not necessary because there is no risk of bank panics. For that reason, researchers began to study the feasibility of fairly priced deposit insurance where there is asymmetry of information. Chan, Greenbaum and Thakor (1992), for example, consider a setting where there is asymmetry of information and the insurance provider offers a menu of contracts, each requiring the bank to hold a certain capital–to–assets ratio and charging it a given insurance premium per unit of deposits it holds. The is find that it is generally impossible to implement incentive–compatible, fairly priced deposit insurance in that setting. When there is only adverse selection, the impossibility arises because banks are indifferent vis–à–vis their capital

structure when insurance is fairly priced. Therefore, they prefer a lower insurance premium for any positive level of deposits. Because of this, the high–risk institution always prefers the menu of contracts chosen by the low–risk institution as long as this one chooses some positive level of deposits.

2.1.5.5. The depositors' representative argument

The systemic risk argument builds on the instability that arises with banks' provision of monitoring and liquidity services, which leaves them with a balance sheet that combines a large portion of liabilities in the form of demand deposits with a large portion of assets in the form of illiquid loans.

Dewatripont and Tirole (1993a, 1993b) propose a rationale for banking regulation – the representation hypothesis – that builds instead on the corporate governance problems created by the separation of ownership from management and on the inability of depositors to monitor banks.

The departing point of their argument is that banks, like most businesses, are subject to moral hazard and adverse selection problems. Therefore, it is important that investors monitor them. Monitoring, however, is expensive and requires, among other things, access to information. Furthermore, it is wasteful when duplicated by several parties. In the case of banking, this is complicated by the fact that bank debt is mainly held by unsophisticated depositors without the necessary information to perform efficient monitoring. In addition, because most of them hold only a small deposit they have little incentive to perform any of the functions that monitoring a bank would require. This free–riding problem creates a need for a private or public representative of depositors. That need can be met by a regulation that mimics the control and monitoring that depositors would exert if they had the appropriate information, were sophisticated and fully coordinated.

In sum, the research reviewed in this section shows that banks provide superior intertemporal risk sharing when they found themselves with demand deposits. Under these conditions, however, bank runs and panics may develop as an equilibrium phenomenon. Because these are costly, several mechanisms have been proposed to rule them out. These mechanisms,

however, are themselves costly. For example, government deposit insurance can provide depositors full insurance but is a source of moral hazard. These problems are usually presented as one of the reasons for regulating banks. Another common rationale for banking regulation builds on the problems that the separation of ownership from management raises for corporate governance. In the case of banks, these problems are compounded by the fact that depositors are not in a position to monitor management, as they are small and uninformed. Therefore, they need to be represented by a regulator.

2.2. Banks profitability and liquidity and its measurement

2.2.1. Banks profitability

Commercial banks make profit by earning more money than what they pay for expenses and taxes. The most important portion of a bank's profit comes from the fees that it charges for its services and the interest that it earns on its assets. Its major expense is the interest paid on its liabilities. Loans dominate asset holding at most banks and generate the largest share of operating income. Loans are the dominant asset in most banks‟ portfolios, comprising from 50 to 70 percent of total assets (Claudiu and Daniela (2009).

The major assets of a bank are its loans to individuals, businesses, and other organizations and the securities that it holds, while its major liabilities are its deposits and the money that it borrows, either from other banks or by selling commercial paper in the money market. Return on asset (ROA) and return on equity (ROE) are the commonly used ratios to measure profitability of a business. Assets are used by businesses to generate income. Loans and securities are a bank's assets and are used to provide most of a bank's income. However, to make loans and to buy securities, a bank must have money, which comes primarily from the bank's owners in the form of bank capital, from depositors, and from money that it borrows from other banks or by selling debt securities. A bank buys assets primarily with funds obtained from its liabilities. However, not all assets can be used to earn income, because banks must have cash to satisfy cash withdrawal requests of customers.

The ROA is determined by the amount of fees that it earns on its services and its net interest income.Net interest income depends partly on the interest rate spread, which is the average

interest rate earned on it assets minus the average interest rate paid on its liabilities. Net interest margin shows how well the bank is earning income on its assets. High net interest income and margin indicates a well-managed bank and also indicates future profitability. The measurement of bank performance has been developed over time. At the beginning, many banks used a purely accounting-driven approach and focused on the measurement of Net income, for example, the calculation of ROA. However, this approach does not consider the risks related to the referred assets, for instance, the underling risks of the transactions, and also with the growth of off-balance sheet activities. Thus the riskiness of underlying assets becomes more and more important. Gradually, the banks notice that equity has become the scarce resource. Thereby, banks turn to focus on the ROE to measure the net profit to the book equity in order to find out the most profitable business and to do the investment (Gerhard .S 2002 cited in Ara et al., 2008). Net interest margin (NIM) ratio is also used to measure bank profitability in the baking literature. Studies that explore the factors that influence the profitability of banks use one or a combination of these ratios alternatively as measures of bank profitability in their analysis.

Ratios (net profit to total asset, net profit to equity, and NIM) instead of the real value of profits are used in measuring bank profitability because ratios are not influenced by variations in the general price level. Ratios are time invariant; the real value of profits may be affected by the time varying inflation rates. That is, ratios are time invariant because both the numerator and the denominator in the period-t would be measured in monetary terms based on period-t price levels (Guru et al., 1999)

2.2.2. Bank liquidity

As Ramlall, (2009), mentions it is critical that a bank guard carefully against liquidity risk; the risk that it will not have sufficient current assets such as cash and quickly saleable securities to satisfy current obligations e.g. those of depositors especially during times of economic stress. Without the required liquidity and funding to meet obligations, a bank may fail. However, liquid assets are usually associated with lower rates of return. The higher this percentage the more liquid the bank is and less vulnerable to a classic run on the bank.

Ramlall, (2009), also noted as low levels of liquidity constitute the main causes of bank failure.

2.2.2.1. Anticipated income theory

This theory holds that a bank‘s liquidity can be managed through the proper phasing and structuring of the loan commitments made by a bank to the customers. Here the liquidity can be planned if the scheduled loan payments by a customer are based on the future of the borrower. The theory emphasizes the earning potential and the credit worthiness of a borrower as the ultimate guarantee for ensuring adequate liquidity. (Nwankwo 1991) posits that the theory points to the movement towards self-liquidating commitments by banks. This theory has encouraged many commercial banks to adopt a ladder effects in investment portfolio (Sunny et al 2013).

2.2.2.2. Shift ability Theory

This theory posits that a bank‘s liquidity is maintained if it holds assets that could be shifted or sold to other lenders or investors for cash. This point of view contends that a bank ‘s liquidity could be enhanced if it always has assets to sell and provided the Central Bank and the discount Market stands ready to purchase the asset offered for discount. Thus this theory recognizes and contends that shift ability, marketability or transferability of a bank's assets is a basis for ensuring liquidity. This theory further contends that highly marketable security held by a bank is an excellent source of liquidity. According to (Nwankwo (1991) the theory argues that since banks can buy all the funds they need, there is no need to store liquidity on the asset side (liquidity asset) of the balance sheet. Liquidity theory has been subjected to critical review by various authors. The general consensus is that during the period of distress, a bank may find it difficult to obtain the desired liquidity since the confidence of the market may have seriously affected and credit worthiness would invariably be lacking. However, for a healthy bank, the liabilities (deposits, market funds and other creditors) constitute an important source of liquidity (Sunny et al 2013).

2.2.2.3. Commercial loan theory

The theory stipulates that lending should be on short-term since most deposits are also in short-term. It is the oldest theory of liquidity management. It seeks to match short-term profit motive with short-term obligations of making depositors funds available when needed. The doctrine is buttressed by (Onoh, 2002), he opines that for management and application of funds (liquidity) to be effective, the tenor of funds (sourced from deposits and other sources) must be marched with the tenor of asset (i.e. loans and advances to customers etc.)

This theory has been subjected to various criticisms by (Nwankwo 1992). From the various points of view, the major limitation is that the theory is inconsistent with the demands of economic development especially for developing countries since it excludes long term loans which are the engine of growth. The theory also emphasizes the maturity structure of bank assets (loan and investments) and not necessarily the marketability or the shift ability of the assets (as cited by Sunny et al 2013).

Also, the theory assumes that repayment from the self-liquidating assets of the bank would be sufficient to provide for liquidity. This ignores the fact that seasonal deposit withdrawals and meeting credit request could affect the liquidity position adversely. Moreover, the theory fails to reflect in the normal stability of demand deposits in the liquidity consideration.

2.3. The Relationship between banking regulation and profitability and liquidity.

Regulations impact on the very structure of the banking system since they present the stipulations and restrictions that must be considered in the banks entire series of operations. But in terms of optimality, it remains to be answered whether all the restrictions in place are necessary. Bhattachyra (1998) had some notable conclusions when he set out to survey modern literature on bank regulation, exploring the implications for optimal regulation.

Among the conclusions were:

I. Imposing restrictions on banks investment may limit the liability of the deposit insurance fund, affecting the optimal configuration of banking and may reduce charter values as a result.

II. Risk sensitive capital requirements and risk calibrated deposit insurance premia are potentially useful regulatory tools in coping with moral hazard.

III. If bank closure policy is improved and discipline brought to bear, it could attenuate the moral hazard problems related to deposit insurance

IV. Increasing banks charter values can also help to dampen the risk-taking propensities of the insured banks.

V. If universal banking is permitted it facilitates reusability of information and stimulates investments.

Further Bhattachyra (1998) suggests that restricting banks to financing themselves does not sacrifice efficiency; bank sizes should not be restricted and financing with non-traded demand deposit contracts without constraints on the associated interest rate patterns should be permitted. Therefore, it can be concluded that although restrictions have their place in the financial system, they are no tall beneficial of the public nor the banking system and sometimes the economy as a whole. Measures such as interest rate ceilings and floors, exchange and credit controls and reserve requirement are typical tools for the central bank to use in their effort to the banks. One school of thought is that where there is no deposit rate ceilings, banks will bid up deposit interest rates which in turn will cause them to seek out higher yielding riskier assets to justify the high deposit rates.

2.4. Empirical review

There are prior studies conducted in different countries which are related to the topic/problem of this study. In order to show the research gap and justify the importance of this study the following section presents review of the empirical evidence that have examined banking regulation and profitability of commercial banks.

KPMG carried out a survey in the United States of America in 2013. This survey was carried out by Forbes Insights and it involved 910 executives at US-based multinational corporations, banks and asset management firms. The survey was geared towards outlining the measures

that need to be taken to turn the perceived burden of regulations on transformation into opportunities. After the financial crisis of 2008 financial institutions have found it to be very expensive to comply with tighter regulations. The new regulations have hampered the growth of revenue and profitability. This survey shows that regulations reduce the financial performance of financial institutions.

Vianney (2013) conducted a study in Rwanda that was intended to ascertain the relationship between regulation and the financial performance of commercial banks in Rwanda. He adopted a descriptive research design which enabled him to examine the above stated relationship. His sample size was 10 commercial banks. His findings were that regulation is not a significant predictor of financial performance of commercial banks in Rwanda. He states that regulation is a key pillar of financial institutions operation and by extension to financial prosperity and stability. He recommended that the government of Rwanda should develop policy that will help banks to operate in a conducive environment and this can create financial stability of financial institutions in the country. According to this study, regulations have no impact on the financial performance of financial institutions.

Barth, Caprio & Levine (2002) carried out a survey between 1998 and 2000 that was funded by the World Bank. The purpose of the survey was to investigate the relationship between bank regulations and supervisory practices and bank performance and stability. The survey was intended to collect information on bank regulations and practices in supervision for more than 107 countries. They used regression analysis in the survey. They concluded that there is a negative association between restricting the activities of a bank and its performance and stability as compared to when banks could freely diversify into other financial activities.

Brownbridge (1996) conducted a study on the impact of public policy on the banking system in Nigeria. His main focus was on commercial and merchant banks. Since 1986 Nigeria started the partial deregulation of its financial system which had significant effects on banking markets. The aim of this liberalization was to increase competition among banks as well as foster the efficient allocation of resources. This saw the easing of entry restrictions and some allocate controls were removed. This led to a rapid expansion in banks. Most of the federal government banks were privatized. Deregulation of controls was partial and inconsistent and

as a result its impact was limited on the efficiency of resource allocation in banking markets. He concluded that the liberalization of entry requirements and interests increased the risk of financial instability in the late 1980s and early 1990s for all banks including those that were well managed. This was due to the intense competition for deposits and forced nominal deposits and lending rates to go up. Therefore, deregulation although it was partial, had adverse effects on the banking industry and the economy at large.

Mwega (2014) carried out a case study in the Kenyan financial sector to investigate the potential tradeoff between regulation and stability of Kenya's financial sector. The study focused on the banking sector. The study adopted an empirical approach, entailing quantitative work and focused policy analysis. He states that finance aims at propagating economic activity and the main aim of regulations is maintaining financial stability and enhancing economic growth. There is need to be balanced because when great focus is placed on stability of the financial sector it can hamper growth while on the other hand if emphasis is placed on growth it might bring about a financial crisis in the future. He concluded that reforms in the financial sector over the last ten years have strengthened the banking industry..

Gudmundsson, Kisinguh & Odongo (2013) conducted a survey on the role of capital requirements on bank competition and stability. It was carried out over the period 2000 to 2011. They used the Lerner index as well as the Panzar and Rosse H-statistic to measure the level of competition in Kenya's banking industry. They also used ROE to measure bank performance and stability. They found that an increase in core capital reduces competition up to a certain point after which competition starts to increase. This implies that its benefits start to be realized the moment consolidation in the banking sectors starts to take place. They concluded that there is a positive relationship supporting the evidence that capital regulation does improve the performance of banks and financial stability.

Mureithi (2012) carried out a study on the effect of financial regulation on financial performance of Deposit-Taking Microfinance institutions (DTMs) in Kenya. The research design used was descriptive survey method and cross sectional method. The target population was 6 DTMs in Kenya. She concluded that the supportive Deposit Taking Microfinance Regulations of 2008 led to the improvement in financial performance of DTMs. The

regulations lead to increase in the value of loans outstanding, total assets, profit and shareholders' equity of DTMs. Hence regulations do have a positive impact on the profitability of commercial banks.

Eden (2014) studied on The Impact of National Bank Regulation on Banks Performance: Evidence from the Private Banks of Ethiopia. Start her study by the general objective of examine the impact of National Bank regulation on private banks performance in Ethiopia. The conclusion of her study is that NBE-Bill purchase has negative and significant effect on banks performance due to the lesser amount of interest rate compared to the amount of interest rate if the amount invested on the Bill was invested on other investments and she measured through both Return on Asset and Net Interest Margin and also she concluded Change in reserve requirement has negative and significant effect on the banks cost of intermediation measured through Net Interest Margin.

Yodit (2012) with the use of in depth interview made on exploratory research to investigate on the implication of NBE bill Purchase on performance of private commercial banks in Ethiopia and found out that the directive affects the bank's profitability in an adverse manner. The directive states that banks should purchase 27% based on their total disbursement with disregard to the nature of loan, which have revolving nature and are also short term, would aggravate the liquidity problem. But taking into consideration the deposit structure of the banks into account if the banks shift to loan term maturing loan in order to avoid the aggravated problem of liquidity with such revolving loans the banks would be faced with asset liability mismatch.

Another study conducted by Shibiru, (2014) on the assessment of the implication of regulatory policy on the development of private commercial banks in Ethiopia in case of NBE bill purchase directive. The objective of his study was to assess the implications of NBE bills purchase directive on the development of private commercial banks in Ethiopia.

The conclusions of his study was, implications of bills purchase directive of NBE negatively reflected on almost all private commercial banks" performances/activities consequently on the development of private commercial banks. The study also revealed the directive has negative

implications on the expense of the private commercial banks via increasing the expenses of private commercial banks.

Tesfaye (2014) made research on the impact of policy measures on Ethiopian private banks performance on the case of government bill purchase. The major theme of the study is to assess the effect of sector specific policy measures on bank performance. The study has taken one of the top policy issues; the requirement to purchase government securities, and analyzed its impact on profitability measure, ROA. The study finds that exposure to government bills has negative and significant relationship with performance. Nevertheless, the magnitude is not severe.

He reveals that even the pre and post policy periods comparison revealed a relatively better profitability record for private banks during times of policy restrictions. Hence, the bill seems contributed positively to performance via moping the excess liquidity holding of banks or providing an opportunity for private banks to invest their excess funds in government securities than the customary practice of holding their liquid asset in zero earning accounts at the National Bank of Ethiopia (Tesfaye, 2014).

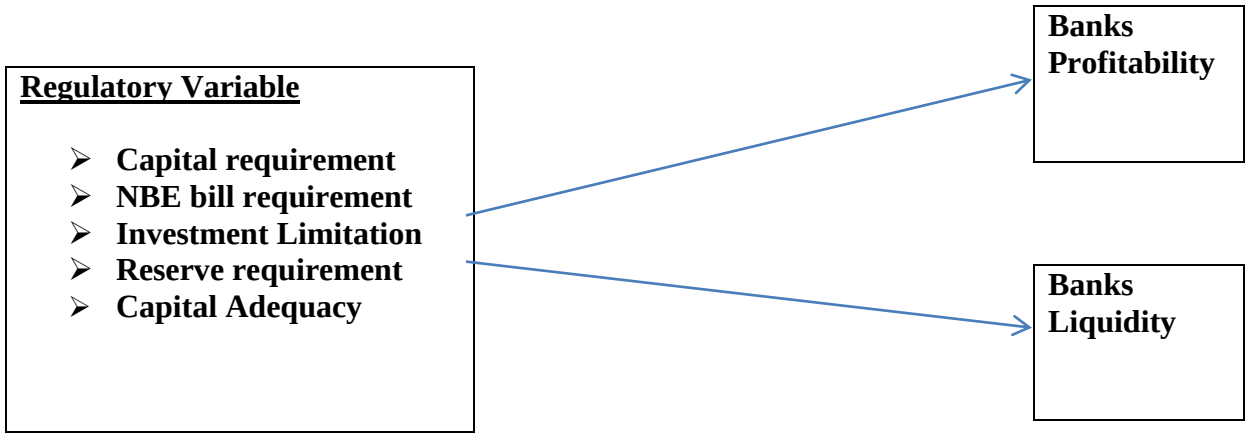
2.5. Literature gap

In order to measure the impact level of National Bank regulations (Legal reserve, Capital requirement, Capital Adequacy, NBE bill purchase requirement and Limitation of Equity Investment) on profitability and liquidity of commercial banks in Ethiopia it necessitates study in each country since we cannot describe the impact level from the scratch or simple from the theory. The review of the literature discussed in this chapter reveals the existence of gaps of knowledge in this regard, particularly in the context of Ethiopia. To my knowledge the above mentioned issue has not been adequately investigated in Ethiopia.

Eden (2014) studied on The Impact of National Bank Regulation on Banks Performance and she used credit cap, NBE bill purchase and legal reserve as explanatory variables without incorporate capital requirement, Capital Adequacy and equity investment limitation and also the performance proxy was *ROA & NIM* but the NBE regulations effect better in addition to see on liquidity of the bank.

Yodit (2012), Tesfaye (2014) and Shibiru, (2014) investigate the implication of NBE bill Purchase on performance of private commercial banks in Ethiopia. However, it's not shown the general effect of NBE regulations by taking separately the NBE bill Purchase as indicator of regulation as result it need further comprehensive research in this area by incorporating Legal reserve, Capital requirement, NBE bill purchase requirement, Capital Adequacy and Limitation of Equity Investment. Therefore, this study was conduct to fill this knowledge gap by examining the effect of National bank regulation on private Commercial banks performance& liquidity in Ethiopia.

2.6. Conceptual framework



CHAPTER THREE:

3. Research Design and Methodology

The preceding chapter presented the review of the existing literature on the NBE regulations effect on the profitability and liquidity of private commercial banks in Ethiopia and identified the knowledge gap. This chapter presents the methodology used in order to address the research questions and hypotheses and hence achieve the broad objective. The chapter is organized in three sections. Section 3.1 discusses the research design adopted in the study including the data collection tools and methods of data analysis. Section 3.2 presents the research approach while section 3.3. presents the research hypotheses with the description of variables used in the study.

3.1. Research design

3.1.1. Type of study

According to Saunders et.al (2009) there basically exist three different types of studies which aim to answer the research question in different ways. The three different types are exploratory, descriptive and explanatory. The main focus of an exploratory study is to approach problems in new ways and it is a very good method to increase the understanding of a specific topic. The most common data collection methods are interviews in order to get an in-depth understanding of the subject being investigated. The second type of study is explanatory which aims to establish relationships between different variables in order to detect a certain pattern. The third type of study according to Saunders is a descriptive study and it is usually used as an indication to the two other types of studies. The main aim of the descriptive study is to get an accurate picture of the situation that is being studied.

The main purpose of this research is to find the relationship between NBE regulations and the profitability and liquidity of private commercial banks in Ethiopia. Since the aim is to establish a relationship between variables, the explanatory approach is the most appropriate. On the other hand, before testing the relationship the variables included in the study have to

be identified and presented. Therefore, the research was combined the explanatory and the descriptive type of studies.

3.1.2 Sample design

The population of this study includes all private commercial banks in Ethiopia. As a result; out of the 16 private commercial banks, seven private commercial banks: Bank of Abyssinia S.C, Awash International Bank S.C, Dashen Bank S.C, Nib International Bank S.C, United Bank S.C, Wegagen Bank S.C and Cooperative Bank of Oromia S.C are selected using purposive sampling technique. As NBE (2017/18) annual report stated that those seven private commercial banks together accounted for 69% of the market share based on their number of branch and capital held by all Ethiopian private commercial banks and have more experience on the handling of liquidity problem and maximization of profitability.

3.1.3 Data and Data Collection Instrument

In order to carry out any research activity; information should be gathered from proper sources. The study based only on secondary data. Conducting appropriate data gathering instruments support researchers to combine the strengths and amend some of the inadequacies of any source of data to minimize risk of irrelevant conclusion. Consistent and reliable research indicates that research conducted by using appropriate data collection instruments increase the credibility and value of research findings (Koul 2006).

Accordingly, the researcher used secondary sources of data that is panel in nature. A secondary source of data is preferred by the researcher since it is less expensive in terms of time and money while collecting. And also, it affords an opportunity to collect high quality data (Belay 2012 as cited by Saunders et al 2007). Therefore, secondary data obtained from the audited annual financial statements of the private commercial banks included in the sample and publications of NBE from 2008 to 2017 and structured document review used to collect the required information.

3.1.4 Data Analysis and Presentation

To identify and measure the impact level of NBE regulations on banks profitability and liquidity, the study did primarily base on panel data, which collected through structured document review. In this study, a panel data set which employed comprises of 7 banks for which the same variables were collected annually for ten years. Thus this pooled data has a total of 70 observations. Panel data is preferred because of its many advantages over either cross-section or time series data. As noted in Brook (2008) it is possible to address a broader range of issues and tackle more complex problems with panel data than would be possible with pure time-series or pure cross-sectional data alone and it is often of interest to examine how variables, or the relationships between them, change dynamically (over time).

Thus, the collected panel data analyzed using descriptive statistics, correlations matrix and multiple linear regression analysis. The descriptive statistics used to quantitatively describe the important features of the variables and to analyze the general trends of the data from 2008 to 2017 based on the sector sample of 7 banks using statistical results mean, maximum minimum and standard deviations. In addition, the correlation analysis conducted to identify the degree of association between the independent and explanatory variables. The correlation analysis shows only the degree of association between variables and does not permit the researcher to make causal inferences regarding the relationship between variables. However, regression is more flexible and more powerful than correlation and permits making causal inferences regarding the relationship between variables (Brooks 2008).

Therefore, in order to test the hypothesis of this study and to determine the relative importance of each independent variable in influencing profitability and liquidity of the commercial banks in Ethiopia multiple linear regression analysis used.

3.2. Research approaches

A research approach can be either qualitative or quantitative or mixed. Critical decision should be made which design to be used for specific topic. The selection of appropriate research approach helps a researcher to plan and implement the study in a way that will help to obtain the intended results. On the basis of the research problem, the researcher should

decide which research approach is going to lead him/her easily, swiftly and most efficiently to the most reliable findings that adequately answer the research questions (Devetak, et al. 2010). The following discussions presents the basic features of the three research approaches. A quantitative approach is one in which the investigator primarily uses postpositive claims for developing knowledge effect thinking, reduction to specific variables and hypotheses and questions, use of measurement and observation, and the test of theories, employs strategies of inquiry such as experiments and surveys, and collect data on predetermined instruments that yield statistics data. This approach is based on the numerical observations and aims at generalizing a phenomenon through formalized analysis of selected data (Creswell, 2003). Quantitative research design provides precise, quantitative, numerical data and allows for statistical comparison between various groups (Johnson and Onwuegbuzie, 2004).

The second approach is qualitative approach and it is characterized by more of description instead of numerical data and aim to create a common understanding of the subject being studied. Qualitative methods provide a depth of understanding of issues that is not possible through the use of quantitative, statistically based investigations. In this approach data is gathered more in a verbal and visual than in a numeric form. The researcher collects open-ended, emerging data with the primary intent of developing themes from the data. A major strength of the qualitative approach is the depth in which explorations are conducted and descriptions are written, usually resulting in sufficient details for the reader to grasp the habit of the situation. The ultimate aim of qualitative research is to offer a perspective of a situation and to provide well written research reports that reflect the researcher's ability to illustrate or describe the corresponding phenomenon (Devetak, et al. 2010).

The third approach is mixed methods research approach which involves philosophical assumptions, the use of qualitative and quantitative approaches, and the mixing of both approaches in a study. This research design is useful to capture the best of both quantitative and qualitative approaches (Creswell, 2003, p. 24). The combined use of quantitative and qualitative methods has a number of benefits.

Therefore, the study was conducted based on quantitative research methodology to construct an empirical model in order to measure the effect of bank regulation on profitability and

liquidity of private commercial banks in Ethiopian. Specifically, regression analysis was used to measure the effect of regulations on the dependent variables. The use of regressions considers the simultaneous relationships among the multiple numbers of independent and dependent variables found across the regression model; therefore, it is suitable for such a study.

3.3. Variables definition

As already shown in the first chapter, the broad objective of this study is examining the NBE regulations effect on the profitability and liquidity of private commercial banks in Ethiopia controlling the influence of some selected bank specific variables.

To achieve these objectives, testable hypothesis and research questions are developed. The following subsections present the dependent variable and the independent variables with testable hypotheses.

3.3.1. Dependent Variables

The dependent variable in this study is profitability and liquidity. Theoretically the measures of profitability are Return on Equity (ROE) and Return on Assets (ROA) while a measure of spread is the Net interest/income margin (NIM). For this study, the measure of profitability was employed Return on Equity (ROE) which many analysts and investors tend to focus on ROE as their primary measure of company performance. Many executives focus heavily on this metric as well, recognizing that it is the one that seems to get the most attention from the investor community. ROE focuses on return to the shareholders of the company. If you are a shareholder, this gives you a quick and easy to understand metric, instead of the alternative ROA.

Academically the measures of liquidity is the ratio of current asset to current liability however in this research liquidity is defined based on the NBE definition of liquidity that appropriate measurement for the objective of the research problem “Liquid assets” include cash, deposits with the National Bank and other local and foreign banks having acceptance by the National Bank, other assets readily convertible into cash expressed and payable in Birr or foreign

currency having acceptance by the National Bank, deposits held in Organization for Economic Cooperation and Development (OECD) member countries' currencies and payable by banks of OECD member countries and in such other currencies as may be approved by the National Bank as well as securities issued by OECD member countries denominated in currencies of such countries and such other assets as the National Bank may from time to time declare to be liquid assets; (NBE Directives No. SBB/57/2014). The proxy for liquidity that is to be used in this study is the ratio of liquid assets to deposits and short term borrowings.

3.3.2. Independent Variables

The researcher used NBE bill purchase, legal reserve requirement, Equity investment limit, capital adequacy and paid up capital requirement as independent variables to achieve the first objective. Similarly, the researcher used NBE bill purchase, legal reserve requirement, Equity investment limit, capital adequacy and paid up capital requirement as independent variables to achieve the second objective. In order to isolate NBE regulations effect on performance and liquidity, it is needed to control for other bank specific factors that are expected to have some influence on profitability and liquidity. The control variables which are expected to influence bank's profitability and liquidity are: Deposit fund and management efficiency.

3.3.2.1. NBE-Bills purchase: Represent amount of forced bill purchase by a bank, which is measured as Dummy variable before and after the bill purchase requirement. The researcher expects that it has a negative effect on the profitability and liquidity of private commercial banks in Ethiopia, while it decreases liquidity of the banks.

Hypothesis 1: requirement of NBE bill purchase has negative and significant impact on the profitability of private commercial banks.

Hypothesis 2: requirement of NBE bill purchase has negative and significant impact on the liquidity of private commercial banks.

3.3.2.2. Legal Reserve Requirement: It is a portion of bank's asset in National Bank of Ethiopia with no interest and it has proxied by ratio of Reserve Account in NBE to total deposit (Eden, 2014). Furthermore, high reserve requirements decrease loan able funds

available for investment by reducing the fraction of given volumes of deposits rate and by reducing the equilibrium volume of deposits through decreasing the profit-maximizing deposit. Hence they are considered as a leakage in the intermediation process (James, 2002).

Hypothesis 3: legal reserve requirement has negative and significant effect on profitability of Private commercial banks in Ethiopia.

Hypothesis 4: Legal reserve requirement has positive and significant effect on liquidity of Private commercial banks in Ethiopia

3.3.2.3. Capital Requirement: The minimum paid up capital requirement of national bank of Ethiopia and it measured by natural log. of total paid up capital amount. Capital serves as a buffer against losses and hence failure. Furthermore, with limited liability, the tendency for banks to engage in higher risk activities is curtailed with greater amounts of capital at risk.

Hypothesis 5 Capital requirement has positive and significant effect on profitability of Private commercial banks in Ethiopia.

Hypothesis 6: Capital requirement has positive and significant effect on liquidity of Private commercial banks in Ethiopia

3.3.2.4. Equity Investment: National bank of Ethiopia gave permission to commercial banks to invest their income on different non-banking companies share with limited percentage. These companies can be insurance company or other share companies. The banks invest on this business in order to collect an additional income in a form of dividend. It is measured by log of total amount investment on insurance company and other share companies stock except NBE Bill to total capital. Prior studies suggest that equity investment has a positive and significant effect on bank performance Allen (2010), Franciso (2010) and Michael et al.(2012).

Hypothesis 7 Equity investment has positive and significant effect on profitability of Private commercial banks in Ethiopia.

Hypothesis 8 Equity investment has positive and significant effect on liquidity of Private commercial banks in Ethiopia.

3.3.2.5. Capital Adequacy: This measures capital strength of the banks. The ratio of Equity to total Asset is employed as a measure for bank Capital Adequacy. This measures the percentage of the total asset that is financed with equity capital. Capital adequacy therefore describes the sufficiency of the amount of equity that can absorb shocks that banks may experience. It is expected that the higher the Equity to Asset ratio, the lower the need for external funding and therefore the lower the risk of the bank. Bank with higher capital to asset ratio are considered relatively safer and remained profitable even during economically difficult times. Conversely, banks with lower capital adequacy are considered riskier relative to highly capitalized banks Kosmidou (2008). Considering the fact that capital adequacy may have an ambiguous effect on profitability; theoretical expectation of capital adequacy remains a puzzle to be answered by empirical investigation.

Hypothesis 9Capital Adequacy has Negative and significant effect on profitability of Private commercial banks in Ethiopia.

Hypothesis 10Capital Adequacy has positive and significant effect on liquidity of Private commercial banks in Ethiopia

3.3.2.6. Managerial effeciency: The expense management variable, which is defined as the ratio of operating expenses to total asset, provides information on variations in operating costs and it used as aproxy to measure the management quality of the bank. The total cost of a bank, excluding interest expense, includes operating cost and other expenses such as depreciation and taxes. From these only operating expenses can be viewed as the outcome of the bank management decision. Therefore, expense management is captured by the ratio of these operating expenses to total assets **Managerialeffeciency** = **operatingexpense** /**Total** Asset

3.3.2.7. Deposit Fund: It is measured by the ratio of total deposit to total asset and it is known that the primary function of the commercial banks are collecting deposits and giving loan to the public and finally they earn more interest income from their lending which in turn

increase their profitability. Commercial banks, accepts cash and hold on to as much of it as possible because the more it has and can retain the more funds it can lend to the public.

3.4. Model Specification

The model one presented below used to show the relationship between profitability and NBE regulations.

$$ROE = \beta 0 + \beta 1\ LRR + \beta 2\ CA + \beta 3\ CR + \beta 4INV + \beta 6\ Dummy + \beta 7\ DF + \beta 8MF + \varepsilon it$$

The model two presented below used to show the relationship between liquidity and NBE regulations.

$$LIQ = \beta 0 + \beta 1\ LRR + \beta 2\ CA + \beta 3\ CR + \beta 4INV + \beta 5\ Dummy + \beta 6\ DF + \beta 7\ ME + \varepsilon it$$

Table 3.1 Summarized Descriptions of the Variables and Their Expected Relationship

	Variables	Measure	Notation	Expected Sign with Profitability	Expected Sign with Liquidity
Dependent variable	**Profitability and Liquidity**	Net income/total equity and Liquid Asset/Deposit	ROE and LIQ		
Independent Variables	**Dummy variable**	before and after the bill purchase requirement	DUM	-	-
	Legal Reserve Requirement	Reserve Account in NBE to total deposit	LRR	-	+
	Equity Investment	Log of Ratio of total amount of investment except NBE Bill /Capital	INV	+	-
	Capital Requirement	Log of Paid capital	CR	+	+
	Capital Adequacy	Equity / total Asset	CA	+	-
	Deposit Fund	Deposit/total loan and advance	DF	+	-
	Management Efficiency	Operating Expense/Total Asset	ME	-	-

CHAPTER FOUR

EMPIRICAL FINDINGS AND DISCUSSIONS

In this section results on impact of NBE regulations on the profitability and liquidity of private commercial banks in Ethiopia is presented. The empirical evidence of the impact of NBE regulations on the profitability and liquidity of private commercial banks in Ethiopia is studied based on panel data, where all the variables are observed for each cross sectional and each time period. The study has a time series segment spanning from the period 2008 up to 2017 and a cross section segment which considered seven private Ethiopian commercial banks, Awash International Bank, Dashen Bank, Bank of Abyssinia, Wegagen Bank, United Bank, Nib International Bank Cooperative Bank of Oromia. Moreover, this chapter deals with the results of study which include descriptive statistics of variables, correlation results of variables, the test of CLRM assumption and regression analysis of independent variable on the dependent variable

The descriptive statistics for the dependent and independent variables for seven private commercial banks of Ethiopia from year 2008 to 2017 with a total of 70 observations are presented below.

4.1. Descriptive Statistics

Table 4.1 Descriptive Statistics

```
. summarize liq roe lrr ca me df loginv logcr
```

Variable	Obs	Mean	Std. Dev.	Min	Max
liq	70	.4257614	.1939163	.1425	.8914
roe	70	.21243	.0598908	.0151	.369
lrr	70	.1023471	.0700517	.0447	.3699
ca	70	.1307329	.0309109	.0856	.2187
me	70	1.777484	3.060541	.557	20.7713
df	70	1.650333	.2395161	1.0934	2.4697
loginv	70	-3.497158	1.774099	-7.26443	0
logcr	70	20.41941	.6365873	19.16489	21.69606

Source: - annual report of sample bank computed using Stata application

As stated in the above table, from the total of 70 observations, the highest return on equity is 0.36 and the lowest return on asset is 0.0151. That means, the most profitable bank of the sample banks earned 36 cents of net income from a single birr of investment and the lowest income obtained from the investment is 1.51 cent per one-birr investment. On the other hand, average amount of profit obtained per one-birr investment is 21.02 cent. The standard deviation statistics for ROE was 0.065 which indicates that the profitability variation between the selected banks is relatively low as compared to other variables.

On the other hand, the outputs of the descriptive statistics indicate that, bank liquidity which is defined as NBE definition has an average value of 0.434, with a minimum of 0.3019 and a maximum of 0.5986 all loan and advance are excluded from current asset as NBE definition of current asset. This means that Ethiopian commercial banks on the average, they can meet & above the statutory requirement of 15%

Regarding the explanatory variables of the model there are some interesting statistics that have to be mentioned. Capital adequacy which is the ratio of equity to total asset indicates that on the average, the equity-to-asset ratio equals 13.07% with a maximum of 21.87%, which was considerably above the statutory requirement of 8% set by NBE based on Basel II recommendation and its minimum value was 8.56%. The standard deviation statistics for capital strength was 0.03 which shows the existence of relatively low variation of equity to asset ratio between the selected banks compared to other variables.

The average value for equity investment as measured by log of equity invested amount was 14.82 % with standard deviation of 5.90, maximum of 20.51 and the minimum of Zero. Form the sample the minimum value zero indicates most banks stare equity investment in recent years.

The average value for legal reserve requirement as measured by reserve amount divided by total deposit was 10.23% with standard deviation of 0.07, maximum of 36.99 % and minimum of 4.47%. This means most of the samples banks are meet the reserve requirement of national bank of Ethiopia.

The mean value of the control variable deposit fund was 0.7585 and also maximum, minimum and standard deviation value is 0.836, 0.6428 and 0.048 respectively. On the other hand the average bank efficiency measured by total noninterest expense divided by total asset is 0.3778 with standard deviation of 0.0094, maximum of 0.076 and the minimum of 0.0192. The low standard deviation relative to other variable shows some banks are very efficient and the remains are less efficient.

4.2. Correlation Analysis among Variables

Correlation matrix between independent variables is presented in table below. As shown in table 4.2 there were fairly low data correlations among the independent variables. These low correlation coefficients indicate that, there is no problem of multicolinearity in the study. Moreover, Kennedy (2008) stated that multicolinearity problem exists when the correlation coefficient among the variables are greater than 0.70, but in this study there is no correlation coefficient that exceeds to 0.70. Accordingly, in this study there is no problem of multicollinearity which enhanced the reliability for regression analysis.

Table 4.2.Correlation Analysis

```
. corr lrr ca me df loginv logcr dummy
(obs=70)
```

	lrr	ca	me	df	loginv	logcr	dummy
lrr	1.0000						
ca	-0.1164	1.0000					
me	0.0429	-0.0243	1.0000				
df	0.1289	-0.2521	-0.2586	1.0000			
loginv	-0.0669	0.0290	0.0685	0.0093	1.0000		
logcr	-0.6537	0.2070	-0.0726	-0.1778	-0.2064	1.0000	
dummy	-0.6462	0.0681	-0.0290	0.1821	-0.0899	0.6699	1.0000

Source: - annual report of sample bank computed using Stata application

4.3. Testing Assumption of CLRM

Before going further in to panel data econometric measurement, the first issue is to test the assumption of classical linear regression model (CLRM). Five assumptions were made relating to the classical linear regression model (CLRM). These were required to show that estimation technique, ordinary least squares (OLS), had a number of desirable properties, and also hypothesis tests regarding the coefficient estimates could validly be conducted Brooks (2008).

Test1: - The Error have Zero Mean *E* (*ut*) = 0

The first assumption required is that the average value of the errors is zero. In fact, if a constant term is included in the regression equation, this assumption will never be violated Brooks (2008). Since this research included a constant term (α) in the regression model it passed the first assumption.

Test2: Heteroskedasticity (*ut*) = $\sigma 2 < \infty$

It has been assumed that the variance of the errors is constant, σ2 this is known as the assumption of homoscedasticity. If the errors do not have a constant variance, they are said to be heteroscedastic Brooks (2008). To test this assumption, the white test was used having the nullhypothesis of heteroskedasticity. The result for this test shows: -

Heteroskedasticity Test for model one

Table 4.3 Heteroskedasticity test of model one

```
. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of ROE1

         chi2(1)      =     1.41
         Prob > chi2  =   0.2356
```

Source: - annual report of sample bank computed using Stata application

Heteroskedasticity Test for model two

Table 4.4 Heteroskedasticity test of model two

```
. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of liq

         chi2(1)      =     3.64
         Prob > chi2  =   0.0566
```

Source: - annual report of sample bank computed using Stata application

As shown for the above for the test of both the F-statistic and Chi-Square versions of the test statistic gave the same conclusion that there is no evidence for the presence of heteroscedasticity on both models, since the p-values were in excess of 0.05. So, for the second assumption it was proved that the variance of the error term is constant or homoskedastic and had no evidence of heteroskedasticity and sufficient evidence to reject the null hypothesis of heteroskedasticity

Test3: Covariance Between the Error Terms Over Time Zero cov(*ui , uj*) = 0 for *i* _=

This assumption stated that the covariance between the error terms over time (or cross sectionals, for that type of data) is zero. In other words, it is assumed that the errors are uncorrelated with one another. If the errors are not uncorrelated with one another, it would be stated that they are„ auto correlated‟ or that they are „serially correlated‟ Brooks (2008). Brooks (2008) noted that the test for the existence of autocorrelation is made using the Durbin-Watson (DW) test and Breusch-Godfrey test. The lagged value of a variable is used in this research in order to adjust the autocorrelation. Legged the value is simply the value that the variable took during a previous period Brooks (2008). So from the regression result for the existence of autocorrelation is thought.

Autocorrelation test for model one:-

Table 4.5 Autocorrelation test for model one

```
. tsset time
        time variable:  time, 1 to 70
                delta:  1 unit

. estat bgodfrey, lag(23)

Breusch-Godfrey LM test for autocorrelation
```

lags(*p*)	chi2	df	Prob > chi2
23	34.247	23	0.0617

H0: no serial correlation

Source: - annual report of sample bank computed using Stata application

Autocorrelation test for model two:-

Table 4.6 Autocorrelation test for model two

Number of gaps in sample: 3

Breusch-Godfrey LM test for autocorrelation

lags(*p*)	chi2	df	Prob > chi2
23	26.712	23	0.2684

H0: no serial correlation

Source: - annual report of sample bank computed using Stata application

The above table show test of autocorrelation after inclusion of lagged variable and p value is greater than 0.05 in two models and it indicates the absence of auto correlation. The conclusion from both versions of the test in this case is that the null hypothesis of autocorrelation is rejected and the errors are uncorrelated.

Test4: Normality (errors are normally distributed (ut~ N (0, +2))

A normal distribution is not skewed and is defined to have a coefficient of kurtosis ≈ 3. JarqueBera formalizes this by testing the residuals for normality and testing whether the

coefficient of skeweness and kurtosis are ≈ 0 and ≈ 3 respectively. Normality assumption of the regression model can be tested with the Jarque- Bera measure.

If the JarqueBera value is greater than 0.05,it‟s an indicator for the presence of normality (Brook, 2008).In addition, it is quite often the case that one or two very extreme residuals cause a rejection of the normality assumption. Such observations would appear in the tails of the distribution, which enters into the definition of kurtosis, to be very large. Such observations that do not fit in with the pattern of the remainder of the data are known as outliers. If this is the case, one way to improve the chances of error normality is to use dummy variables Brooks (2008). The table below shows the result of normality by including dummy variables.

Chart 4.1 Normality test for model one

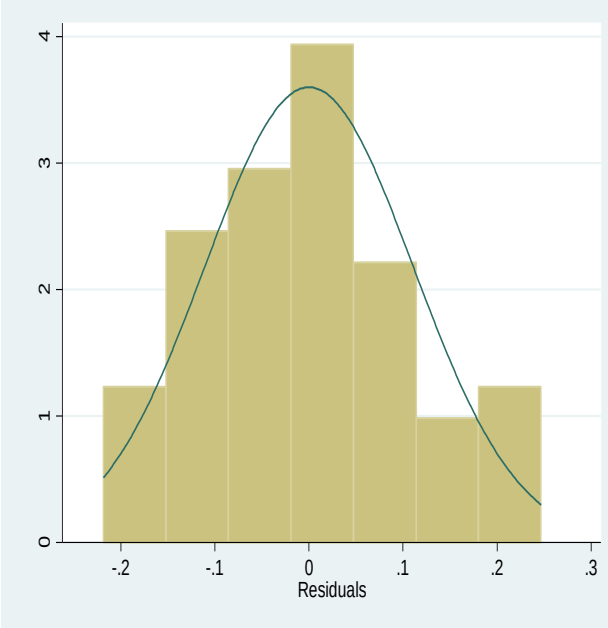


Table 4.7 Normality test for model one

```
. sum uhat, detail

                        Residuals
-------------------------------------------------------------
      Percentiles      Smallest
 1%    -.2187675      -.2187675
 5%    -.1587911      -.1759536
10%    -.1429564      -.1637593       Obs                  61
25%    -.0852162      -.1587911       Sum of Wgt.          61

50%     .0004246                      Mean           1.71e-10
                       Largest        Std. Dev.      .110778
75%     .0665734       .1995042
90%     .1610179       .2069464       Variance       .0122718
95%     .1995042       .2306424       Skewness       .3200432
99%     .2470959       .2470959       Kurtosis       2.479293
```

Table 4.8 JarqueBera test for model one

```
. jb uhat
Jarque-Bera normality test:   1.73 Chi(2)  .4209
Jarque-Bera test for Ho: normality:
```

Chart 4.2 Normality test for model two

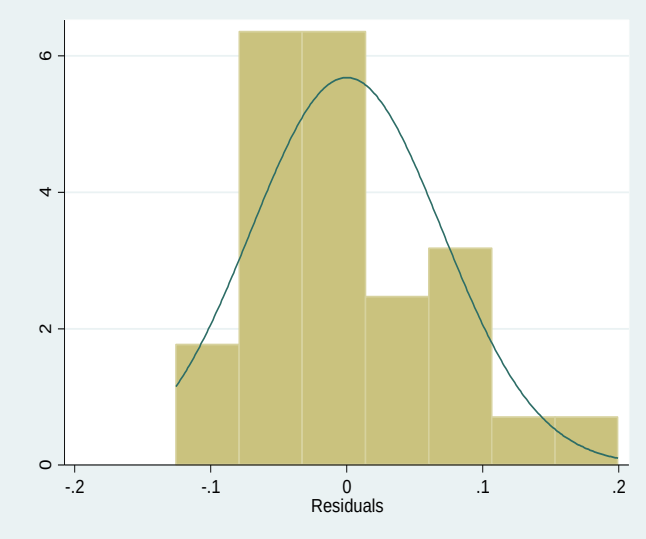


Table 4.9 Normality test for model one

```
. sum uhat, detail

                            Residuals
-------------------------------------------------------------
      Percentiles      Smallest
 1%    -.1255344      -.1255344
 5%    -.0979865       -.106433
10%    -.0767665      -.1032227       Obs                  61
25%    -.0501091      -.0979865       Sum of Wgt.          61

50%       -.0149                      Mean           1.53e-11
                        Largest       Std. Dev.      .0702172
75%     .0330018       .1199603
90%     .1014171        .134599       Variance       .0049305
95%     .1199603       .1608939       Skewness       .6999204
99%     .1996546       .1996546       Kurtosis       3.035745
```

Table 4.10 JarqueBera test for model one

Jb hat

Jarque-Bera normality test: 2.854 Chi(2) .5424

Jarque-Bera test for Ho: normality:

The diagram witnesses that normality assumption holds the coefficient of kurtosis was close to 3,skewness was also close to zero and the Jarque-Bera statistic has a value which is greater than 0.05. These imply that the data were consistent with a normal distribution assumption. Based on the statistical result, the study failed to reject the null hypothesis of normality.

Test 5: Multicollinearity Test

This assumption is concerned with the relationship between explanatory variables. If an independent variable is an exact linear combination of the other independent variables, then we say the model suffers from perfect Collinearity, and it cannot be estimated by OLS (Brooks,2008). Multicollinearity condition exists where there is high, but not perfect, correlation between two or more explanatory variables (Cameron & Trivedi, 2009; Wooldridge, 2006). Malhotra (2007) stated that Multicollinearity problem exists when the correlation coefficient among variables is greater than 0.75. Kennedy (2008) also suggests that any correlation coefficient above 0.7 could cause a serious Multicollinearity problem leading to inefficient estimation and less reliable results. This indicates that there is no a

single agreed upon measure of Multicollinearity. In this research paper the researcher had 7 explanatory variables. The table below shows the correlation result for all the independent and control variables in this research.

Table 4.2.Correlation Analysis

```
. corr lrr ca me df loginv logcr dummy
(obs=70)
```

	lrr	ca	me	df	loginv	logcr	dummy
lrr	1.0000						
ca	-0.1164	1.0000					
me	0.0429	-0.0243	1.0000				
df	0.1289	-0.2521	-0.2586	1.0000			
loginv	-0.0669	0.0290	0.0685	0.0093	1.0000		
logcr	-0.6537	0.2070	-0.0726	-0.1778	-0.2064	1.0000	
dummy	-0.6462	0.0681	-0.0290	0.1821	-0.0899	0.6699	1.0000

Source: - annual report of sample bank computed using Stata application

The method used in this study to test the existence of multicollinearity was by checking the correlation between the independent variables. The correlations between the independent variables are shown in table 4.2 above. All correlation results are below 0.75, which indicates that multicollinearity is not a problem for this study.

4.4. Random Effect (RE) Versus Fixed Effect (FE) Models

There are broadly two classes of panel estimator approaches that can be employed in financial research: fixed effects models (FEM) and random effects models (REM) (Brooks, 2008). The choice between both approaches is done by running a Hausman test. To conduct a Hausmantest the number of cross section should be greater than the number of coefficients to be estimated. The following results is observed, with only the top panel that reports the Hausman test results being reported here in the following test.

Test 6: Hausman test

Table 4.11 Hausman test for model one

```
. hausman fixed .
```

	Coefficients (b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
EFFEC	-.3783026	-.4128776	.034575	.0378118
INVS	-.0003095	-.000286	-.0000235	.0001009
LRR	-.0083119	.0156723	-.0239842	.0194219
capadq	-1.184768	-1.184854	.0000867	.0710232
logcapreq	.010301	.0012939	.0090071	.01042
dummy	-.0128305	.0268334	-.0396639	.0341758
deposfund	-.3832579	-.3731369	-.0101211	.0228572

```
                b = consistent under Ho and Ha; obtained from xtreg
     B = inconsistent under Ha, efficient under Ho; obtained from xtreg

 Test:  Ho:  difference in coefficients not systematic

           chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                   =        3.94
         Prob>chi2 =      0.7870
```

Source: - annual report of sample bank computed using Stata application

According to (Brook, 2008) if the *p*-value for the test is greater than 1%, indicating that the random effects model is not appropriate and that the fixed effects specification is to be preferred. As show in the above table the result of Hausman test the p- value is greater than 1%, the nullhypothesis which is random effect model appropriate was rejected and the research used the fixed effect model.

4.5. Analysis and Interpretation of Regression Result

This section presents the empirical findings from the econometric results on impact of NBE regulations on the profitability and liquidity of private commercial banks in Ethiopia. The section covers the empirical regression model used in this study and the results of the regression analysis.

Empirical model: As presented in the methodological part of the study, the empirical model used in the study in order to identify impact of NBE regulations on the profitability and liquidity of private commercial banks in Ethiopia is provided as follows.

Model one

The panel regression model used to find the statistically significant regulatory variables impact on banks performance measured by ROE was

$$ROE = \beta 0 + \beta 1\ LRR + \beta 2\ CA + \beta 3\ CR + \beta 4 INV + \beta 6\ Dummy + \beta 7\ DF + \beta 8 MF + \varepsilon it$$

$$ROE = .6963 + .0438 LRR - .8850 CA - .0187 CR - .0019 INV - 0.0083 ME + .0021 DF + .0219 Dummy + \varepsilon it$$

The estimation result of the operational panel regression model used in this study is presented in table below. As shown in the table below, the R- squared result of 0.4405 endorse that 44.05 % of the variation in the dependent variable (return on equity) is explained by the independent variables of the model. The remaining 55.95 % of the variation in the dependent variable is left unexplained by explanatory variables of the study. The regression result of the study is presented as follows:

Table 4.12 Regression for model one

```
. reg roe lrr  ca  logcr loginv me df dummy
```

Source	SS	df	MS
Model	.109031217	7	.015575888
Residual	.138465285	62	.002233311
Total	.247496501	69	.003586906

Number of obs	70
F(7, 62)	6.97
Prob > F	0.0000
R-squared	0.4405
Adj R-squared	0.3774
Root MSE	.04726

roe	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lrr	.0438806	.1228371	0.36	0.722	-.2016673	.2894285
ca	-.8850301	.1944466	-4.55	0.000	-1.273723	-.4963369
logcr	-.0187815	.0146714	-1.28	0.205	-.0481093	.0105463
loginv	-.0019058	.0034274	-0.56	0.580	-.0087572	.0049456
me	-.0083039	.0019804	-4.19	0.000	-.0122625	-.0043452
df	.0021179	.0292967	0.07	0.943	-.0564455	.0606812
dummy	.021996	.0203649	1.08	0.284	-.0187129	.0627049
_cons	.6963513	.3108307	2.24	0.029	.0750097	1.317693

The above table presents results of net income to Equity (ROE) as dependent variable and regulatory variables as explanatory variables for the sample of seven private banks in Ethiopia. The adjusted R-square is **0.3774** which means 3**7.74**% of the total variability of return on equity about their mean value is explained by the model. Thus a model is sufficient to explain variability of ROE.

The regression F-statistic takes a value 6.97 F- Statistics tests the null hypothesis that all of the slope parameters (ßs.) are jointly zero. In the above case p-value of zero attached to the test statistic shows that this null hypothesis should be rejected even at 1% level of significance. As it is shown in the above table Capital Adequacy and Managerial Efficiency were the statistically significant regulatory variables affecting profitability of private banks in Ethiopia the other Equity investment requirement, Legal Reserve Requirement, Dummy (NBEBILL), Deposit fund and paid up Capital Requirement were not statistically significant regulatory variables affecting profitability of private banks in Ethiopia. Capital Adequacy requirement and Managerial Efficiency had negative and statistically strongly significant impact on ROE at 1% level of confidence. The other regulatory variables, Equity investment requirement and paid up Capital Requirement had negative and statically insignificant impact on ROE and Dummy(NBEBILL) requirement, Legal Reserve Requirement and Deposit Fund had positive and statically insignificant impact on ROE.

Model two

The panel regression model used to find the statistically significant regulatory variables impact on banks liquidity measured by CA/CL was

$$LIQ = \beta 0 + \beta 1\ LRR + \beta 2\ CA + \beta 3\ CR + \beta 4 INV + \beta 5\ Dummy + \beta 6\ DF + \beta 7\ ME + \varepsilon it$$

$$LIQU = 0.98 + .7967 LRR - .2886 CA - .0348 CR + .0118 INV + .0143 Dummy - .1070 DF - .4893 ME + \varepsilon it$$

The estimation result of the operational panel regression model used in this study is presented in table below. As shown in the table below, the R- squared result of 0.4489 endorse that 44.89 % of the variation in the dependent variable (liquidity) is explained by the independent variables of the model. The remaining 55.11 % of the variation in the dependent variable is

left unexplained by explanatory variables of the study. The regression result of the study is presented as follows:

Table 4.13 Regression for model two

```
. reg  liq lrr ca CR INV Dummy df mgteffici
```

Source	SS	df	MS		
Model	.250265148	7	.035752164	Number of obs =	61
Residual	.295827229	53	.005581646	F(7, 53) =	6.41
				Prob > F =	0.0000
Total	.546092377	60	.00910154	R-squared =	0.4583
				Adj R-squared =	0.3867
				Root MSE =	.07471

liq	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lrr	.7967491	.207161	3.85	0.000	.3812367	1.212261
ca	-.2886176	.4129068	-0.70	0.488	-1.116804	.5395686
CR	-.0348707	.0240008	-1.45	0.152	-.0830102	.0132688
INV	.0118636	.0094821	1.25	0.216	-.007155	.0308823
Dummy	.0143086	.0351806	0.41	0.686	-.0562548	.0848719
df	-.1070658	.2296361	-0.47	0.643	-.5676574	.3535259
mgteffici	-.4893544	1.147243	-0.43	0.671	-2.790433	1.811724
_cons	.9848696	.4890161	2.01	0.049	.0040276	1.965712

The above table presents results of Current Asset to total deposit (Liquidity) as dependent variable and regulatory variables as explanatory variables for the sample of seven private banks in Ethiopia. The adjusted R-square **0.3867** which means **38.67%** of the total variability of liquidity position of the bank about their mean value is explained by the model. Thus a model is sufficient to explain variability of liquidity.

As it is shown in the above table only legal required reserved requirement was the statistically significant regulatory variables affecting liquidity of private banks in Ethiopia and the remaining regulatory variables Equity Investment requirement, Dummy (NBEBILL), Capital requirement and capital adequacy requirement at 10% level of confidence were not statistically significant affecting liquidity of private banks in Ethiopia. Legal required reserved had positive and statistically strongly significant impact on liquidity at 1% level of confidence. Dummy (NBEBILL) and Equity Investment requirement had positive and statically insignificant impact on liquidity of private banks in Ethiopia and the other Capital adequacy and Capital requirement had negative and statically insignificant impact on liquidity of private banks in Ethiopia. Among control variables from bank specific variables efficiency

and deposit fund had a negative effect and it is statistically insignificant at 10% level of confidence.

Discussion of the regression results

Table 4.12 and 4.13 present regressions out puts for profitability (ROE) and liquidity (LIQ) on bank NBE's regulatory variables. The results were discussed as follows.

Legal reserve requirement

Reserve Requirement with profitability According to table 4.12 reserve requirement had positive but statistically insignificant impact on banks performance measured by ROE. The coefficient estimate and the p value was .0438 and .722 respectively. It was not in line with the workable hypothesis but insignificantly.

The result is not consistent with the previous studies of Eden (2014) that indicated legal reserve requirement had positive impact on profitability however it was also statically insignificant.

Reserve Requirement with liquidity According to table 4.13 reserve requirement had positive and strong statistically significant impact on banks liquidity measured by current asset with exception of loan and advance divided by total deposit. The coefficient estimate and the p value was .7967 and 0.0000 respectively. The result showed that holding other variables constant, the liquidity of private commercial banks increase by .7967 unit when a 1-unit increase in legal reserve account. The study results legal reserve requirement has positive relationship with liquidity because; legal reserve requirement account is one part of the current asset so the firm can also assure its solvency through maintaining reserve account.

Equity Investment

Equity investment with profitability and liquidity according to table 4.12 and table 4.13 respectively equity investment requirement had negative impact on banks performance and positive impact on liquidity but insignificant statistically at 10% level of significant. The

result shows, investment other than bank industry has relatively lower return on the other hand regarding of diversification it is means of risk minimization tool.

Capital Requirement

Capital requirement with profitability and liquidity according to table 4.12 and table 4.13 respectively, capital requirement had negative impact on both banks performance and liquidity but insignificant statistically at 10% level of significant. The result shows capital requirement with profitability was in line with the workable hypothesis means cost of equity capital compares to cost of debt was expensive. While result shows capital requirement with liquidity is not consistence with expected sign that means NBE on 19th day of September 2011 under Directives No. SBB/50/2011 raises the minimum capital required as result there should be increment on current asset consequence of new cash injection in the business but the result shows contrary.

Capital Adequacy

Capital adequacy with profitability According to table 4.12 reveals that Capital adequacy had negative and strong statistically significant impact on banks performance measured by ROE. The coefficient estimate and the p value was -.8850 and 0.000 respectively. The result showed that holding other variables constant, the ROE of private commercial banks decrease by .8850 unit when a 1-unit increase in Capital adequacy. The study results Capital adequacy has negative relationship with ROE because; fund from selling of additional share might be not cheaper than cost of liability or customer deposit. Capital adequacy with liquidity According to table 4.13 capital adequacy had negative and statistically insignificant impact on banks liquidity measured by current asset with exception of loan and advance divided by total deposit. The coefficient estimate and the p value was -.2886 and 0.488 respectively. This shows owner contribution is expense so the firm should raise fund from other cheaper source of finance like fixed time deposit.

NBE Bill Purchase

As it is shown in the above table 4.12 NBE bill was the statistically insignificant regulatory variable positively affecting profitability of private banks in Ethiopia and the coefficient estimate and the p value was .0219 and 0.284 respectively. This is because that all bank adjust their lending interest rate followed by the NBE Bill purchase policy measure, which might be associated with Bank's response to the policy through adjusting their loan prices in a way to compensate for the opportunity lost. Hence, the Banks cost related to bill purchase see to some extent seems covered by the borrowers than the Banks and the result of the study shows that the effect of the policy measure is mitigated by raising the cost of bank borrowing during the policy formulation, the limited but likely possibility to expand to other fee generating services, stable liability prices and banks discretion to adjust their asset prices after gain decrease as almost one third of the total loan that a bank gives to borrowers is invested in government bill with the interest rate of 3% recently extended to 5%. In same way according to table 4.13 NBE bill purchase policy had positive but statistically insignificant impact on banks liquidity. The coefficient estimate and the p value were 0.0143 and 0.686 respectively. This result shows as revealed in the dummy variable added to the research, banks liquidity has positive association with the post bill purchase period.

Deposit Fund and Management Efficiency

The regression output in Table 4.12 reveals that the researcher find Bank efficiency had a negative and significant effect on Bank profitability at 1% significant level and the other variable Deposit fund has insignificant positive effect on profitability at 10% significant level. Under 4.13 both variable Deposit fund and Management Efficient had negative and insignificant effect on banks liquidity.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1. Conclusion

This study aims to identify the NBE regulations that can affect Ethiopian private commercial banks profitability and liquidity to what extent these impacts. In doing so, previous studies on the impact of each NBE regulations on bank profitability and liquidity have been reviewed and impacts are identified. Therefore, this study specified an empirical framework to investigate the impact of NBE regulations on Ethiopian private commercial banks profitability and liquidity from 2008 to 2017. The NBE regulations that were used in this study include variables such as NBE Bill Purchase requirement, Legal reserve requirement, Equity Investment, Capital Requirement and Capital Adequacy.

The empirical findings on the impact of NBE regulations on Ethiopian private commercial banks profitability and liquidity for the sample suggest the following conclusions.

- Regarding the impact of legal reserve requirement on banks liquidity has a positive and statically significant at 1% level of confidence. This implies that when banks increase the amount of legal reserve it's more related with stability and soundness of the Banks instead of profitability
- Capital adequacy and Management efficiency had a negative significant effect on the profitability of private commercial banks. This implies that bank financial structure has strong direct relationship with profitability. As equity increasing the size, they can earn lower profit and other than interest expense, rent and salary expense are negatively affect the net profit.
- Generally, according to the regression result capital adequacy and Management Efficiency had a negative significant effect on the profitability of private commercial banks the remaining five independent variables were not statically significant. While legal reserve requirement had a positive effect on the liquidity of private commercial banks.

5.2. Recommendation

Based on the findings of the study the following possible recommendations were forwarded:

- In the study capital adequacy is found negatively related with profitability and hence, Banks should strive to improve their deposit amount through mobilizing funds by giving excellent banking service offering attractive other cheaper source of finance other than equity.
- Office rent and salary expenses are pointedly affect profit of the bank as result the management should find efficient office in terms of its rent cost and revised the employee's compensation system.
- The study confirms that having legal reserve requirement enables private commercial banks to be more liquid and stable. Therefore, this policy should be maintaining the proper implementation for future through consistent follow-up of the finance position of the private Banks.

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Annex 1

Annex 1–The raw data that was used to analyze the variables which was used in the paper is presented as follows

Year	*Bank*	*ROA*	*ROE*	*LIQ*	*LRR*	*CA*	*Paid up capital*	*Investment Amount*	*Mgt Effici*	*DF*	*NBE Bill Purchase*
2008	NIB	0.0310	0.1890	0.5396	0.1287	0.1639	416,901,000.00	2,652,500.00	0.0262	0.6767	0.00
2009	NIB	0.0321	0.2114	0.3582	0.1253	0.1516	487,129,000.00	3,778,500.00	0.0273	0.6858	0.00
2010	NIB	0.0336	0.2192	0.3251	0.1303	0.1535	579,867,000.00	3,778,500.00	0.0304	0.6913	0.00
2011	NIB	0.0347	0.2105	0.4875	0.1479	0.1646	717,018,500.00	6,993,750.00	0.0272	0.7252	563,281,058.00
2012	NIB	0.0346	0.1873	0.5106	0.0974	0.1846	943,806,500.00	40,248,000.00	0.0263	0.7055	1,211,281,058.00
2013	NIB	0.0313	0.1718	0.3388	0.0501	0.1822	999,399,000.00	62,451,000.00	0.0315	0.7278	1,911,097,058.00
2014	NIB	0.0292	0.1597	0.3698	0.0503	0.1828	1,201,027,500.00	65,877,770.00	0.0367	0.7374	2,686,108,058.00
2015	NIB	0.0254	0.1548	0.3254	0.0502	0.1642	1,265,202,500.00	84,637,100.00	0.0353	0.7373	3,774,511,058.00
2016	NIB	0.0225	0.1417	0.3254	0.0499	0.1591	1,502,380,000.00	125,777,840.00	0.0366	0.7848	4,168,435,000.00
2017	NIB	0.0246	0.1748	0.3254	0.0498	0.1405	1,792,391,500.00	131,033,740.00	0.0350	0.7810	5,095,628,000.00
2008	Dashen	0.0310	0.3272	0.4739	0.1496	0.0947	453,993,000.00	28,385,795.00	0.0227	0.7969	0.00
2009	Dashen	0.0257	0.2750	0.5934	0.1615	0.0934	528,512,000.00	28,385,795.00	0.0209	0.8143	0.00
2010	Dashen	0.0262	0.2885	0.4859	0.1503	0.0909	591,860,000.00	28,385,795.00	0.0209	0.8212	0.00
2011	Dashen	0.0307	0.3227	0.5847	0.1520	0.0953	698,709,000.00	28,385,795.00	0.0223	0.8077	971,100,000.00
2012	Dashen	0.0299	0.3182	0.4623	0.1683	0.0940	720,460,400.00	23,524,845.00	0.0245	0.7540	1,844,058,051.00
2013	Dashen	0.0307	0.2966	0.4327	0.0503	0.1036	737,214,000.00	33,793,322.00	0.0251	0.8027	2,922,820,000.00
2014	Dashen	0.0324	0.2743	0.3700	0.0509	0.1183	1,064,118,000.00	29,959,322.00	0.0280	0.8051	4,090,476,000.00
2015	Dashen	0.0294	0.2494	0.3857	0.0517	0.1181	1,238,691,000.00	46,799,322.00	0.0352	0.8001	5,811,883,000.00
2016	Dashen	0.0254	0.2165	0.3019	0.0506	0.1175	1,492,331,000.00	58,972,322.00	0.0354	0.7964	6,429,915,000.00
2017	Dashen	0.0218	0.1894	0.3254	0.0495	0.1153	1,927,141,000.00	63,572,322.00	0.0399	0.8024	8,217,134,000.00
2008	Abyssina	0.0187	0.2013	0.4148	0.1280	0.0927	312,571,450.00		0.0512	0.7673	0.00
2009	Abyssina	0.0183	0.1933	0.5284	0.1346	0.0948	313,141,425.00		0.0269	0.8206	0.00
2010	Abyssina	0.0224	0.2401	0.5764	0.1352	0.0932	315,000,000.00		0.0231	0.8183	0.00
2011	Abyssina	0.0249	0.2738	0.4767	0.1374	0.0908	315,000,000.00		0.0269	0.8348	816,603,000.00
2012	Abyssina	0.0263	0.2386	0.3726	0.0960	0.1100	478,897,703.00	1,258,000.00	0.0274	0.8218	1,461,233,000.00
2013	Abyssina	0.0261	0.2390	0.3652	0.0500	0.1090	577,025,454.00	5,030,000.00	0.0251	0.8362	2,090,348,000.00
2014	Abyssina	0.0240	0.1771	0.3019	0.0500	0.1356	923,971,393.00	8,752,500.00	0.0306	0.8067	2,711,332,000.00
2015	Abyssina	0.0211	0.1590	0.3974	0.0503	0.1325	1,119,826,835.00	15,092,500.00	0.0352	0.8135	3,388,590,000.00
2016	Abyssina	0.0226	0.1790	0.4755	0.0496	0.1262	1,274,805,614.00	31,150,500.00	0.0412	0.8103	3,683,044,000.00
2017	Abyssina	0.0213	0.1860	0.5687	0.0478	0.1147	1,802,000,736.00	83,315,500.00	0.0425	0.8174	5,121,161,000.00
2008	Wegagen	0.0337	0.2293	0.5986	0.1326	0.1468	370,825,000.00		0.0360	0.7191	0.00
2009	Wegagen	0.0353	0.2159	0.3857	0.1417	0.1634	517,618,000.00		0.0293	0.7284	0.00
2010	Wegagen	0.0389	0.2124	0.5246	0.1525	0.1832	633,170,000.00		0.0285	0.6832	0.00
2011	Wegagen	0.0401	0.2417	0.4985	0.1349	0.1659	779,316,000.00		0.0268	0.7391	899,887,000.00
2012	Wegagen	0.0402	0.2092	0.4847	0.1004	0.1922	952,939,000.00	5,030,000.00	0.0302	0.6898	1,597,430,000.00

2013	Wegagen	0.0327	0.1858	0.3229	0.0478	0.1761	1,090,898,000.00	25,030,000.00	0.0313	0.7265	2,358,984,000.00
2014	Wegagen	0.0276	0.1485	0.3585	0.0496	0.1860	1,341,291,000.00	29,030,000.00	0.0374	0.7273	3,039,782,000.00
2015	Wegagen	0.0257	0.1460	0.4987	0.0505	0.1761	1,497,834,000.00	56,870,000.00	0.0405	0.7452	4,162,844,000.00
2016	Wegagen	0.0232	0.1339	0.3456	0.0507	0.1733	1,778,851,000.00	65,370,000.00	0.0413	0.7329	4,344,751,000.00
2017	Wegagen	0.0254	0.1586	0.3425	0.0484	0.1602	2,072,112,000.00	65,370,000.00	0.0442	0.7458	5,099,335,000.00
2008	Awash	0.0265	0.2625	0.3143	0.0907	0.1009	282,300,378.00	3,564,400.00	0.0247	0.7149	0.00
2009	Awash	0.0300	0.2809	0.5821	0.1411	0.1067	445,483,236.00	4,058,798.00	0.0326	0.6957	0.00
2010	Awash	0.0274	0.2580	0.4975	0.1392	0.1063	550,000,000.00	5,824,048.00	0.0201	0.6767	0.00
2011	Awash	0.0325	0.2698	0.5228	0.1459	0.1205	734,069,582.00	14,124,209.00	0.0192	0.6983	1,588,214,000.00
2012	Awash	0.0301	0.2390	0.3434	0.1000	0.1258	912,253,280.00	47,107,907.00	0.0225	0.7013	2,483,718,000.00
2013	Awash	0.0247	0.2123	0.4625	0.0502	0.1162	1,170,381,418.00	62,250,300.00	0.0267	0.7054	3,145,808,000.00
2014	Awash	0.0280	0.2381	0.3365	0.0512	0.1175	1,394,066,531.00	62,256,388.00	0.0279	0.6803	4,066,764,000.00
2015	Awash	0.0256	0.2026	0.3852	0.0513	0.1263	1,777,318,491.00	68,427,500.00	0.0318	0.7346	5,365,119,000.00
2016	Awash	0.0239	0.1890	0.3698	0.0491	0.1263	2,242,721,874.00	88,873,240.00	0.0339	0.7330	5,305,891,000.00
2017	Awash	0.0239	0.2085	0.3154	0.0490	0.1146	2,645,330,081.00	89,894,740.00	0.0357	0.7288	6,884,528,000.00
2008	Coop	0.0173	0.0792	0.4975	0.1672	0.2187	210,478,300.00		0.0341	0.7223	0.00
2009	Coop	0.0023	0.0151	0.5712	0.2580	0.1529	224,510,200.00	6,676,000.00	0.0398	0.7710	0.00
2010	Coop	0.0142	0.1328	0.5248	0.1550	0.1069	238,540,100.00	23,500,000.00	0.0368	0.7756	0.00
2011	Coop	0.0189	0.1923	0.5487	0.1406	0.0983	252,574,600.00	23,500,000.00	0.0324	0.7921	230,761,572.00
2012	Coop	0.0278	0.2445	0.4418	0.0845	0.1137	280,637,852.00	25,008,000.00	0.0286	0.7621	426,965,292.00
2013	Coop	0.0290	0.2719	0.5874	0.0460	0.1065	442,337,900.00	29,491,000.00	0.0313	0.6830	567,247,292.00
2014	Coop	0.0468	0.3155	0.3390	0.0447	0.1483	632,138,300.00	43,391,000.00	0.0415	0.7415	839,903,292.00
2015	Coop	0.0273	0.2214	0.3307	0.0476	0.1231	864,848,200.00	52,181,000.00	0.0530	0.6428	1,505,183,292.00
2016	Coop	0.0037	0.0320	0.3587	0.0519	0.1142	910,731,547.00	52,181,000.00	0.0760	0.7942	1,775,521,720.00
2017	Coop	0.0117	0.1370	0.3956	0.0511	0.0856	1,000,000,000.00	53,420,000.00	0.0536	0.8055	3,299,727,000.00
2008	United	0.0280	0.1946	0.5671	0.2314	0.1439	330,277,074.00	320,000.00	0.0238	0.7517	0.00
2009	United	0.0201	0.1800	0.5874	0.3682	0.1118	355,202,724.00	506,000.00	0.0230	0.7772	0.00
2010	United	0.0296	0.2736	0.5214	0.3699	0.1081	373,187,498.00	506,000.00	0.0220	0.8013	0.00
2011	United	0.0300	0.2572	0.5868	0.2272	0.1167	523,298,077.00	810,829,009.00	0.0203	0.7852	806,823,009.00
2012	United	0.0463	0.3690	0.4236	0.1021	0.1254	580,942,925.00	45,106,000.00	0.0258	0.7690	1,545,682,009.00
2013	United	0.0283	0.2347	0.3254	0.0496	0.1204	600,000,000.00	67,226,000.00	0.0285	0.8082	2,185,123,009.00
2014	United	0.0234	0.1766	0.3599	0.0500	0.1326	898,275,709.00	69,510,000.00	0.0339	0.7917	2,868,493,009.00
2015	United	0.0196	0.1668	0.3214	0.0487	0.1174	974,748,216.00	79,995,000.00	0.0411	0.8220	4,051,703,009.00
2016	United	0.0196	0.1636	0.3625	0.0500	0.1200	1,251,893,646.00	91,627,000.00	0.0416	0.7876	4,356,683,000.00
2017	United	0.0174	0.1517	0.4852	0.0503	0.1149	1,557,577,452.00	91,627,000.00	0.0388	0.8074	4,836,305,000.00