



**The Impact of National Bank of Ethiopia Directives on the
Profitability and Liquidity of Private Banks: The Case of
National Bank of Ethiopia Bill Purchase requirement**

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This is to certify that the thesis prepared by Shimels Yesuf, entitled: *The impact of National Bank of Ethiopia directives on the profitability and liquidity of private commercial banks in Ethiopia: The case of NBE bill purchase requirement* and submitted in partial fulfillment of the requirements for the degree of Master of Science in Accounting and Finance complies with the regulations of the University and meets the accepted standards with respect to originality and quality. Approved by:

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Abstract

The financial system plays a pivotal role in economic activities in any country. Thus it is vital to determine the status and assess the financial health of the financial system and take corrective policy measures continuously. The main objective of the study is to examine the impact of National Bank of Ethiopia directive: NBE bill purchase requirement on the performance and liquidity of private commercial banks. Balanced fixed effect panel regression was used for the data of eight private commercial banks in the sample covered the period from 2007 to 2014 with a total of 64 observations. The study finds that purchasing NBE bill had a negative and significant impact of the profitability of private commercial banks in Ethiopia. However, the magnitude is not severe to result in loss. Moreover, the pre and post policy periods comparison revealed that a relatively better profitability record for private commercial banks during the time of policy restrictions by way of clearing the excess liquidity holding of banks, diversify other fee generating services and the cost related to bill purchase to some extent seems covered by the borrowers (stable liability prices and banks discretion to adjust their asset prices). Similarly the requirement of purchasing NBE bill had negative and significant impact on the liquidity of private commercial bank in Ethiopia. In addition the pre and post periods comparison revealed liquidity of private commercial banks decreased after requirement. This is due to the fact that the requirement of purchasing NBE bill has a possibility of creating maturity mismatches because Private Banks collect savings mostly at two to three-year maturity and even shorter in some cases and fulfilling the 27 percent requirement means that they have to freeze these resources for 5 years.

Key words: government intervention, liquidity, NBE bill, profitability; private banks, regulation, supervision.

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List of Acronyms

AIBA	Awash International Bank
BIEX	Bill Exposure
BIS	Bank of International Settlement
BOA	Bank of Abyssinia
CBA	Cost and Benefit Analysis
CBE	Commercial Bank of Ethiopia
CBO	Cooperative Bank of Oromiya
CBRC	China Banking Regulatory Commission
CLRM	Classical Linear Regression Model
CPA	Capital Adequacy
CR	Credit Risk
DB	Dashen Bank
DBE	Development bank of Ethiopia
DW	Durbin-Watson
FY	Fiscal year
GATS	General agreement on trade in service
GDP	Gross Domestic Product
GoE	Government of Ethiopia
GTP	Growth Transformation Plan
IDF	Income Diversification
IE	Interest Expense
II	Interest Income
IMF	International Monetary Fund
LDC	Less Developed Countries
LIB	Lion International Bank
LCR	Liquidity Coverage Ratio
LQ	Liquidity
LG	Loan Growth
ME	Management Efficiency
MENA	Middle East and North Africa
MFIs	Micro Finance Institutions
NBE	National Bank of Ethiopia
NIB	Nib international Bank
NIM	Net Interest Margin
NPL	Non-Performing Loans
NSFR	Net Stable Fund Ratio
OBS	Off Balance Sheet
OECD	Organization for Economic Cooperation and Developmen.
OLS	Ordinary Least Square
ROA	Return on Assets
RR	Reserve Requirement
SIZ	Bank Size
TB	Treasury bill
TI	Total Income
UB	United Bank
US	United State

VaR	Value at Risk
WOB	Wogagen Bank

Chapter one

1. Introduction

1.1 Background of the study

Historically, no industry has been as heavily intervened in by the state as the financial industry (Haber and Perotti 2008). State intervention has been pervasive in most developing countries as well as in many now advanced economies. Financial industry was a vehicle through which the state executed its industrial policies (policy-based lending), mobilized war finance, and financed fiscal deficits resulting from its majority policies. Financial industry also empowered the government to tame the industrialists by controlling their source of funding. Capital control, interest rate ceilings, credit rationing, and policy lending to priority sectors have been common features of state interventions.

This state approach to the financial sector has been called “financial repression,” and it became the subject of criticism by many economists, especially starting around the 1970s. McKinnon (1973) wrote one of the seminal works in this regard. Many economists, through theoretical and empirical analyses, made persuasive arguments on the negative effects of financial repression on financial sector development as well as economic growth (Caprio & Honohan 2001). This, together with the innovations of information technologies and rapid globalization, has led most countries to embark on the liberalization and opening of their domestic financial markets. Interest rates were deregulated, policy-based lending was reduced, interventions in bank management and credit allocations (such as restrictions on consumer loans) abated, and, in many cases, banks were privatized. While liberalizing its financial sector may bring economic and social benefits it also involves certain risks. Therefore weighing its benefits and risks carefully is important in deciding whether or not to liberalize (Yoon 2010).

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). It is worth noting the financial liberalization index that measure banking security and independence control on scale of 10 to 100 (100 the most liberal) is only 20 to Ethiopia (it is the lowest in the Sub Saharan Africa). This indicates that the Ethiopian financial sector is the most highly regulated (controlled) by government (Yodit 2012). As a result of this various proclamations and regulations were passed by issuing directives in different periods. Some of them are:

1.1.1 Corporate governance

Initially Corporate governance is closely related with the founding of “corporate suffrage”, where each shareholder had one vote (Dunleavy 1998). Its aim was to create “democracy” by reducing special privilege by restraining shareholder’s number of votes irrespective of the number of shares own, but it was already changed into “plutocracy” by moving towards “one-share-one-vote” and thus permitted for concentrated ownership and control (Mekonen&Melesse 2014 as cited by Dunlavy 1998).

Concerning concentrations of ownership the National Bank of Ethiopia issued a directive. no. sbb /47/ 2010 whose aim is to limit for reduction and/or relinquishing shareholdings. In this directive any person was not allowed, to hold more than 2 percent of a bank’s total shares either on his own or jointly with his relatives(his spouse or with a person who is below the age of 18 related to him). Likewise the NBE has given the power to limit: proxy votes in any meeting of shareholder, shareholders voting rights (who borrowed money from the bank) and may suspend the voting rights of an influential shareholder of a bank fails to fulfill the given ethical and propriety requirements.

Accordingly, NBE issued Directive to limit the remuneration of board members and number of employees‘ that can be members of the board. In this directive the annual compensation to a director is limited to 50,000 Ethiopian birr, the monthly allowance paid to a director not to exceed birr 2,000 (two thousand birr). And it did not allow an employee of the bank to be aboard member. Consequently in this directive the Bank got the power to issue directives relating to appointment and suspension of directors (Directive No. SBB/49/2011).

1.1.2 Restriction on banks and on like to commerce

Countries may limit banks to a specific range of activities, or allow them to engage in a broad activities, because these scope of activities basically defines what the term “bank,” is, therefore banks may not be the same in every country around the world.

With regard to the meaning of a bank the 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.

The three main regulatory variables that significantly affect the activities of banks: (a) Banks engage in **Securities**; such as underwriting, brokering, dealing, and all aspects of the mutual fund industry. (b) Banks engage in insurance underwriting and selling. (c) Banks engage Real Estate investment, development, and management.

On this issue the NBE issued Directive No. SBB/12/1996 to limit the type of investment of banks may engage. Though the bank did not prohibit banks from engaging in securities, insurance and real estate it has put limit their level of investment. For instance the directive limits banks

1. No bank shall engage in insurance business but may hold up to 20% in an insurance company and up to a total of 10% of the banks equity capital in such business.
2. Banks are prohibited from engaging directly in non-banking businesses such as agriculture, industry, and commerce.
3. A bank may hold shares in a non-banking business only up to 20% of the company's share capital and total holdings in such business shall not exceed 10% of the bank's net worth.
4. A bank's equity participation in another bank shall be subject to prior authorization by National Bank of Ethiopia.
5. No Bank shall commit more than 20% of its net worth in real estate acquisition and development other than for own business premises without prior approval of the National Bank of Ethiopia.
6. A bank may not invest more than 10% of its net worth in other securities.

7. The aggregate sum of all investments at any one time (excluding investment in government securities) may not exceed 50% of the bank's net worth, without prior approval by the National Bank of Ethiopia.
8. Dealing in securities shall be done by banks only through a limited liability subsidiary company where in the holding of the bank shall not exceed 10% of its equity capital.

1.1.3 Limitation of foreign entry on banking industry

This regulation variable was captured using; if there is any restrictions placed for 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.

Ethiopia emerges exceptional compared to its neighbors Kenya, Tanzania, and Uganda and other developing countries in that it has not so far liberalized its banking sector. The Ethiopian banking sector still did not affect by the world's financial distress and is out of the impact of globalization. Although the ruling party understands the potential benefit of financial liberalization, believed, that liberalization may result in loss of control over the economy and may not be economically beneficial.

„When finance was liberalized the entry of foreign banks somewhat increased competition. The foreign banks have had to focus on the most profitable segments of the market and these happen to be the largest urban centers and the bigger corporate customers. They have therefore had a trend of reducing their presence in the smaller towns and rural areas and reducing their service to customers outside the large corporate sector. The new entrants have started with such a narrowly focused approach while the older ones have had to shift towards such a narrow focus. Clearly there has been little improvement in quality of service or range of service” (Mekonen & Melesse 2014 cited in Zenawi, n.d)

1.1.4 Interest rate regulation

Financial liberalization is closely related with interest rate deregulation and has been the agenda of various scholars of private interest view and the World Bank. On the other hand scholars of the public interest view recommend interest rate control as the main instrument of financial regulation for the following reasons:

- 1. Charging high interest rate on lending and low interest rate on saving is considered as exploitation therefore, according to the scholars of the public interest view, government should protect borrowers and depositors by setting a ceiling and floor on interest rates.*
- 2. Governments must also implement interest rate controls to obtain cheap funds to finance their projects that are beneficial for the general public. On the other hand governments also control interest rates on the assumption interest rate controls can stimulate investment; this argument is based on the Keynesians notation that investment demand is decreasing in the interest rate. But this argument does not take into consideration where lower interest rates, can decrease the availability of funds for investment by decrease savings (Mekonen & Melesse 2014 as cited by Zenawi).*

Regarding this the government of Ethiopia is in favor of the interest regulation. Initially lending rates are free whereas deposits rates are subject to a floor set by the National bank of Ethiopia it was 6% until 2000/01, then reduced to 3% and increased to 4% in 2007. In 2013/14 the actual minimum interest rate on saving deposit was 5 percent and the maximum 5.75 percent NBE (2013/14)

1.1.5 Requirement of purchasing NBE bill

On April 4, 2011 (NBE Directive No. MFA/NBE Bills/001/2011), the NBE issued a directive requiring all private commercial banks to invest 27% of their every new loan disbursements in NBE bills with maturity of five years at a very low interest rate, 3%, far below from what banks pay as an interest for the deposit. The government took this action as a way of mobilising resources for government targeted private sector activities and these funds are administered by the DBE. Following the five-year development plan - GTP (2010/11-2014/15) which aims to at least lay the ground for the structural transformation of

the economy from agriculture to industry, the government has fully recognised the pivotal role of the private sector in the transformation process and committed to finance the private sector in selected strategic sectors that facilitates such transformation. These strategic sectors (manufacturing and agro processing) require long-term and large loans. However, private banks are not interested in providing long-term loans and have also limited capacity in providing large loans (single borrower limit). It is this factor that led the GoE to issue this bill to mobilise resources and facilitate access to long-term and large loans. These resources are being intermediated by the DBE, a bank established to financing long-term projects. Consequently private banks are shifting to long-term loans so as to reduce the amount of NBE bills as the turnover of short-term loans is high. Private Banks are also engaged in rescheduling loans, which is not considered as new loan and hence managed to avoid additional NBE bills. They are also engaged in fee-based projects where they only give loan guarantee for projects and simply get money for this service without even being engaged in administration. NBE was aware of private banks' reaction such as shifting to long-term loans, and came up with a new regulation that forces all private banks' short-term loans to constitute at least 40% of total loans in 2013 (Directive No. MFA/NBE Bills/002/2013) According to IMF report (2012), the NBE directive introduced in April 2011 is having tangible impacts on the banking sector, including maturity mismatch and less profitability. The requirement on private banks to purchase NBE bills equivalent to 27 percent of any new loans appears to have a sizable negative impact on private banks' intermediation activities. The requirement also has the potential of creating maturity mismatches as private banks collect savings at two to three-year maturity and even shorter in some cases, but have to freeze these resources for five years at rates lower than cost of funds.

1.1.6 Prudential regulation of bank

Prudential regulation emphasize the control of systemic risk through principally balance sheet constraint. Prudential rules typically relate to rules relating to capital adequacy, loan loss reserve requirements, minimum cash reserve and liquidity requirements or regulations on what constitutes an adequate level of diversification of risk, permissible bank concentration (share of bank's assets held by a particular body or individual ratios; and it establishes guidelines to banks with the intention of maintaining safety and soundness of the

banking system and protecting the users of financial services. Some of the prudential regulations are:

1.1.6.1 Licensing and Approval of External Auditors

The NBE is guided by Proclamation No 84/94 in conducting this function. When request for licensing is made, the NBE will check whether the request is in line with the proclamation and starts evaluating the feasibility study before deciding on the matter. Similarly, NBE conducts renewal of licenses pursuant to the latest on-site examination and off-site surveillance

Part of the regulatory activity of NBE is appointing appropriate auditors by examining these auditors' past experience (or record). On top of this, the NBE will examine other relevant variables such as security of the premises, staff operation area, insurance, documentation policy and procedure and the like.

1.1.6.2 Capital requirement

Traditional approaches to bank regulation emphasize the positive features of capital adequacy requirements [Dewatripont and Tirole (1994)]. 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. Capital adequacy requirements, especially with deposit insurance, play a crucial role in aligning the incentives of bank owners with depositors and other creditors [Berger et al.(1995)].

With the objective of enhancing commercial banks capacity to absorb unexpected or unusual losses, the NBE promulgated a directive that sets the minimum paid up capital for new and existing commercial banks. 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). 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. Regarding directive No. SBB/3/95 the contribution in kind of the initial capital requirement and stated capital contribution in kind is not allowed for fulfilling minimum required capital and even if the bank fulfills its requirement the capital contributed in kind must not exceed 25% of paid up capital.

In addition the NBE issued various requirements on directive **No. SBB/4/95** that after banks fulfill the initial minimum capital they are subject to the following obligations in order to have sound reserves account in their NBE. This obligation is to transfer from its total annual profit 25% to its reserve account until the reserve equals its capital (if their reserve reaches the capital of the bank only 10% of profit is required to be transferred to their reserve account).

1.1.6.3 Limit and Directed credits

In this strategy the NBE issued credit limits guideline to individual counterparties and groups of connected counterparties of banks. According to this guideline under any circumstance banks are not allowed to set credit limits higher than the limits set by NBE. This guideline also limits on specific industries, specific geographies, specific products, and group of borrowers.

Based on this guideline the NBE issued a directive dealing with limitation on Loans to Related Parties. This directive obliges banks not to extend loans to related parties on preferential terms (on; conditions, interest and repayment periods) than conditions usually applied to other borrowers. Similarly the regulation has put limits on banks not to expose to a single and associated borrower. With this regard any bank cannot lend more than 15% of its net worth to a single borrower, and the total sum of loans to all related parties at any one time shall not exceed 35% of the total capital of the bank. In directing credit governments usually subsidized selected industries indirectly, the reasons for subsidization is to narrow the variance between private and social benefits that arise because of negative externalities, market failure and coordination failures. In this regard the government of Ethiopia tries to address this issue by selecting certain industries that are considered crucial for the countries overall economic development such as manufacturing industries, agriculture and tourism (Mekonen & Melesse 2014,P 69-70).

1.1.6.4 Reserve requirement

In most of the LDCs the use of reserve requirements against banks liabilities goes beyond their traditional role as a monetary instrument and a prudential measure. They have been used to control the quantity of money and credit; affect the liquidity of the banking system.

However high reserve requirements decrease loanable 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-maximising deposit. Hence they are considered as a leakage in the intermediation process. (Johnston & Sandararajan, 1999)

With the objective of controlling the recurring inflationary episodes in the country, 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).hence the share of private banks in loan disbursement is decreased since 2009. From the total disburse loan in 2011/12 Public banks cover 66%. The CBE is the dominant bank in the country as it covered 57% of the total loan disbursed in 2011/12. Private Banks all together granted USD 1.1 billion or 34% of the total fresh loans disbursed during the same fiscal year (Getnet 2014). Following the success in getting down the inflation in the country, the NBE revised the reserve requirement downwards to 10% effective from Jan 2012 (Directive No. SBB/46/2012) and further to 5% effective March 2013 (Directive No. SBB/55/2013).

1.1.6.5 Liquidity requirement

The 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 rese 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

According to (5th Replacement) Directives No. SBB/57/2014”. any licensed bank shall maintain liquid assets of not less than 15% of its total demand, saving and time deposits and similar liabilities with less than one month maturity period. At least 5% of the required liquid assets shall be in the form of primary reserves (notes and coins, and balances held with the NBE); and 10% of it in the form of secondary reserve assets (defined in Article 16(2)(b) of proclamation No.84/1994).

1.1.6.6 Provisions for loss on loan or advance

Non -performing loans can be defined as defaulted loans, which banks are unable to profit from. Usually loans fall due if no interest has been paid in 90 days, but this may vary between different countries and actors. Defaulted loans force banks to take certain measures in order to recover and securitize them in the best way. Loans become nonperforming when it cannot be recovered within certain stipulated time that is governed by some respective laws so non- performing loan is defined from institutional point of view.

It is widely accepted that the quantity or percentage of non-performing loans (NPLs) is often associated with bank failures and financial crises in both developing and developed countries. In fact, there is abundant evidence that the financial/banking crises in East Asia and Sub-Saharan African countries were preceded by high non-performing loans. The current global financial crisis, which originated in the US, was also attributed to the rapid default of sub-prime loans/mortgages. In view of this reality it is therefore understandable why much emphasis is placed on non-performing loans when examining financial vulnerabilities. (Khemraj, 2004)

According to 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.

1.2. Statement of the problem

The financial history of Ethiopia shows that following the nationalization of private banks and other financial institutions in 1974, there were only few government banks operating throughout the country till 1994/5 namely Commercial Bank of Ethiopia, Construction and Housing Bank and Agricultural and Development Bank. 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).

NBE was established to control the financial system and monetary policy of the country. This monetary policy refers to a bundle of actions. Some of the action taken by the central bank including; setting minimum interest rates on deposits or the rediscount rate charged to commercial banks borrowing reserves, setting reserve requirements on various classes of deposits, increasing or decreasing commercial bank reserves through open market purchases or sales of government securities, set minimum capital requirements, set credit cap, intervention in foreign exchange markets to buy and sell domestic currency for foreign exchange.

As such NBE has been taking measure that is likely to weaken financial intermediation via private banks and make the play field not level equally for private and public banks. NBE, under its Directive No. MFA/NBE Bills/001/2011 dated April 4, 2011 has issued a directive requiring all private commercial banks to invest 27% of their every new loan disbursement in NBE bills for five years at 3% interest rate, far below from what banks pay as an interest for the deposit.

“The 27 percent NBE bill requirement has the potential of crowding out private sector financing. To highlight this possibility, an illustrative numerical scenario is considered where the initial fund available to a bank for its intermediation activities is birr 1.27 million. Out of this fund, the bank is assumed to disburse a one-year loan in the amount of 1 million birr at the current lending rate of 9 percent and purchase NBE bills of 0.27 million birr as required. After one year when this loan is paid back, the total loanable fund available to the bank (birr 1,098,100) would be the loan repaid plus the interest it generated, plus the interest accrued on the NBE bills. Out of this fund, the bank can extend the maximum of birr 864,676 and is required to purchase additional NBE bills of birr 233,463, with the stock of NBE bills rising to birr 503,454. Renewing such an operation every other year over five years would reduce the fund available for lending by the bank to birr 590,677 in the fifth year, while the stock of NBE bills rises sharply to birr 1,045,748, suggesting a significant

crowding out of private bank lending to the private sector. It is also an indication that the allocative role of private banks is being taken over by the government, raising the issue of the efficiency of such an allocation. If private banks were to try to circumvent this heavy penalty, by issuing one long term (5 years) loan and to comply with the 27 percent only once, it would put the financing of the DBE—which relies on the proceeds of the 27 percent NBE bills—at risk. The requirement also has the potential of creating maturity mismatches. Private Banks collect savings mostly at two to three-year maturity and even shorter in some cases. Fulfilling the 27 percent requirement means that they have to freeze these resources for 5 years, creating a clear maturity mismatch.(IMF 2012)

However, private commercial banks have serious complaint on this (Getnet 2014). These banks are of the opinion that NBE took this decision without rigorous study of the implications. The argument is that private banks' deposit mobilization is short-term nature while the 27% bill goes to long-term investment and blocked for five years. As stated above, commercial banks deposit mobilizations were short-term, and they provided short-term loans (up to 3 years) and were not in the business of providing loans for long-term investment projects. But what happened after this new directive is that more NBE bills follow provisions of short-term loans and Banks have more cash out flow than inflow. This exposed private banks to liquidity problem to provide loans to their esteemed customers.

When considering the total loan disbursed and the amount of bill purchased by private commercial banks in 2012 and 2013, the total loan disbursed in 2012 and 2013 are 40,737 million & 44,910 million and the total bill purchase in the same year are 12,577 million & 18,599 million respectively. This point toward the total amount of loan and advance of the 2013 is increased by 10.2% from 2012. But the total amount of bill purchased in 2013 is increased by 47.9% from 2012. These indicate that the amount of NBE bill is growing much faster than the total loan and advances. Furthermore, they have been offered very low interest rate (3%) by NBE which is less than cost of collecting saving on average 5.38% NBE (2013/14) from the public. This even makes private commercial banks to incur net loss of 2.38%. Not only incurring a net loss of 2.38% but also the interest rate calculated on the bills is far less than the market lending rate which is 11.88% on average NBE (2013/14) having 8.88% difference. This difference made private commercial banks to loss substantial amount of income.

Therefore, the NBE bills have caused uncalled-for portfolio adjustment by banks. To tackle these problems, private banks were shifting to long term loan so as to reduce the amount of NBE bills as the turnover of short-term loans is high. Private Banks are also engaged in rescheduling loans, which is not considered as new loan and hence managed to avoid additional NBE bills. Thus NBE was aware of private banks' reaction and came up with a new regulation that forces all private banks' short-term loans to constitute at least 40% of total loans in 2013 (Directive No. MFA/NBE Bills/002/2013). What makes matters worse is the change in the definition of short-term loans from up to 36 months maturity in the past to a maturity of only 12 months. This could lead to more funds be taken up by the NBE each time a short-term loan is advanced by banks. (Ibid 2014).

In relation to the above problem, Yodit (2012) assess the implication of NBE bill purchase on the performance of private commercial banks in Ethiopia using qualitative research method and she concluded that the performances of private banks are affected because of the requirement of NBE bill purchase. Additionally the empirical research is conducted on the impact of policy measure on the performance of private banks in Ethiopia: in the case of government bill purchase by Tesfaye (2014) using panel data from 2007 to 2013 of eight middle size private banks and ROA as a measure of profitability. The study finds that exposure to government bills has negative and significant relationship with the performance of private banks. 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 the result indicate *that NBE Bill and Credit cap had negative and statistically significant impact on banks profitability but reserve requirement had negative and insignificant impact on profitability. Even though these researches are conducted, still it is not sufficient and there is no any empirical study in the impact of NBE bill on the liquidity of private commercial banks. Therefore, additional empirical study was important to check the consistency of the result of the above study using additional variables (income diversification, management efficiency) and one year data that are not used by the above researchers. Furthermore it is important to examine its impact on the liquidity of private commercial banks. Thus, this study was designed to contribute to the current literature by providing some evidence on the impact of NBE bill purchase requirement on the profitability and liquidity of private commercial banks in Ethiopia.*

1.3 Objective of the study

1.3.3 General objective

In the context of the problems highlighted above, the broad objective of the study was to examine the impact of National Bank of Ethiopia Directive on profitability and liquidity of private commercial banks.

1.3.4 Specific objective

Specifically, this study addresses the following objectives;

1. to investigate the impact of purchasing NBE bill on the profitability of private commercial banks in Ethiopia
2. to examine the impact of purchasing NBE bill on the liquidity of private commercial banks in Ethiopia

1.9 Research questions and Hypothesis

1.4.3 Research question

- Does the requirement of NBE bill purchase affect the profitability of private commercial banks in Ethiopia?
- Does the requirement of NBE bill purchase affect the liquidity of private commercial banks in Ethiopia?
- Is there challenge faced by banks in doing business as the result of this directive?

1.4.4 Research Hypothesis

- H_{01} : requirement of NBE bill purchase has no significant impact on the profitability of private commercial banks
- H_{02} : requirement of NBE bill purchase has no significant impact on the liquidity of private commercial banks.

1.10 Significance of the Study

The significance of this research would include the following:

- The study would identify and draw some conclusions about the impact of NBE bill purchase 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.

- There is no sufficient research in Ethiopia with the objective of investigating the impact of NBE bill purchase on the 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.

1.11 Scope of the Study

The study is focused on eight private commercial banks registered by the National Bank of Ethiopia and that have at least 8 years' experience. 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. Geographically, the study was conducted in Addis Ababa where all banks have their headquarters. This research is limited to determine the impact of NBE bill purchase on profitability and liquidity of private commercial banks in Ethiopia based on the recent 8 years Audited financial statement issued by each banks started from 2007 to 2014.

1.12 Limitation of the study.

All private commercial banks included in this study are operated more than eight years and had more experience on the handling of liquidity problem and maximization of profitability. Therefore the impact of NBE bill on the profitability and liquidity of lately established private banks might not be similar to private banks included in this study. Furthermore, the researcher could not acquire much theory basically on the country and subjects under the study for reviewing and to make comparative analysis on the result. With the exception of some research papers on the impact of bank regulation on the performance of commercial banks in Africa, all the other theories presented under theoretical review of European, American and Asian countries which may not be directly related to Ethiopia in terms of differences in macroeconomic condition and industry structures.

1.13 Organization of the paper

The rest of this paper is organized as follows: Chapter two presents theoretical and empirical review of the related literature to the issue of government intervention on financial sectors, theory of bank regulation, regulatory instrument, cost and benefit of bank regulation, recent development in international bank regulation and different issues related to liquidity and

profitability of banks; Chapter three would provide research design and methodology; Chapter four would contain results and discussion; and Chapter five would have conclusion and recommendations. A ~~reference~~ of related literature is referred while writing the paper and appendices are included after chapter five.

Chapter two

2 Review of related literature

2.1 Theoretical review

2.1.1 Economic theory of bank regulation

The evolution of banking regulations closely parallels the evolution of the economic analysis of regulation. Until the 1960s, the analysis of banking regulations that mostly prevailed amongst academics and regulatory authorities focused on the public interest motive underlying regulations. From the late 1960s on, that view was challenged and replaced by the private interest view of regulation as a new regulatory paradigm leading to major changes in the banking industry in the 1970s and 1980s.

2.1.1.1 The public interest approach to banking regulation

The public interest view of regulation is strongly connected with welfare economics. It holds that regulation provides corrective measures against various market failures, including natural monopolies and increasing returns of scale, information imperfections in market transactions, income and wealth distribution, effects under-provision of collective goods and externalities. It has been suggested that market failures may be more pronounced, and therefore the case for public regulation is stronger, in developing countries (Stiglitz 1971).

From this perspective, regulation is considered to promote public interest and increase social welfare. Accordingly, regulatory authorities are assumed to be concerned with efficiency alone. In this view, they are protected from the pressure of private interest groups, they do not pursue any private agenda and redistributive issues are left outside the scope of regulation, as an exclusive matter for politicians. In addition, regulators are assumed to be rational and perfectly informed, so that their decisions are not affected by either informational or computational limitations. This optimistic view of regulation motivated state intervention in a wide range of areas after the New Deal and World War II. Similar public interest rationales were thus used to justify state regulation in a wide array of industries, including public utilities, transportation and energy (Winston 1993). In the banking sector, from the 1930s to the 1970s, regulation focused on a mix of market structure regulations, restrictions on banking group structures, asset allocation rules, and interest rate ceilings. Issued after the Great Depression, such instruments are straightforward to justify on

public interest grounds, as they are intended to deal with various kinds of market failures (Sophie & Laurence 2015). Thus not only do they provide a safeguard against the occurrence and severity of the negative externalities arising from major banking crises, they also aim to protect investors and consumers and provide the socially optimal amount of collective goods, including macroeconomic stability and a sound banking system. By reducing the risk-taking tendency of banks, they also strengthen their robustness and thereby dramatically reduce the probability of failure associated with excessive risk-taking. In addition, such statutory measures are also intended to solve market inefficiencies and welfare losses arising from imperfect competition in the banking industry. From this viewpoint, regulatory authorities are the agents capable of rectifying market failures and restoring the market to a competitive equilibrium (Ibid 2015).

These rules and regulations operated until the 1970s. However, in the late 1960s, a critique of the public interest theory of regulation started to develop, pointing out the poor economic performance of most regulated markets and the difficulty in understanding some regulation from a welfare-maximizing point of view (Ibid 2015).

The critique left no field of state regulation unscathed. However, criticism was especially sharp in the banking sector, asserting that the regulations affecting the structure of the banking industry and the conduct of banks prevented financial intermediaries from functioning at their full capacity, thereby generating inefficiencies and welfare losses. Thus, as early as in the mid-1960s, some authors called for alternative regulation, pointing out that many of the controls imposed on banking fail to achieve their purposes, impose costs that appear to exceed the benefits or create the problem that they are said to eliminate. It would seem desirable, therefore, to eliminate many of the existing controls and to replace them with a new set of institutional arrangements (Meltzer 1967). At the same time, regulations were accused of hindering competition and guaranteeing artificially high profitability for the banks. According to this view, entry restrictions protect banks from competition, portfolio restrictions hinder diversification, deposit insurance systems exacerbate moral hazard problems and geographic restrictions prevent expansion within a country or across national borders. Thus, commentators associated banking regulation in many countries with financial repression. McKinnon(1973), seeing them as two sides of the same coin, since the policies causing financial repression include administered interest rates, high bank reserve

requirements, capital controls, restrictions on market entry into the financial sector, credit ceilings or restrictions on the direction of credit allocation and government ownership or domination of banks.

Eventually, at the end of the 1960s, a consensus seemed to emerge that the public interest approach to regulation fails to take into account the negative effects of most regulatory provisions in the banking industry. Challenging the public interest theory of regulation in the banking industry was part of a larger movement that helped make deregulation a respectable idea (Hagg 1997 & McGarity 1996)

2.1.1.2 The private interest approach to banking regulation

At the end of the 1960s and the beginning of the 1970s, the critique of regulation was taken over by scholars about a new theory of regulation. Their standpoint, known as the private interest view of regulation, was much more pessimistic about the positive effects of regulatory intervention than the public interest approach. They focused on both the inefficiencies and distributional effects that stem from government regulation, such as the effect of the influence and pressure exerted by special interest groups on regulatory authorities

The effectiveness of the interest groups depends on a number of factors. First, cohesive groups will find it easier to organize and overcome free-rider problems in lobbying for regulations that may benefit them. Producers of goods and services tend to be more compact and better organized than consumers, so there is a tendency for regulation, on net, to benefit producers more than consumers (Stigler 1971).

Second, groups tend to be more effective not only when the benefits are concentrated among group members but also when the costs of the regulation are relatively diffuse. A compact group of potential “losers,” each of whom would experience high losses associated with the regulation, are likely to form a lobby that will try to counteract the original interest group’s pressure. Interest groups most directly affected by the regulation may also attempt to build a broader coalition to lobby for or against the regulation. In the long legislative debate over the expansion of bank powers, securities firms, and insurance companies organized powerful lobbying organizations that focused much of their energy on battling each other (Kroszner & Stratmann 1998).

Third, in addition to the diffusion of costs across different groups, the level of the costs relative to the benefits obtained by the interest group plays an important role (Becker 1983). According to Becker (1983) deadweight loss is defined as precisely the difference between the ~~winner's~~ benefit minus the loser's cost from the change in output generated by the regulation. Factors affecting the ~~efficiency~~ of the regulatory or transfer mechanism thus may have an important impact on political outcomes. As the deadweight loss grows, an interest group faces greater opposition to its protective regulation on the margin and hence it is less likely to be successful

Along these lines, most regulation in the banking industry is thought to serve the private interests of banks and to organise the distribution of rents between them (Benston, 1998). As the financial sector is especially well funded and well organised, it appears powerful enough to influence regulation (Barkow, 2013 & Caprio, 2013). Following the special interest group theory, several historical studies re-interpret existing regulations as serving the vested interests of commercial banks and savings and loans (S&Ls) against external competitors, at the expense of consumer welfare, rather than being driven by public interest and social welfare considerations (Benston, 1989)

A fundamental assumption of this approach is that regulatory authorities are no longer expected to maximize social welfare but are rather self-interested. Theorists argue that individuals are essentially self-interested in or out of the public arena and it are necessary, therefore, to analyze the regulatory process as the product of relationships between different groups. This has been refined in the concept of ~~regulatory capture~~, which involves the regulatory process becoming biased in favor of particular interests. In the extreme case, the regulatory capture literature concludes that regulation *always* leads to socially sub-optimal outcomes because of ~~inefficient~~ bargaining between interest groups over potential utility rents" (Laffont & Tirole 1990).

More generally, it is to be expected that both the process and outcomes of a regulatory regime will be determined by the specific institutional context of an economy, as reflected in its formal and informal rules of economic transacting. By setting the ~~rules of the game~~, institutions impact on economic development (World Bank 2002). Economic development is seen not simply as a matter of amassing economic resources in the form of physical and human capital, but as a matter of ~~institution building~~ so as to reduce information

imperfections, maximize economic incentives and reduce transaction costs. Included in this institution building are the laws and political and social rules and conventions that are the basis for successful market production and exchange.

2.1.2 Prudential theory of bank Regulation

Prudential regulation refer to the financial soundness of financial service suppliers and aim to prevent the risk of suppliers not being able to meet their liabilities as they fall due. and also General Agreement on Trade in Services (GATS) adopts a seemingly broader definition (with a pro-regulation touch) by regarding as prudential those policies or measures adopted to protect consumers of financial services such as investors or depositors and to maintain the integrity and stability of the financial system (Panagiotis 2012). This indicates that prudential regulation of banks is intended to pursue two main goals: investor protection and financial stability. The theoretical justification of these goals hinges essentially upon three complementary arguments. First the nature of the banking business makes asymmetric information a severe problem to the relationship between banks and depositors. Secondly, since most deposits are callable either on demand or at a small cost, depositor's reactions to negative information about the solvency of a bank usually take the form of deposit withdrawals. Finally, given interbank lending and payment-related links among financial institutions, bank failures are likely to produce negative impact on the overall economy. Investor protection aims preserving externalities across the financial system and on the rest of economy giving raise to the so-called systemic risk of banking. In this context, investor protection aims preserving the liquidity and safety of deposits, whilst financial stability aims keeping systemic risk under control (Diamond & Dybvig 1983). Prudential rules typically relate to rules relating to capital adequacy, loan loss reserve requirements, minimum cash reserve and liquidity requirements or regulations on what constitutes an adequate level of diversification of risk. Prudential regulations can be discriminatory or may be applied in a discriminatory manner.

Before the crisis, micro-prudential regulation and supervision mainly involved a focus on individual financial institutions and their investors and how they managed balance sheet risks in a liberalized financial system where capital movements, interest rates and exchange rates were (and remain) deregulated. Although micro-prudential regulation had been utilized by many national regulators prior to the 1970s, it became a primary focus of bank

supervisors in the 1970s. The theory of micro-prudential regulation is, oftentimes, based on some reasoning. Banks finance themselves with government-insured deposits. It has been argued that deposit insurance could effectively prevent runs (Diamond & Dybvig 1983). However, it could induce or create opportunities for bank managers to take excessive risks, knowing fully well that losses will be borne by the taxpayer. Interestingly, if the probability of the deposit insurer to bear losses is minimized to a considerable low level, micro-prudential regulation tends to have achieved its objective.

The micro-prudential approach to regulation and supervision has been predominantly concerned with the stability of individual financial institutions and their responses to exogenous risks (Adrian & Brunnermeier 2011). However, by focusing on individual institutions, such forms of regulation tend to ignore the impact of financial institutions' risk-taking on the broader financial system. For example, the micro-prudential approach often failed to incorporate into regulatory assessments on the impact of a bank's size, degree of leverage and interconnectedness with the rest of the financial system. Moreover, bank supervisors generally assumed that banks were primarily exposed to exogenous risks, that is, risks that are generated externally to the bank's operations, and that any change, for example, in their credit or market risk exposures would require them to make balance sheet adjustments (ie., by buying or selling assets) in a more or less similar manner. Although each bank individually might be adjusting their balance sheet risk in a prudent manner, the cumulative effect of all banks acting in the same manner would be to increase system-wide risks across the financial sector. This could have the effect of exacerbating a market upturn or downturn. Indeed, the Turner Review (2009) published in the aftermath of the crisis, argued that this sort of regulation mistakenly and fatally relied on an underlying philosophy and ill-placed faith in market prices as accurate indicators of risk, while financial innovation was viewed to be wholly beneficial. In seeking to regulate at the level of the individual institution, regulators failed to take account of a number of internal amplifying processes which perpetuate the failure of one financial institution through affecting other institutions' balance sheets.

The financial crisis demonstrates the need to enhance the micro-prudential regulatory approach to include broader oversight of risks across the financial system and a concern for taking supervisory measures that support the stability of the financial system as a whole and

account for the interconnectivity of financial institutions and their effects on the global economy in times of crisis. Goodhart & Charles (2011) noted that Macro-prudential regulation consists of three main areas: 1) adjusting the application of regulatory rules to institutions according to developments in the broader economy (ie., countercyclical capital requirements). 2) Imposing economy-wide controls on the financial sector to limit aggregate risk-taking (ie., capital controls to limit foreign exchange risk or system-wide leverage limits) 3) prudential requirements for financial infrastructure or firms providing infrastructure services (ie., capital requirements for derivative clearing houses). An extensive literature has arisen analyzing these different areas of macro-prudential regulation.

The adequacy of both micro- and macro-prudential rules came to the forefront during the recent crisis. The current financial system failed in the micro-prudential supervision of financial service providers because it was concentrating on individual providers rather than the system as a whole. For instance, the main instrument for measuring risk, value at risk (VaR), can only capture the risk linked to an individual bank in isolation and thus may be important for micro-prudential regulation, but does nothing to identify systemic risk. The financial system also failed in macro-prudential supervision as demonstrated by insufficient capacity to supervise effectively and to assess macro-systemic risks of contagion of correlated horizontal shocks (Adrian & Brunnermeier 2011). In particular, the importance of macro-prudential regulation for the overall stability of the financial system was largely disregarded. Despite these different approaches, micro-prudential regulation and supervision and macro-prudential regulation and supervision are not mutually exclusive. Indeed, by recognizing the links between micro-prudential and macro-prudential regulation, a more coherent and effective framework can be developed for mitigating excessive risk-taking in financial regulation (Brunnermeier et al. 2009).

2.1.3 Regulatory instrument

To maintain the health of the financial system governments have developed a whole range of regulatory instruments. They have placed different degrees of emphasis upon the various objectives at different times and have used different regulatory tools to achieve them. The different regulatory and policy measures are classified in Table 1 according to the following criteria. First, following Baltensperger (1990) public authorities may limit themselves to *ex post* interventions, offering protection to customers and financial intermediaries in the case

of impending insolvency. They may also act in a preventive way by controlling the levels of risk assumed and reducing the probability of insolvency and illiquidity. Second, the safety and stability of the financial system may be enhanced by structural limitations of competition and market forces. Instead of these structural measures more weight is given to market efficiency by resorting to a whole set of prudential measures. Third, regulatory measures may focus on the macroeconomic concerns of systemic risk, or directly aim at microeconomic consumer protection. However, both are interrelated as the avoidance of consumer risks also limits systemic risks and vice-versa.

Table 1.1 Regulatory instrument

Protective systems (ex post)		*Lender of last resort * Deposit insurance
Preventive measures (ex ante)	Structural	*Restrictions on entry and on business activities *product line restrictions * geographic restrictions * Regulation of interest rates
	prudential	* Portfolio restrictions and supervision *capital adequacy standards * asset restrictions and diversification rules * liquidity adequacy requirements * Disclosure standards and reporting requirements * Conduct and conflict rules *Inspection and bank examination

Source Dirk (1999)

2.1.3.1 Protective measure

Protective interventions in the form of the lender of last resort and deposit insurance provisions do not involve such extensive regulation. Central banks can significantly limit the occurrence of systemic crises by their role as a „*lender of last resort*“. Central banks have been set up to control liquidity provision in the economy. They are the ultimate source of credit to which financial institutions can turn during a panic. By providing liquidity as a bankers' bank they can stop the contagious transmission of financial problems among financial intermediaries.

As pointed out in Herring and Litan (1995, pp. 51-55), in some countries central banks under certain conditions also guarantee the settlements risk involved in the funds transfer system. By bearing the risk of non-payments by participants they take the systemic risk out of the

payments system. The same role may also be taken up by private clearing houses, which have developed to handle larger value payments transactions. These clearing houses additionally use forms of private regulation such as capital standards, limits on the amount of debt and so on, to reduce default risk. The problem, however, is that these private intermediaries do not have sufficient means to cope with economy-wide shocks, for example serious disturbances that affect the members as a whole.

There are several difficulties with the lender of last resort function. First, interventions must be carried out swiftly in a credible way. Credit should only be advanced to solvent financial intermediaries using the good, but illiquid, assets as collateral. They should not be used to bail out insolvent institutions, often at a high cost for taxpayers. However, it may not be easy in practice to distinguish between problems of liquidity and insolvency. Second, lender of last resort interventions may conflict with monetary policy objectives. In order to avoid a systemic crisis central banks may extend liquidity and fuel inflationary pressures. Inflation may structurally weaken the financial sector and its capacity to absorb shocks, thereby increasing the probability of a systemic crisis.

In addition public authorities also intervene by guaranteeing some financial liabilities and by directly protecting investors through „*deposit insurance*“. Insurance arrangements contain the promise that if a financial institution fails, the investors will be reimbursed for the funds lost. They directly aim at individual investor's protection, in particular the small depositors who are unable to determine the quality of the bank's assets. Indirectly they also reduce the threat of a systemic crisis. This is achieved not by bailing out individual financial institutions, but by reducing incentives for bank runs by depositors and by containing the risk of contagion among financial institutions (Diamond & Dybvig, 1983).

The question arises whether government intervention may not be limited to these protective policies. Why do public authorities resort to more extensive public regulation of the financial system? According to Herring and Litan (1995) further government regulation has to be explained by the potential high costs and moral hazard problems that these protective policies may entail? The lender of last resort prevents failures of financial institutions, in particular when they are considered to be „too big to fail“. In their IMF study Lindgren et.al (1996) document that the „too-big-to-fail“ doctrine has been prevalent in many countries, also in major industrial countries, for example recently in France and Japan, where it has

prevented the closure of major commercial banks. Also in the US the practice in case of distress of merging banks rather than closing them relies upon this philosophy. When the government provides such a safety net it tempts financial institutions to pursue high risk investment strategies at the expense of the government. Also, when they are covered by deposit insurance, depositors have less incentive to monitor and discipline financial institutions. Hence, government safety nets help solve risk problems only by creating other problems.

2.1.3.2 Preventive Measures

2.1.3.2.1 Structural measures

In order to limit the threat of systemic risks government intervention in the financial sector traditionally consisted in regulatory measures aiming at limiting competition and at restricting the operation of market forces. Unbridled competition was seen as a major threat to the stability of the financial sector. As listed in Table 1, structural regulation mainly involves restrictions on entry and on business activities, and often includes various measures of interest rate regulation.

It was mainly in the aftermath of the Great Depression, which found its origin in a stock market crash, that it was deemed necessary to introduce structural *restrictions* on the scope of *permissible activities* of the different financial institutions. Before the crisis commercial banks acted as securities market financial institutions as well as depository institutions. They had an incentive to take on more risky activities in financial markets and earn investment banking fees, the risk being shifted in part to the depositors. In order to limit these risky activities and to reduce the risk of contagion within the financial system, after the crisis these activities were legally separated in many countries. Frequently the ownership of financial institutions and non-financial firms was separated, and the investments of industrial firms in banks limited. However, these additional restrictions were aimed at limiting the concentration of power (Demirgu et.al 2004)

Since the 1970s the debate over retaining these restrictions has been reopened and limits have faded significantly. First, it was observed that some countries such as Germany had maintained a system of universal banking, in which banks were allowed to participate heavily in non-financial activities. Second, the increased affiliation with commercial companies, however, remains a controversial issue. It may stretch the safety net meant only

for bank depositors to protect other commercial operations, and induces more risky behavior. Also the risk of contagion increases as shocks in the industrial sector may more easily spread to financial institutions. Third, the combination of banking and insurance within the same financial institution has been permitted mainly in European countries. Fourth, domestic branching restrictions by limiting the concentration of power may lower the cost of providing risk sharing, liquidity and information services. However, they increase the exposure of banks to credit risk by reducing their ability to diversify assets. In the meantime banks have spread worldwide so that it increasingly becomes difficult to maintain these restrictions (Dirk 1999).

Interest rates are important instruments of monetary policy. Hence, governments traditionally have intervened in the price formation in money and capital markets by regulating interest rates. *Interest rate ceilings* and other pricing rules, however, were also introduced to limit competition between banks and other financial institutions. Limiting price competition in financial markets would also reduce risk taking and moral hazard problems for financial institutions. Imposing interest rate ceilings in the past in the US would then lower the cost of funds, enhance profits and reduce the likelihood of bank runs (Ibid 1999).

Recently many of these anti-competitive regulatory measures have been removed. It was observed that they did not contribute to financial stability in the long run. They resulted in disintermediation as funds could be more profitably directly invested in and obtained from financial markets. Also many financial innovations were introduced to circumvent these restrictive regulations. In the trade-off between safety, stability and efficiency the present regulatory environment gives more weight to competition and efficiency. Instead of structurally limiting competition and the operation of market forces, regulation is taking more and more the form of prudential measures which may better serve the interest of the customers (Panagiotis 2012).

2.1.3.2.2 Prudential measure

Prudential control is exercised first at the market entry stage by ‘chartering’ that is the obligation to file an application for a charter. To obtain a license the owners have to supply sufficient equity capital. A minimum of capital is required as a cushion against losses. The chartering of new financial institutions is also subject to a screening of the proposed

managers to prevent undesirable people from controlling them. According to Mishkin (1997) an adverse selection problem arises as financial activities may attract entrepreneurs wishing to engage in speculative activities.

A central instrument of prudential control consists in capital adequacy rules. Equity capital provides the necessary cushion against losses, since shareholders may want to benefit from the leverage effect and to increase their return on equity by providing as little capital as necessary. Only in well capitalized institutions, however, do the shareholders have enough incentives to monitor their financial health. When financial institutions hold a large amount of equity capital, they have more to lose in case of failure so that they will pursue less risky activities (Dirk 1999). Consistency

As is argued by Herring and Litan (1995) sound capital standards are important to offset the moral hazard created by government safety nets for depositors and other creditors. If capital regulation were perfect, no other regulatory interventions would be needed against the danger of moral hazard. Financial intermediaries could then be shut down and creditors reimbursed just before insolvency of the intermediary. In practice, however, regulators face delays in taking appropriate action, moreover the measuring of risk and the valuation of assets and capital proves to be difficult. Hence, other regulatory tools are necessary to backstop capital regulation.

Besides structural interventions whereby financial institutions are not allowed to engage in certain activities, such as investments in common stocks by banks, the imposition of quantitative limits on certain asset holdings has more the character of prudential regulation. By „*portfolio diversification rules*“ such as, limiting the amount of loans in particular categories or to individual borrowers the risk profile of banks can be reduced.

Cash reserve requirements are often imposed as a measure to enhance liquidity adequacy. By providing the necessary liquidity for deposit withdrawals they increase confidence with depositors and reduce the threat of bank runs. In situations of collective withdrawals of deposits, however, they turned out to be largely insufficient to avoid a bank panic. Nowadays changes in required reserves have developed to an instrument that is used primarily for controlling the quantity of money and credit creation. By regular *examination* and *inspection* regulators may limit the moral hazard problems. They have to control whether the financial institutions are complying with the capital requirements and the

restrictions on asset holding. A supervisory structure has to be set up in which bank examiners make periodic, but also unannounced visits to the financial intermediaries (Drik 1999).

Recent prudential measures such as „*dislosure requirements*“ tend to emphasize the disciplining of financial institutions by the market rather than by regulators. Generally, providing appropriate and timely disclosure of financial conditions of companies may help to reduce information asymmetry. In particular, disclosure of financial conditions of financial institutions not only increases the ability but also gives incentives to investors to monitor the performance and the risk-profile of financial intermediaries. Recently the Basle Committee issued recommendations to banks to disclose their trading and derivatives activities. Also by discouraging shareholders and managers from excessive risk taking, public disclosure reduces the threat of systemic crises. Some degree of market discipline is also restored by recent developments such as market value accounting (BCBS 2010).

2.1.4 Cost and benefit of bank regulation

The reasons for requiring organizations to use cost and benefit Analysis (CBA) are varied. The most obvious reason is that we want regulations that advance the public interest, and regulations that produce gains greater than losses will normally do just that. 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).

The cost of government regulation of business has become a political issue in recent years, and the cost is no less controversial for banks than for other types of businesses. Banks 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. The cost of regulation

consists of opportunity and operating costs that arise from activities or changes in activities that are required by the regulation. 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, 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).

The *total cost* of a regulation is the cost of performing all the activities that it requires. The *incremental cost* of a regulation is the cost of activities that are performed only because the law mandates them. The costs of performing activities that are mandated by the law but would be performed anyway in the ordinary course of business are part of the total cost of a regulation but are not part of the incremental cost (Joskow and Rose 1989).

In the side of the Benefit of bank regulation, the first benefit of bank regulation is guarding banks against systemic risk. Avoiding systemic risk is the prime objective of banking regulation. Systemic risk may be defined as the risk of a sudden, unanticipated event that would damage the financial system to such an extent that economic activity in the wider economy would suffer. Such shocks may originate inside or outside the financial sector and may include the sudden failure of a major participant in the financial system; a technological breakdown at a critical stage of settlements or payments systems; or a political shock such as an invasion or the imposition of exchange controls in an important financial center. Such events can disrupt the normal functioning of financial markets and institutions by destroying the mutual trust that lubricates most financial transactions (Kenneth 2000).

Regulatory bodies take a substantial number of measures to safeguard the financial system from systemic risk. Some of the methods now used by bank regulators to control banking risks are bank capital requirements, restrictions on the type and quality of bank securities holdings, periodic examinations of loan quality and other banking factors, limitations on the activities that banks and their employees can pursue, and supervisory enforcement actions to control risk taking at problem institutions. (Ibid 2000).

The second fundamental rationale for financial regulation is the protection of consumers against excessive prices or opportunistic behavior by providers of financial services. Antitrust enforcement is the most obvious policy tool to counter excessive prices. Competition policy is motivated not only by the concern to protect consumers from monopolistic pricing, but also by the aim of attaching market forces to enhance the efficiency of the allocation within the financial sector and between the financial sector and the rest of the economy(Ibid 2000).

Consumers of financial services – particularly unsophisticated consumers – find it very difficult to evaluate the quality of financial information and services provided to them. In part this is because payment for many financial transactions must often be made in the

current period in exchange for benefits that are promised far in the future. But even after the decision is made and financial results are realized, it is difficult to determine whether an unfavorable outcome was the result of bad luck, even though good advice was competently and honestly rendered, or the result of incompetence or dishonesty. Customers face a problem of asymmetric information in evaluating financial services. Consequently they are vulnerable to *adverse selection*, the possibility that a customer will choose an incompetent or dishonest firm for investment or agent for execution of a transaction. They are also vulnerable to *moral hazard*, the possibility that firms or agents will put their own interests or those of another customer above those of the customer or even engage in fraud. In short, unsophisticated consumers are vulnerable to incompetence, negligence and fraud (Ibid 2000).

In order to ease these asymmetric information problems, regulators often establish “fit and proper tests” for financial firms to affirm their quality *ex ante*. And *ex post*, strict enforcement of conduct of business rules with civil and criminal sanctions will deter firms from exploiting asymmetric information vis-à-vis customers. Strict enforcement of conduct of business rules also provides firms with incentives to adopt administrative procedures that ensure consumers are competently and honestly served and that employees will behave in a way that upholds the firms’ reputation. Conflict of interest rules and customer suitability requirements serve a similar function (Ibid 2000).

The provision of insurance is another response to the asymmetric information problem faced by unsophisticated consumers. One of the rationales for deposit insurance is to protect unsophisticated depositors of modest means who would find it excessively costly to monitor their bank. Other kinds of financial contracts are also insured for the protection of unsophisticated consumers

Reserve requirements, capital requirements and liquidity requirements designed to ensure that a financial services firm will be able to honor its liabilities to its customers, have a consumer protection (and micro-prudential) rationale as well as a macro-prudential rationale to safeguard the system against systemic risk. In effect, regulators serve a monitoring function on behalf of unsophisticated customers of modest means. (Ibid 2000).

Another aspect of a good banking system is that customers are provided quality services at competitive prices. One of the purposes of bank regulation, therefore, is to create a

regulatory framework that encourages efficiency and competition and ensures an adequate level of banking services throughout the economy

Efficiency and competition are closely linked together. In a competitive banking system, banks must operate efficiently and utilize their resources wisely if they are to keep their customers and remain in business. Without such competition, individual banks might attempt to gain higher prices for their services by restricting output or colluding with other banks. Competition is also a driving force in keeping banks innovative in their operations and in designing new services for customers. A further consideration is that for resources throughout the economy to flow to activities and places where they are of greatest value, competitive standards should not differ significantly across banking markets or between banking and other industries.

The promotion of an efficient and competitive banking system carries a number of implications for regulation. Competition and efficiency depend on the number of banks operating in a market, the freedom of other banks to enter and compete, and the ability of banks to achieve an appropriate size for serving their customers. For instance, too few banks in a market could encourage monopolization or collusion, while banks of a suboptimal size might be unable to serve major customers and might be operating inefficiently.

Consequently, regulators must be concerned with the concentration of resources in the banking industry and with the opportunities for entry and expansion across individual banking markets.

Banking regulation must also take an approach that does not needlessly restrict activities of commercial banks, place them at a competitive disadvantage with less regulated firms, or hinder the ability of banks to serve their customers' financial needs. Finally, regulation should foster a banking system that can adapt and evolve in response to changing economic conditions and technological advances (Ibid 2000).

2.1.5 Recent development in international bank regulation

In 1988, the Basel Committee on Banking Supervision introduced the first broadly accepted international accord on banking supervision; the Basle Capital Accord - also known as Basel-I. Originally, the accord focused on credit risk as it is the most important risk driver for banks (Santos, 2001). Later on, the Basel Committee also incorporated market risks (e.g. interest rate risk and foreign exchange risk) from the trading book in calculating risk

weighted assets and capital requirements (Basel Committee on Banking Supervision, 1998). Basel I defined minimum requirements for the ratio between capital and risk weighted assets to ensure a sound capital position, table 1 presents the minimum capital ratios under Basel I. In 2004, the Basel Committee revised the original framework and introduced Basel II. Following (Allen et al. 2010) moral hazard and regulatory arbitrage formed the main reasons for the revision. Basel II relies on a three-pillar system (Basel Committee on Banking Supervision, 2004). The first pillar incorporates minimal capital requirements, similar to those in Basel I. Subsequently, the second pillar presents guidelines for sound risk management and captures residual risks that are not described in the first pillar. In this context, the Basel Committee mainly transfers the responsibility of the residual risks to the banking sector, without setting any specific target ratio. Finally, the third pillar sets out requirements for market discipline and disclosures on risk management. Thus, this final pillar serves as control to the first two pillars by requiring adequate disclosures of risk management controllable by supervisors and other stakeholders. According to Basel Committee on Banking Supervision (2004) the objectives of Basel II are to strengthen the stability and soundness of the financial sector. Moreover, Basel II aims to be more risk-sensitive and to make greater use of banks' internal models and risk management principles in calculating capital ratios. With the introduction of Basel II interaction and disclosures to national supervisors are intensified.

Table 2.1 Differences between minimum capital requirements

Regulation	Requirements	Tier1 (core equity)	Tier	Total capital
Basel I	Minimum		4.00%	8.00%
Basel II	Minimum	2.00%	4.00%	8.00%
Basel III	Minimum	4.50%	6.00%	8.00%
	Capital Conservation Buffer		2.50%	
	Minimum + Capital Conservation Buffer	7.00%	8.50%	10.50%
	Countercyclical buffer		0% 2.50%	

Source: Basel Committee (1988), Basel Committee on Banking Supervision (2004) and Basel Committee on Banking Supervision (2010)

Notes: the definition of Tier 1 Capital could differ between the different Basel frameworks; see also appendix I for a review of the definitions for the different Tier capital forms under the Basel frameworks.

More recently, new revisions to the current Basel II accord were initiated that will impose new liquidity restrictions, funding requirements and substantially tighten minimum capital requirements, (Basel Committee on Banking Supervision, 2010). These latest revisions of the prior framework, known as Basel III, will have profound effect on the balance sheet structure and business decisions of banks. According to Allen et al. (2010) the introduction of new regulation will shift future risk management more and more to complex assets and liability decisions in which business decisions are restricted by funding and liquidity constraints.

In the upcoming years, national governments will implement Basel III, which will impose new constraints on banks' activities. Table 1 presents the differences between the different Basel frameworks with respect to the minimum capital requirements; the table illustrates that the minimum capital ratios are strengthened over time. Note that the Basel Committee revised the definition of tier 1, tier 2 and tier 3 capitals under the different frameworks, by excluding some forms of hybrid and innovative capital instruments (Basel Committee on Banking Supervision, 2010). Besides the minimum capital requirements, Basel III consists of a capital conservation buffer and a countercyclical buffer. The Basel Committee designed the capital conservation buffer to require banks to build up extra buffers outside periods of stress of up to 2.5% above Tier 1 ratio. The buffer does not constrain bank operations but only affect capital distributions and dividend payments by restricting dividend payouts when banks have less than 2.5% of a capital conservation buffer. The countercyclical buffer is designed to avoid system-wide bank failure that can arise by excessive aggregate credit growth. The countercyclical buffer is set within national jurisdictions, and varies between zero and 2.5%.

Furthermore, Basel III will also impose funding and liquidity restrictions. The Liquidity Coverage Ratio (LCR) identifies the amount of high quality liquid assets that a bank should hold in order to meet its liquidity needs over a thirty day horizon under a severe period of stress (Basel Committee on Banking Supervision, 2010). The Net Stable Funding Ratio (NSFR) focuses on a longer horizon by examining a one-year period to complement the

LCR. The objectives of NSFR are to restrict over-reliance on short-term wholesale funding and to promote more stable medium and long term funding of the assets (Basel Committee on Banking Supervision, 2010). The LCR and NSFR will likely impact business decisions and affect the funding structure and liquidity structure

2.1.6 Theory of bank liquidity

2.1.6.1 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. According to (Nzotta 1997) 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).

2.1.6.2 Shiftability 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 shiftability, 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 (Dodds 1982) Liquidity management theory consists of the activities involved in obtaining funds from depositors and other creditors (from the market especially) and determining the appropriate mix of funds for a particular bank (as cited by Sunny et al: 2013). This point of view contends that liability management must seek to answer the questions How do we obtain funds from depositors, How do we obtain funds from other creditors and What is the appropriate mix of the funds for any bank? This indicates that

supplementary liquidity could be derived from the liabilities of a bank. 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).

2.1.6.3 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 matched 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 shiftability 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.

2.1.6.4 Demand for money theory

Miller and Orr (1966) model of demand for money by firms suggests that there are economies of scale in cash management. This would lead larger firms to hold less cash than

smaller firms. It is argued that the fees incurred in obtaining funds through borrowing are uncorrelated with the size of the loan, indicating that such fees are a fixed amount. Thus, raising funds is relatively more expensive to smaller firms encouraging them to hold more cash than larger firms. Firms with more volatile cash flows face a higher probability of experiencing cash shortages due to unexpected cash flow deterioration. Thus, cash flow uncertainty should be positively related with cash holdings.

Barclay and Smith (1995), however provide evidence that firms with the highest and lowest credit risk issue more short-term debt while intermediate credit risk firms issue long-term debt. If we consider that firms with the highest credit rating have better access to borrowing, it is expected that these firms will hold less cash for precautionary reasons, which would cause debt maturity to be positively related to cash holdings.

2.1.6.5 Financial fragility-crowding out hypothesis

This theory produced opposing predictions on the link between capital and liquidity creation (Berger & Bouwman, 2007). It predicted that higher capital reduces liquidity creation. Diamond and Rajan (2000, 2001) focused on this theory and model a relationship bank that raises funds from investors to provide financing to entrepreneurs. The entrepreneur may withhold effort, which reduces the amount of bank liquidity level and financing attainable and the bank may also withhold effort, which limits the bank's ability to raise financing. An exception to this theory is the bank deposit contract which mitigates the bank's holdup problem because depositors can run on the bank if the bank threatens to withhold effort and therefore maximizes liquidity creation. Providers of capital cannot run on the bank, which limits their willingness to provide funds and hence reduces liquidity level and creation. The negative effect of capital on liquidity creation as suggested by Diamond and Rajan (2001) depends significantly on deposit insurance coverage being incomplete. The completion of deposit insurance will provide no incentive for depositors to run on the bank and a deposit contract will not alleviate the bank's holdup problem. Gorton and Winton (2000) show how a higher capital ratio may reduce liquidity creation through the crowding out of deposits. They argue that deposits are more effective liquidity hedges for investors than investments in equity capital. Thus, higher capital ratios shift investors' funds from relatively liquid deposits to relatively illiquid bank capital, reducing overall liquidity for investments.

2.1.7 How can banks achieve adequate liquidity?

According to (Vodova 2013 cited in Valla et al 2008) Banks can increase their liquidity in multiple ways, each of which ordinarily has a cost, including:

- Shorten asset maturities
- Improve the average liquidity of assets
- Lengthen liability maturities
- Issue more equity
- Reduce contingent commitments
- Obtain liquidity protection

Shorten asset maturities. This can help in two fundamental ways. First, if the maturity of some assets is shortened by enough that they mature during the period of a cash crunch, then there is a direct benefit. Second, shorter maturity assets generally are more liquid.

Improve the average liquidity of assets. Assets that will mature beyond the time horizon of an actual or potential cash crunch can still be important providers of liquidity, if they can be sold in a timely manner without an excessive loss. There are many ways that banks can improve asset liquidity. Securities are normally more liquid than loans and other assets, although some large loans are now designed to be relatively easy to sell on the wholesale markets, so this is a matter of degree and not an absolute statement. Shorter maturity assets are usually more liquid than longer ones. Securities that are issued in large volume and by large companies generally have greater liquidity, as do more creditworthy securities.

Lengthen liability maturities. The longer-term a liability, the less likely that it will mature while a bank is still in cash crunch.

Issue more equity. Common stock is roughly equivalent to a bond with a perpetual maturity, with the added advantage that no interest or similar periodic payments have to be made. (Dividends are normally paid only out of profits and are discretionary.)

Reduce contingent commitments. Cutting back the volume of lines of credit and other contingent commitments to pay out cash in the future reduces the potential outflows, thereby improving the balance of sources and uses of cash.

Obtain liquidity protection. A bank can pay another bank or an insurer, or in some cases a central bank, to guarantee the availability of cash in the future, if needed. For example, a

bank could pay for a line of credit from another bank. In some countries, banks have assets pre-positioned with their central bank that can be used as collateral to borrow cash in a crisis. Similarly BIS (2008) also recommends banks to identify alternative source of funding that strengthen its capacity to withstand a variety of severe yet plausible institution specific and market-wide liquidity shocks. Depending on the nature, severity and duration of the liquidity shock, potential sources of funding include the following:

- Deposit growth;
- The lengthening of maturities of liabilities;
- New issues of short- and long-term debt instruments;
- Intra-group fund transfers, new capital issues, the sale of subsidiaries or lines of business;
- Asset securitization;
- The sale of highly liquid assets;
- Drawing-down committed facilities;
- And borrowing from the central bank's marginal lending facilities.

However, not all of these options may be available in all circumstances and some may be available only with a substantial time delay. Bank management should regularly review and test its fund-raising options to evaluate their effectiveness at providing liquidity.

Aspachs et al. (2005) also divide these possibilities into three main mechanisms that banks can use to insure against liquidity crises:

- Banks hold buffer of liquid assets on the asset side of the balance sheet. A large enough buffer of assets such as cash, balances with central banks and other banks, debt securities issued by governments and similar securities or reverse repo trades reduce the probability that liquidity demands threaten the viability of the bank.
- Second strategy is connected with the liability side of the balance sheet. Banks can rely on the interbank market where they borrow from other banks in case of liquidity demand. However, this strategy is strongly linked with market liquidity risk.
- The last strategy concerns the liability side of the balance sheet, as well. The central bank typically acts as a Lender of Last Resort to provide emergency liquidity assistance to particular illiquid institutions and to provide aggregate liquidity in case of a system-wide shortage.

2.1.8 Theory of bank profit

Studies on the performance of banks started in the late 1970s/early 1980s with the application of two industrial organizations models: the Market Power and Efficiency Structure theories (Athanasoglou et al. 2006). The balanced portfolio theory has also added greater insight into the study of bank profitability (Nzongang&Atemnkeng 2006). Thus, each of the aforementioned theories is discussed in detail in this particular section as follows.

2.1.8.1 Market power theory

As noted in Tregenna (2009) applied in banking the market power hypothesis posits that the performance of bank is influenced by the market structure of the industry. There are two distinct approaches within the market power theory; the Structure-Conduct-Performance (SCP) and the Relative Market Power (RMP) hypotheses. According to the SCP approach, the level of concentration in the banking market gives rise to potential market power by banks, which may raise their profitability. Banks in more concentrated markets are most likely to make abnormal profits‘ by their ability to lower deposits rates and to charge higher loan rates as a results of collusive (explicit or tacit) or monopolistic reasons, than firms operating in less concentrated markets, irrespective of their efficiency (Ibid 2009). Unlike the SCP, the RMP hypothesis posits that bank profitability is influenced by market share. It assumes that only large banks with differentiated products can influence prices and increase profits. They are able to exercise market power and earn non-competitive profits (Ibid 2009).

2.1.8.2 Efficiency theory

The efficiency hypothesis, on the other hand posits that banks earn high profits because they are more efficient than others. There are also two distinct approaches within the efficiency; the X-efficiency and Scale–efficiency hypothesis. According to the X-efficiency approach, more efficient firms are more profitable because of their lower costs. Such firms tend to gain larger market shares, which may manifest in higher levels on market concentration, but without any causal relationship from concentration to profitability (Athanasoglou et al. 2006). The scale approach emphasizes economies of scale rather than differences in management or production technology. Larger firms can obtain lower unit cost and higher

profits through economies of scale. This enables large firms to acquire market shares, which may manifest in higher concentration and then profitability (Ibid. 2006).

2.1.8.3 The balanced portfolio theory

The portfolio theory approach is the most relevant and plays an important role in bank performance studies (Nzongang & Atemnkeng 2006). According to the Portfolio balance model of asset diversification, the optimum holding of each asset in a wealth holder's portfolio is a function of policy decisions determined by a number of factors such as the vector of rates of return on all assets held in the portfolio, a vector of risks associated with the ownership of each financial assets and the size of the portfolio. It implies portfolio diversification and the desired portfolio composition of commercial banks are results of decisions taken by the bank management. Further, the ability to obtain maximum profits depends on the feasible set of assets and liabilities determined by the management and the unit costs incurred by the bank for producing each component of assets (Nzongang & Atemnkeng 2006)

2.1.8.4 Risk return trade off theory

The balance sheet structure could also influence banks' profitability; in this context, the equity-to-asset ratio is an important balance sheet ratio that received much attention. For this ratio, theoretical explanations assume different signs of the relationship with profitability. According to the Modigliani & Miller theorem there exists no relationship between the capital structure (debt or equity financing) and the market value of a bank (Modigliani & Miller 1958). In this context, there is no relationship that exists between the equity-to-asset ratio and funding costs or profitability.

Financing theory suggest that increasing risks, by increasing leverage and thus lowering the equity-to-asset ratio (increasing leverage), leads to a higher expected return as entities will only take on more risks when expected returns will increase; otherwise, increasing risks have no benefits. This theoretical explanation is known as the risk-return trade off (Ommeren 2011).

There are also theoretical explanations for the opposite relationship that a higher equity-to-asset ratio has a positive effect on profitability. These explanations are based on the signaling and bankruptcy cost hypotheses. The first hypothesis states that a higher equity ratio is a positive signal to the market of the value of a bank (Berger 1995b). Less profitable banks cannot achieve such a signal since this will further deteriorate their earnings. In this way a lower leverage, indicates that banks perform better than their competitors who cannot raise their equity without further deteriorating the profitability. The latter hypothesis suggests that in a case where bankruptcy cost are unexpected high a bank hold more equity to avoid period of distress (Ibid 1995b).

2.2 Empirical review

Barth et al (2002) conducted a study entitled bank regulation and supervision: what works best? By taking the data of 107 countries the paper tried to show the regulatory and supervisory practice and banking sector development. By taking specific regulatory practice like regulation on capital, restriction on bank activity, restriction on bank entry, the paper tried to see the implication they have on development of banking sector. Based these findings they raised a cautionary flag regarding reform strategies that place excessive reliance on countries adhering to an extensive checklist of regulatory and supervisory on banks. Instead, this paper's findings suggest that regulatory and supervisory practice that 1) force accurate information disclosure 2) empower private-sector corporate control of banks and 3) foster incentives for private agents to exert corporate control work best to promote bank performance and stability. The paper doesn't oppose the idea that there is a need for regulation instead states that private-sector monitoring of banks tends to be associated with greater banking- system success than strategies that place excessive emphasis on direct official government oversight and restrictions on banks stability. In contrast, they provide evidence indicating that encouraging and facilitating private monitoring can boost bank performance. In accordance with the 'activity restrictions approach', Barth et al.(2004) put forward various reasons for and against restricting bank activities. However, overall their results indicate that restricting them may not only lower banking efficiency but also increase the probability of a banking crisis

Another disadvantage of restricting banking activities is presented by Claessens & Klingebiel (2001) say that these restrictions prohibit economies of scale and scope. Furthermore, Claessens & Laeven's (2004) study also found that banking systems with tight activity restrictions are experiencing less competition. Their findings are explained by Laeven & Levine (2009), who say that the reason for this effect is that restrictions in non-lending activities reduce the utility of owning a bank. This gives shareholders an incentive to make riskier decisions in order to compensate for the return they would have gotten when the non-lending activities were not prohibited by the government. In addition, Beck et al. (2006) found that activity restrictions can possibly amplify the negative effect of competition on bank stability.

Demirguc-Kunt et al. (2004) investigate the impact of bank regulations, market structure, and national institutions on the cost of intermediation as measured by accounting ratios (net interest margin and overhead costs). Information on commercial bank regulations is obtained from Barth et al. (2001b; 2003) databases for a sample of 1400 banks operating in 72 countries. The time span considered is 1995 to 1999. Their evidence indicates that tighter regulation on banking services and activities boost the cost of financial intermediation. A result in line with the view that by allowing banks to engage in a broad range of activities one might expect better diversified and more stable banking institutions. Using the same time span as in the above study and a sample of stock exchange-listed banks, Fernandez & Gonzalez (2005) provide evidence to suggest that in countries with low accounting and auditing requirements more power on official supervisory authorities may reduce risk-taking behaviour from managers' perspectives. On the other hand, the authors reveal that higher restrictions on bank activities can diminish the probability of a banking crisis.

Beck et al. (2006)'s use firm-level data on 2500 firms across 37 non-transition economies to examine the relationship between supervisory strategies and corporate financing obstacles. Their empirical findings indicate that strengthening the power of supervisory agencies may actually reduce the integrity of bank lending with adverse implications on the efficiency of credit allocation. Their evidence lends support to the view that private monitoring will have a positive impact on the banking industry in terms of efficient operations and sounder banks. More recently, researchers have turned their attention to the use of frontier analysis in investigating regulatory practices in banking. In a cross-country analysis, Pasiouras (2008) investigates the impact of several regulations on banks technical efficiency for a dataset of 715 commercial banks operating in 95 countries during 2003 to estimate technical efficiency and used Tobit regressions, the results provide evidence in favors of all three pillars of Basel II that strict capital adequacy, powerful supervision and market discipline power promote technical efficiency. However, only the latter one is significant in the estimated specifications. Using a parametric frontier analysis, another study by Pasiouras et al. (2009) investigate the link between bank regulations and cost and profit efficiency. The analysis is based on a sample of 615 commercial banks from 74 countries covering the period 2000-2004. Their findings are in favor of supervisory power and market discipline mechanism,

indicating that enhanced market discipline and supervisory power increase both profit and cost efficiency.

In accordance with foreign bank entry restriction, Claessens and Laeven (2004) suggesting that foreign bank entry limitations obstruct competition and is an effective competition restricting instrument. On the other hand, (Vives 2011) argues that countries with weak institutional structure should moderate the intensity of competition, which can be done by restrictions of competition. In similar period James et al. (2001) examines financial regulation and performance of banks across 50 countries. The study examines three questions. First, do countries with relatively weak government/bureaucratic systems impose harsher regulatory restrictions on activities of banks? Second, do countries with more restrictive regulatory systems have poorly functioning banking systems? Third, do countries with more restrictive regulatory systems have a lower probability of suffering a banking crisis? They find that, Countries with weak government/ bureaucratic systems tend to impose harsher regulatory restrictions on the activities of banks. There is mixed evidence regarding the impact of regulatory restrictions on bank performance. Finally, we find that countries that restrict securities market activities tend to have more fragile banking systems.

Besides Klomp and Haan (2011) used quartile regressions to examine the impact of bank regulation and supervision on banking risk. The analysis is based on a sample of 200 banks from 21 OECD countries covering the period 2002-2008. Their findings are supervisory control, capital regulations, and market entry regulations have a significant effect on 'capital and asset risk', while supervisory control and regulations on activity restrictions, private monitoring, and market entry restrictions, have a significant effect on 'liquidity and market risk'. Their most important finding, however, is that the impact of bank regulation and supervision on banking risk is not uniform. Therefore, they suggest that regulation and supervision do not have much effect on low-risk banks, while most of their measures for the various dimensions of bank regulation and supervision do have a highly significant effect on high-risk banks.

Samy & Mohammed (2008) also examine the influence of bank regulations, concentration, financial and institutional development on commercial bank margin and profitability across a broad menu of Middle East and North Africa (MENA) countries. They cover period from 1989 to 2005 and control for a wide array of macroeconomic, financial and bank

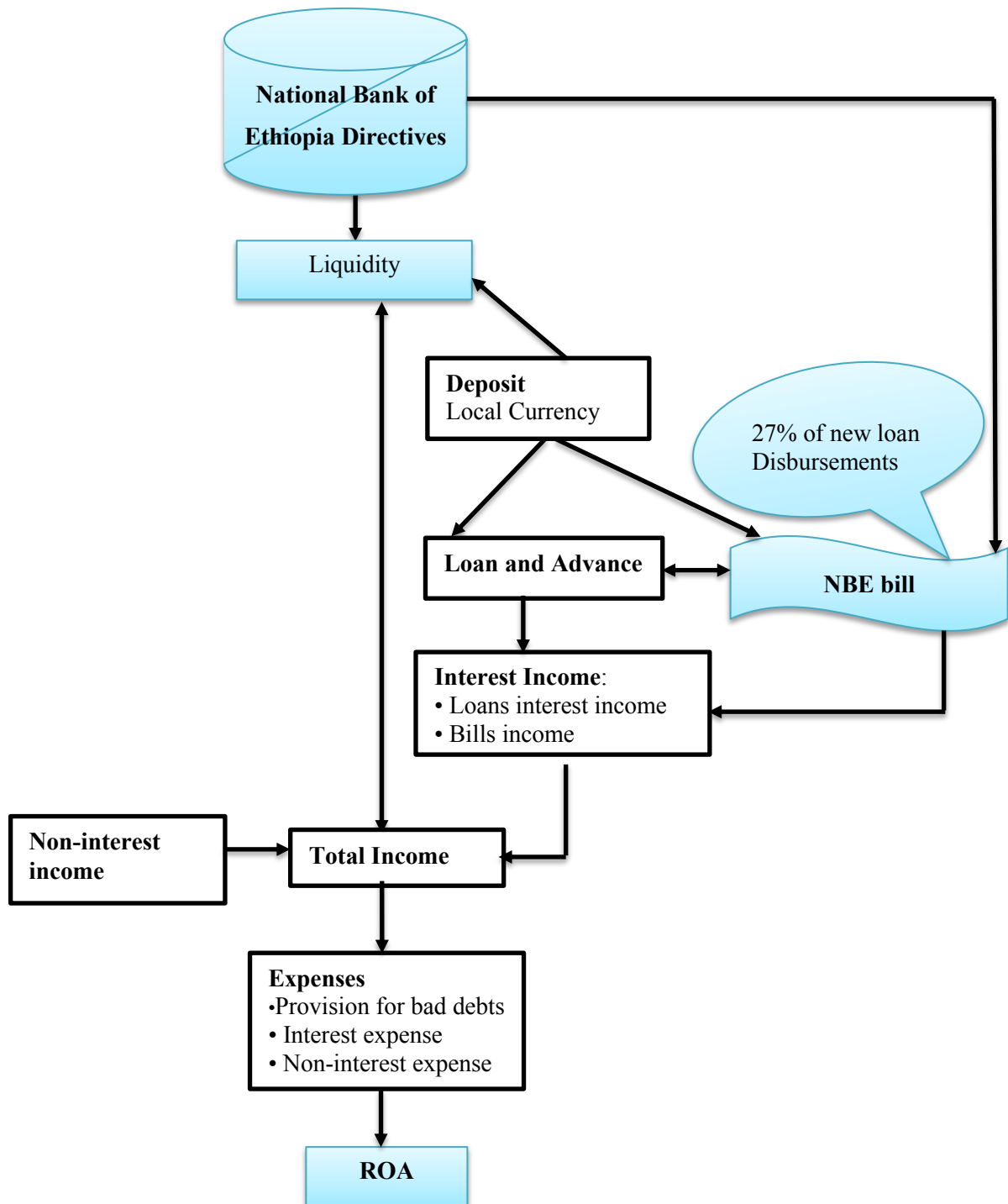
characteristics. this study find the regulatory variable(reserve requirement and coverage to deposit to capital ratio) and institutional variable(concentration) seem to have an impact on bank performance as the results suggest that corruption increases the cost efficiency and net interest margins while an improvement of the law and order variable decreases the cost of efficiency without affecting performance. Correspondingly Tovar et al (2012) analyzed the effectiveness of reserve requirement (RR) system in selected Latin countries. Their conclusion is that RR influences real private bank credit growth and that RR is a useful policy tool to “lean against the wind” and avoid the buildup of imbalances. However, using RR as a countercyclical tool has modest and short-lived effects on credit growth.

Rauch et al. (2009) examines the way in which macroeconomic factors and central bank’s monetary policy influence the creation of liquidity in German saving banks. They measure the liquidity created and its determination using GMM framework focusing on bank specific factors as well as macroeconomic factors and found that over the period from 1997 to 2006 the total amount of liquidity created in German saving banks increased by 51%. They also found that liquidity creation in German saving banks depend negatively on monetary policy indicators. A tightening of monetary policy induces decrease in liquidity creation. In addition to this the research of Aspachs et al. (2005), proxied monetary policy with short-term interest rate and found it significant in liquidity measures. The outcome obtained were of negative relationship, signifying when interest rates are high, banks tend to hold less liquid assets and vice versa. Vodova (2013) also declares the same findings .In another research, by Pecaric & Viskovic (2013) analyze the effects of prudential policy on financial stability of post-transition bank-oriented countries using panel data analysis approach. Using the sample of central and southeast European countries for the period 1998 – 2010, we found that these measures generally reduce the level of non-performing loans, increase the level of profitability, partially affect banking system liquidity,

Yodit (2012) assess the implication of NBE bill purchase on the performance of private commercial banks in Ethiopia using qualitative research method and she concluded that the performances of private banks are affected because of the requirement of NBE bill purchase. Tesfaye (2014) has taken a study on the impact of policy measure (requirement of government bill purchase) on Ethiopian private banks performance. He has used panel data from 2007-2013 of eight middle size private banks with a total of 56 observed variables. The

study finds that exposure to government bills has negative and significant relationship with performance. Nevertheless, the magnitude is not severe. Even the pre and post policy periods comparison revealed a relatively better profitability record for private banks during times of policy restrictions. In the same year Eden (2014) examine the impact of NBE regulations on private banks performance through the significant regulatory variables explaining the NBE directives, using bank-specific and macroeconomic variables as control variables. Balanced fixed effect panel regression was used for the data of six private commercial banks in the sample covered the period from 2004 to 2013. The results of panel data regression analysis showed that NBE Bill and Credit cap had negative and statistically significant impact on banks profitability but reserve requirement had negative and insignificant impact on profitability. While measuring banks cost of intermediation through Net Interest Margin three of the regulatory variables (i.e. NBE Bills, Reserve requirement and credit cap) had negative and statistically significant effect on net interest margin.

2.3 Conceptual framework



2.4 Conclusions on the literature review and knowledge gaps

State intervention in the financial sector has served many purposes. As per the theoretical and empirical review of literatures there are different rules and regulations which are imposed on banks activity and of course the regulations which exist in one country is not similar with that of the others even though there are international regulations in which all of the banks in every country should obey, each and every country have their own regulations which is issued by the central bank for the purpose of controlling the economic activity of the countries. The variable which is used to see the impact of regulatory measure on the profitability and liquidity of private commercial banks other than the control variables is different from county to country.

In Ethiopia Yodit (2012) assess the implication of NBE bill purchase on the performance of private commercial banks in Ethiopia using qualitative research method and she concluded that the performances of private banks are affected because of the requirement of NBE bill purchase. (Tesfaye 2014) has taken a study on the impact of policy measure (requirement of government bill purchase) on Ethiopian private banks performance. He has used panel data from 2007-2013 of eight middle size private banks with a total of 56 observed variables. The study finds that exposure to government bills has negative and significant relationship with performance. Nevertheless, the magnitude is not severe. Even the pre and post policy periods comparison revealed a relatively better profitability record for private banks during times of policy restrictions. in similar year Eden (2014) examine the impact of NBE regulations on private banks performance through the significant regulatory variables explaining the NBE directives, using bank-specific and macroeconomic variables as control variables. Balanced fixed effect panel regression was used for the data of six private commercial banks in the sample covered the period from 2004 to 2013. The results of panel data regression analysis showed that NBE Bill and Credit cap had negative and statistically significant impact on banks profitability but reserve requirement had negative and insignificant impact on profitability. While measuring banks cost of intermediation through Net Interest Margin three of the regulatory variables (i.e. NBE Bills, Reserve requirement and credit cap) had negative and statistically significant effect on net interest margin. However these studies are focused only in the impact NBE bill on the profitability of private banks and there is no any empirical study in the impact of NBE bill on the liquidity of private commercial banks.

Therefore, this study is conducted to fill the knowledge gap by checking the consistency of the result of the above studies and by examining the impact of National bank Directive (the requirement of purchasing NBE bill) on liquidity of private commercial banks in Ethiopia.

Chapter three

3.5 Research Design and Methodology

3.5.1 Research Approach

There basically exist two main types of research approaches which describe the relationship between theory and the research process, deductive and inductive. In the deductive approach the researcher bases their research on already existing theories in order to create a number of hypotheses which later would be tested against empirical data. The next step is either to confirm or reject the stated hypothesis based on the findings. Two important factors in the deductive approach is that the researcher is independent from what is being studied and sample size have to be sufficient in order to be able to generalize the findings (Wubshet 2012 as cited by Bryman & Bell 2007 p.11-14).

The other main research approach is the inductive one which in contrast to the deductive approach bases the research on empirical data that is used in order to create a theory. Some academics argue that the inductive approach creates a higher level of understanding compared to the deductive approach which can be seen as a more descriptive approach. The main difference between the two approaches is that the deductive tests already existing theories while the inductive approach tries to generate new theories based on the empirical data (Saunders et.al 2009 p.125).

In order to answer the stated hypothesis, the collected data was processed using Statistical programs, E-view 7. After processed the necessary data, the stated hypotheses were rejected or fail to reject and compared the existing theories with the findings and determine whether the findings are in accordance with the already existing theories. Lastly made a conclusion based on the findings. Therefore the deductive approach was used for this study.

3.5.2 Research Method adopted

Research is a process of systemic and methodical inquiry and investigation to increase knowledge. Since discipline is established by developing a body of knowledge, every research should add new knowledge to the body of existing data. Research paradigm or world view or epistemology is described as a holistic approach underlying a research approach (Kassim 2001 and Creswell 2009). It reflects the philosophy of knowledge or how we reach the knowledge while approach/methodology focuses on the strategies of how we come to know (Trochim 1998). Hence, according to Creswell (2009), there are three basic

world views that are considered to be base for the quantitative, qualitative and mixed research methods that are post-positivist, social constructivist and participative, and pragmatic respectively.

Therefore, in order to achieve the objective stated in the preceding section, considering the nature of the problem and the research perspective this study used quantitative approach. According to Loose (1993), a quantitative (deductive) research entails the development of a conceptual and theoretical structure prior to its testing through empirical observation. Deductive or quantitative research conventionally commences by analyzing the literature to identify a single selected problem/knowledge gap leading to the isolation of the major research question(s) in which the existing knowledge may be inadequate (could be identified gaps between existing theories or evidence, contradictions to be explored, or new contexts for applying previous findings) (Sutrisna 2009).

Leedy & ormrod (2005) explain that a study is classified as quantitative, if the researcher wants to quantify the variation in a phenomenon, situation, problem or issue, if information is gathered using predominantly quantitative variables (interval and ratio scales), and if the analysis is geared to ascertain the magnitude of the variation. . Besides, quantitative research is used to develop and employ mathematical models, theories, and hypotheses pertaining to natural phenomena. The process of measurement is central to quantitative research because it provides the fundamental connection between empirical observation and mathematical expression of an attribute. i.e., in this approach, the research problem translated to specific variables and hypotheses. As the literature on research methodology indicates, quantitative research approach usually starts with a theory or a general statement proposing a general relationship between variables.

3.5.3 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 patterns. 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 bill purchase 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 would combine the explanatory and the descriptive type of studies.

3.5.4 Sample design

The population of this study includes all private commercial banks in Ethiopia .As a result; out of the 16 private commercial banks, Eight 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, Cooperative Bank of Oromia S.C and Lion International Bank S.C are selected using purposive sampling technique. All private commercial banks included in this study are operated more than eight years and had more experience on the handling of liquidity problem and maximization of profitability.

3.5.5 Data and Data Collection Instrument

In order to carry out any research activity; information should be gathered from proper sources. The study was 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 was obtained from the audited annual financial statements of the private commercial banks included in the sample and publications of NBE from 2007 to 2014 and structured document review is used to collect the required information.

3.5.6 Data Analysis and Presentation

To test the proposed hypotheses, statistical analyses had been carrying out using the following methods: First, descriptive statistics of the variables (both dependent and independent) were calculated over the sample period. This is in line with Malhotra (2007), who states that using descriptive statistics methods helps the researcher in picturing the existing situation and allows relevant information. Then, a correlation analysis between dependent and independent variables were made. Finally, ordinary least square/OLS regression approach including all of its assumptions was employed. The assumptions were tested to see the applicability of the regression models were developed, first to test the relationship of banks profitability and independent variables and next test the relationship between bank liquidity and independent variables. The collected data were analyzed by using E-views 7 software package.

3.6 Study variables

3.6.1 Dependent variables

Profitability

As concluded by extensive Prior academic research, there are different accounting based measures for banks' profitability. For instance, Return on Equity (ROE) used by (Goddard et al., 2004), Return on Assets (ROA) used by (Flamini et al., 2009), the Return on Equity (ROE) and Return on Assets (ROA) utilized by (Athanasoglou et al., 2006), Ommeren (2011) and Bashir (2003), ROE, ROA and Profit Earning Ratio (PER) applied by Moni (2008) and among others, Demircug-Kunt and Huizinga (1999) uses the net interest margin (NIM) as proxy for banks' profitability. According to their investigation those accounting based measurements of bank profitability are nearer to accurate and proxies to measures profitability, even if, they have their own drawbacks.

Study examined by Flamini et al. (2009) proved that return on assets (ROA) as a measure of bank profitability. It defined as the banks' after tax profit over total assets. In principle, ROA reflects the ability of a bank's management to generate profits from the bank's assets. It shows the profit earned per dollar of assets and most importantly, reflects the management's ability to utilize the bank's financial and real investment resources to generate profits, although it may be biased due to off-balance-sheet activities. For any bank, ROA depends on

the bank's policy decisions as well as uncontrollable factors relating to the economy and government regulations. Many regulators believe return on assets is the best measure of bank efficiency and it emerges as the key ratio for the evaluation of bank profitability (IMF, 2002).

On the other hand, according to Ommeren (2011) ROE reflects how effectively a bank management is using shareholders' funds. ROE indicates the return to shareholders on their equity and equals net income divided by total equity capital or ROA times the total equity ratio-to-asset. The latter is often referring to as the bank's equity multiplier, which measures financial leverage. Banks with lower leverage (higher equity) will generally report higher ROA, but lower ROE. It reflects how effectively a bank management is using shareholders' funds. A bank's ROE is affected by its ROA as well as by the bank's degree of financial leverage (equity/ asset). Since returns on assets tend to be lower for financial intermediaries, most banks utilize financial leverage heavily to increase return on equity to a competitive level.

According to Athanasoglou et al. (2008) many scholars remind that ROA is the key ratio for the evaluation of bank profitability given that ROA is not distorted by high equity multipliers, while ROE disregards the risks associated with high financial leverage. In this respect, it is rarely to find the paper utilizes ROE as a single measure of profitability. Most of the time papers utilize ROE for checking the consistency with ROA (Izhar and Asutay, 2007). The rate of return on assets, ROA, is the most comprehensive accounting measure of a bank's overall performance. Because of this, the bulk of studies employed ROA as profitability measure, for instance, (Izhar and Asutay, 2007) and Flamini et al (2009). Some Empirical researches proposed to use the net interest margin to overcome the off balance sheet (OBS) bias. Kosmidoul (2007) use the net interest margin (NIM) as proxy for banks' profitability. The net interest margin can be calculated as interest income (income from loans and securities) minus interest expense (the interest the bank must pay to its depositors and creditors from whom it has borrowed funds) expressed as a percentage of earning assets (i.e earning assets are the sum of all banks assets that earn interest, including loans and investment in fixed income securities) of a percentage of total income.

From these measures of profitability this research was relied on ROA. Return on assets (ROA), calculated as net profit after tax divided by total assets.

Liquidity

The two most widely used approaches to measure liquidity risk of banks are by liquidity gap/flow approach and liquidity ratio/stock approach. The liquidity gap approach adapts the variation between assets and liabilities both currently and future periods. A positive liquidity gap means for deficit, requiring for liabilities to be increased (Bessis, 2009). The liquidity gap treats liquid reserves as a reservoir: the bank computes the required liquidity by comparing inflows and outflows during a specified period. On the other hand, liquidity ratio uses various ratios to identify liquidity tendency. The various ratios label for immediate viable source of funding. This indeed entitles portfolio of assets that can be sold off without any fuss and also adequate amounts of stable liabilities. Most importantly, ready credit line with other financial institutions. Various authors like Moore (2010) and Rychtárik (2009) have also provided similar understandings with liquidity ratios such as liquid assets to total assets, liquid assets to deposits and short term financing, loans to total assets and loans to deposits and short term borrowings (as cited by Vodová, 2013).

To sum up, the stock approach employs various balance sheet ratios to identify liquidity trends. The flow approach, in contrast, treats liquid reserves as a reservoir: the bank assesses its liquidity risk by comparing the variability in inflows and outflows to determine the amount of reserves that are needed during a period. Although both approaches are intuitively appealing, the flow approach is more data intensive and there is no standard technique to forecast inflows and outflows. As a result, the stock approaches are more popular in practice and in the academic literature (Crosse and Hempel 1980). As per Crosse and Hempel (1980), the two most popular stock ratios are the loan-to-deposit ratio and the liquid asset to total assets ratio, where the higher the loan-to-deposit ratio (or the lower the liquid asset to total assets ratio) the less able a bank to meet any additional loan demands. Both indicators have their short-comings: the loan-to deposit ratio does not show the other assets available for conversion into cash to meet demands for withdrawals or loans, while the liquid assets ratio ignores the flow of funds from repayments, increases in liabilities and the demand for bank funds. Therefore, the researcher adapts the ratio of loan to deposit based on stock approach.

3.6.2 Independent Variables

The researcher used liquidity, credit risk, management efficiency, bank size, income diversification and NBE bill to achieve the first objective. Similarly the researcher used credit risk, capital adequacy, growth rate of gross domestic product, net interest margin, loan growth, and NBE bill to achieve the second objective. Majority of these explanatory variables are adopted from CAMELS framework. Whereas NBE bill purchase requirement is included based on the objective of the study and loan growth & income diversification and gross domestic product were added from the researcher's own perception.

CAMELS' framework is a common approach to evaluate the financial health of the organization. This system was created by U.S. bank supervising organizations (Jaffar & Manarvi 2011). Also the Asian Development Bank, African Development Bank, Central bank of America (the Federal Reserve Bank) and the World Bank use these parameters to evaluate the performance of financial organizations (Abassgholi pour 2010). In addition, the International Monetary Fund use compressed index of financial institutions to evaluate the accuracy of the financial systems of the members. CAMELS stand for capital adequacy, asset quality, management efficiency, earnings performance, liquidity and size of bank (as cited by Morteza et al. 2013). All explanatory variables other than NBE bill included in this research are used as a control variable.

3.7 Model Specification

3.7.1 Model used to show the relationship between profitability and NBE bill purchase

The model presented below is used by Tesfaye (2014) to examine the impact of policy measure (government bill purchase requirement) on the performance of Ethiopian private Banks using panel data from 2007 to 2013.

$$\text{Perf}_{jt} = \beta_i + \beta_1 \text{Bill} + \beta_k \sum_{i=1}^K X_{it} + \beta_z \text{DUM} + \varepsilon_{jt}$$

Where Profit is the dependent variable explaining performance of bank i at time t , with $i=1, \dots, N$; $t=1, \dots, T$, β_i is a constant term, X_{it} are k explanatory variables and ε_{it} is the disturbance term. A Dummy variable is added to the model to classify the periods in to two: before and

after the bill purchase policy. A variable 1 is assigned to represent the period after the bill purchase requirement, and 0, otherwise.

The theoretical econometric model can be expressed incorporating the identified variables as follows:

$$ROA_{it} = \beta_0 + \beta_1(LQ)_{it} + \beta_2(CR)_{it} + \beta_3(SIZ)_{it} + \beta_4(ME)_{it} + \beta_5(IDV)_{it} + \beta_6(BIEX)_{it} + \beta_7 DUM + \varepsilon_{it} \dots \dots 1$$

Table 3.1 Description of variable used in regression model 1

Variable	Descriptions	A prior Assumption
Dependent		
ROA_{it}	is the return on asset of i th bank at time t and it indicates how effectively a bank manages its assets to generate Income The proxy is the ratio of net profit after tax to total asset	NA
Independent		
LQ_{i,t}	it measure the liquidity of i th bank at time t. the proxy is the ratio of total loan to total deposit	Negative
CR_{i,t}	is the credit risk of i th bank at time t and it measure the asset quality of Banks. The proxy is ratio of provision for loan or advance to total loan	Negative
SIZ_{i,t}	is the size of I th bank at time t the proxy is log of total asset.	Negative/Positive
ME_{i,t}	it measure the efficiency of management of i th bank at time t. the proxy is the ratio of operating expense to total gross income	Negative
IDV_{i,t}	is the income diversification of I th bank at time t. the proxy is the ratio of non-interest income to total asset	positive
BIEX_{i,T}	Measures the exposure level to government bill which will be Used to finance mega projects like the millennium dam of i th Bank at time t the proxy is log of total NBE bill	Negative/Positive
DUM ; Dummy variables, 1 and 0		

Dummy variable is added to the model to classify the periods in to two: before and after the bill purchase requirement. A variable 1 is assigned to represent the period after the bill purchase requirement and 0, otherwise.

3.7.2 Model used to show the relationship between liquidity and NBE bill purchase

The model presented below used by Timbergen (1956), Aneke (1999) and Rauch et.al (2010).is a panel data that determine liquidity factors of commercial banks in Nigeria and Malaysia.

$$y_{i,t} = \beta_0 + \sum_{i=1}^n \beta_i X_{i,t} + u_{i,t} \dots \dots \dots (1)$$

Where;

$Y_{i,t}$ = The measure of liquidity which is the ratio of total loan and advance to deposit

β_0 = The intercept of the equation.

β_i = The change co-efficient for X_{it} variables.

$X_{i,t}$ is vector of explanatory variables for bank i in time t .

i = The number of the independent variable which will measure the liquidity banks within the period under review i.e., $i = 1, 2, 3, \dots, n$ (in this study $n=6$)

t = The time period i.e. $t = 1, 2, 3, \dots, t$ (in this study $t=8$ years).

The above general least square equation with specified variables will form equation (2) thus

$$LQ_{it} = \beta_0 + \beta_1 CAP_{it} + \beta_2 CR_{it} + \beta_3 GDP_t + \beta_4 NIM_{it} + \beta_5 LG_{it} + \beta_6 BIEX_{it} + \beta_7 DUM \dots (2)$$

Table 3.2 Description of variables used in regression model 2

Variable	Descriptions	A prior Assumption
Dependent		
$LQ_{i,t}$	is a measure of bank liquidity and Calculated as total loan /total Deposit .The ratio indicate what percentage of deposit of I's bank tied up with in loan at time t	NA
Independent		
$CAP_{i,t}$	is the capital adequacy of i^{th} bank at time t. the proxy is the ratio of total bank capital to total assets.	Positive
$CR_{i,t}$	is the credit risk of i^{th} bank at time t.and it measure the asset quality of Banks The proxy is ratio of provision for loan or advance to total loan.	Negative
GDP_t	is used to measure economy health of a nation on the year t. The proxy was growth rate of real GDP	Negative

NIM_{it}	is the net interest margin of i^{th} bank at time t . the proxy is The ratio of $(II-IE)/TI$.	Negative
LG_{it}	is the loan growth of i^{th} bank at time t . The proxy is the Percentage change in loan. $LG = [(L_t - (L_{t-1})) / (L_{t-1})]$ L is total loans and advances to customers	Negative
BIEX_{it}	It measures the exposure level to government bill which will be Used to finance mega projects like the millennium dam of i^{th} Bank at time t the proxy is log of total NBE bill	Negative/Positive
DUM	Dummy variables, 1 and 0 Dummy variable is added to the model to classify the periods in to two: before and after the bill purchase requirement. A variable 1 is assigned to represent the period after the bill purchase policy and 0, otherwise.	

3.8 Model test

To test the impact of purchasing NBE bill on the profitability and liquidity of private commercial banks, theoretical model was developed based on the finance theory in the methodological part of this study. The important issue from theoretical panel models is, it is not specified whether fixed effects or random effects or pooled model is appropriate. Therefore; the first issue was the choice between fixed effects (FE) and a random effects (RE) model based on the Hausman test. According to this test null hypothesis said that random effects model is appropriate than the fixed effects model. Furthermore the Redundant Fixed Effects test was used to test whether fixed effect model or pooled model was preferable. According to this test the null hypothesis said that pooled model is preferable than fixed effects model and the alternative hypothesis said that fixed effects model is preferable than Pooled model. (Brooks 2008 p.509).

3.9 CLRM Assumption and Diagnostic Test

Test for average value of the error term is zero ($E(u_i) = 0$) assumption

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.

Test for homoscedasticity assumption ($Var(u_i) = \sigma^2$)

The second assumption of CLRM stated that the variance of the errors is constant, σ^2 this is known as the assumption of homoscedasticity. If the residuals of the regression have

systematically changing variability over the sample, that is a sign of heteroscedasticity. but this fact was ignored and the researcher proceeds with estimation and inference the OLS estimators will still give unbiased (and also consistent) coefficient estimates, but they are no longer BLUE -- that is, they no longer have the minimum variance among the class of unbiased estimators. Therefore robust technique was used to control for the possible effects Arellano (1987).

Test for absence of autocorrelation assumption ($\text{cov}(u_i, u_j) = 0$ for $i \neq j$)

The test for autocorrelation was made by using Durbin and Watson (1951). Durbin--Watson (DW) is a test for first order autocorrelation -- i.e. it tests only for a relationship between an error and its immediately previous value. DW is approximately equals to $2(1 - \hat{\rho})$, where $\hat{\rho}$ is the estimated correlation coefficient between the error term and its first order lag (Brooks 2008). The null hypothesis for the DW test is no autocorrelation between the error term and its lag. According to Brooks (2008), DW has 2 critical values: an upper critical value (dU) and a lower critical value (dL), and there is also an intermediate region where the null hypothesis of no autocorrelation can neither be rejected nor not rejected. The rejection, non-rejection, and inconclusive regions are shown on the number line.

Reject Ho: positive Authocorrelation	Inconclusive	Do not reject Ho: no evidence autocorrelation	Inconclusive	Reject Ho: Negative Authocorrelation
0	dL	dU 2	$4-dU$	$4-dL$

Test for absence of series multicollinearity assumption

Multicollinearity is a statistical condition in which the independent variables are highly correlated to each other. Due to the interrelationship between the variables it is impossible to see the effects of a change in one variable while the other variables are held constant. Small changes in the data may also cause severe changes in the coefficients and it is therefore important to detect multicollinearity by investigating the correlation between the independent variables. According to Walker & Maddan (2009) a correlation above 0,7 between two independent variables indicates that there are multicollinearity problems in the model. While Hair et al (2006) argue that correlation coefficient below 0.9 may not cause

serious multicollinearity problem. Furthermore Malhotra (2007) stated that multicollinearity problem exists when the correlation coefficient among variables is greater than 0.75. But the level of correlation that causes multicollinearity varies from case to case and it is therefore important to include other measurements as well and not only look at the correlation. SPSS provides a good measurement of multicollinearity called variance inflation factor (VIF) and a value below 4 indicates that there is no multicollinearity problems in the model. But any VIF above 5 is a signal of multicollinearity and in that case some variables have to be adjusted or excluded from the model (Walker & Maddan 2009, p.294). Based on this, correlation matrix and VIF of the independent variables used to determine the impact of NBE bill purchase requirement on performance and liquidity of private commercial banks in Ethiopia.

Normality test

Finally, assumption five require to check whether the disturbances are normally distributed or not. According Brooks (2008), one of the most commonly applied tests for normality is the Bera-Jarque (BJ) test. BJ uses the property of a normally distributed random variable that the entire distribution is characterised by the first two moments, the mean and the variance. If the residuals are normally distributed, the histogram should be bell-shaped and the Bera-Jarque statistic would not be significant. This means that the p-value the normality test should be bigger than 0.05 to not reject the null of normality at the 5% level.

Chapter Four

4.1 Data presentation and analysis

To comply with the objective, the paper was primarily based on panel data, which was collected through structured document review. As noted in Baltagi (2005) the advantage of using panel data is that it controls for individual heterogeneity, less collinearity among variables and tracks trends in the data something which simple time-series and cross-sectional data cannot provide. Thus, the collected panel data was analyzed using descriptive statistics (Mean, minimum, maximum values and standard deviations) were used to analyze the general trends of the data from 2007 to 2014 based on the sector sample of 8 banks and a correlation matrix was also used to examine the relationship between the dependent variable and explanatory variables. The multiple linear regressions model was run, and thus OLS was conducted using Eviews 7 econometric software package, to test the relationship between the NBE bill and profitability and also NBE bill and liquidity. The rational for choosing OLS is as noted in Petra (2007) OLS outperforms the other estimators when the following holds; the cross section is small and the time dimension is short. Therefore, as far as both the above facts hold true in this study it is rational to use OLS. In general the current chapter has five sections. Under the first section (section 4.1.) the descriptive statistics of the dependent and independent variables were presented and followed by correlation analysis under section 4.2. Section 4.3 model test, 4.4 model specification test, 4.5 presents the test for the classical liner regression model/CLRM. Then, the results of the regression analysis were presented under section 4.6

4.1.1 descriptive Statistics of the data

The descriptive statistics for the dependent and independent variables are presented below. The dependent variables are return on asset (Net income after tax/total asset) as the profitability measure of private commercial banks and liquidity (loan/deposit). The remaining are independent variables such as capital adequacy, credit risk, management efficiency, bank size, income diversification, loan growth, NBE Bill, net interest margin and gross national product. Table 4.1 shows descriptive statistics of dependent and independent variables.

Table 4.1 descriptive statistics of dependent and explanatory variables

	ROA	LQ	CR	SIZ	LG	CPA	BIEX	ME	IDV	GDP	NIM
Mean	0.027	0.620	0.028	9.719	0.252	0.134	4.555	0.386	0.035	10.459	0.030
Maximum	0.047	0.967	0.073	10.345	1.550	0.201	9.612	0.722	0.07	11.795	0.043
Minimum	-0.018	0.397	0.001	8.426	-0.100	0.090	0.000	0.191	0.002	8.840	0.011
Std. Dev.	0.012	0.122	0.016	0.397	0.279	0.033	4.598	0.134	0.013	0.091	0.008
Observation	64	64	64	64	64	64	64	64	64	64	64

Source: E-views 7 output from private commercial banks financial statement

For each variable, Table 4.1 shows mean, maximum, minimum and standard deviation value.

On average, banks in our sample have a return on assets (ROA) of 2.7% with minimum of -1.82% and maximum of 4.7%. That means, the most profitable bank of the sample banks earned 4.7 cents of net income from a single birr of asset investment and the maximum losses incurred by some of the sample banks are a loss of 1.8 cents on each birr of asset investment. And also most the remaining banks from the sample earned an average of 2.7 cents from each birr invested by the bank. The standard deviation 1.2% showed that there was lowest variability in the data for the profitability measures.

On the other hand the mean value of LQ was 61.97% which is lower than the international standard for loans to deposit ratio (i.e. 75% (CBRC 2012)). This indicates on average private commercial banks in Ethiopia have lower amount of volatile liabilities/deposits were tied up with illiquid loans. There was moderate dispersion of LQ towards its mean value among banks that is shown by the standard deviation of 12.21%. The maximum value of LQ was 96.72% which was far above the standard whereas the minimum value was 39.68% which was far below the standard. This indicates that there were some commercial banks in Ethiopia had extra liquidity (banks around 40% LQ) and others were going to face liquidity shortages/risk (banks around 97%). Therefore, it can be concluded that loans to deposit ratio was highly dispersed among commercial banks in Ethiopia.

The variable, Credit risk or quality of asset was measured by the ratio of provision for loan or advance to loan. The mean value 2.82% indicate that private commercial banks held 2.82% provision of their credit portfolio which is lower than the minimum provision required for healthy loan. The minimum and the maximum value are 0.05% and 7.25% with lower variability 1.6%. Thus, costs related to default risk are not severe in the period under consideration. The mean of the banks' size which was represented by the natural logarithm of

total assets was 9.715 with a standard deviation of 0.397 and it is ranged from 8.426 to 10.345. This showed that private commercial banks which are included in this research had a small variation in their total asset. The maximum and the minimum values were indicating AIB and LIB respectively.

Loan growth is measured as the annual percentage change in total loans or advances and this showed a mean of 25.19%. This indicates that, on average, loan growth rate was 25.19% during the eight - year period and growth in loan for the sample period are ranged from -9.99% to 154.96% with standard deviation of 27.88%. The 27.88% of standard deviation indicates the existence of high variation in growth rate among private commercial banks in Ethiopia. The maximum and minimum value was indicating LIB and WOG in the same year 2009. The mean value of capital adequacy was 13.38% which was above the statutory requirement of 8% set by NBE with directive No. SBB/50/2011 based on Basel II recommendation. The standard deviation of CPA 3.32% indicated that the dispersion of minimum value 9.01% and maximum value 20.13% from the mean. Therefore, achieving high level of capital adequacy ratio is the sign of having more capital to hedge against the risk.

Exposure of private commercial banks in NBE bill is measured by natural logarithm of total bill purchased by private banks which are considered as a sample in the period under consideration. With reference to table 4.1 the mean value of NBE bill purchased by private commercial banks was 4.555. The natural logarithm of total bill purchased by private commercial banks range from 0 to 9.6118 with standard deviation of 4.5977. The reason being minimum value zero was that private commercial banks before exposed to the requirement. On the other hand the maximum value showed that one of the private bank is purchased higher amount of NBE bill with in four years after the requirement (i.e Dashin Bank S.c). Considering the management efficiency (operating expenses to gross income ratio) of private commercial banks, the mean value showed that most banks from the sample incurred 38.62% percent operating expenses out of the total gross income per year. In other words the bank incurred 38.62 cents as operating expenses out of one birr of gross income. The minimum and maximum value indicated that most efficient banks incurred 19.08% of operating expenses and the inefficient banks incurred 72.18% operating expenses. The

standard deviation 13.36% showed that there was moderate variability of management efficiency between private commercial banks in Ethiopia.

The other important variable was income diversification (IDV) which is measured by the ratio of non-interest income to total asset. The mean of IDV was 3.52%. This indicated, most banks from the sample earn 3.52 cents as non-interest income from one birr invested in asset. The maximum value (i.e 6.99 %) point to some banks from the industry used non-interest income as the main source of income rather than interest income and those banks have gradually transforming away from the traditional business of financial intermediation. The minimum value (i.e 2.38%) directed the more traditional banks in the industry still used interest income as the main source of income.

One of the macroeconomic indicators that can affect banks liquidity position over time is GDP. The mean value of real GDP growth rate was 10.46% indicating the average real growth rate of the country's economy over the past 8 years. The maximum growth of the economy was recorded in the year 2007 (i.e. 11.8%) and the minimum was in the year 2012 (i.e. 8.84%) with little dispersion towards the average over the period under study with the standard deviation of 9%. As far as profitability ratios concerned, NIM records a minimum of 1.10% and maximum of 4.3% with a mean value of 3.0% and low variability of 0.8% in the period under consideration.

4.1.2 Correlation analysis

According to Brooks (2008), correlation between two variables measures the degree of linear association between them. Pearson product moment of correlation coefficient was used to find the association of the independent variables with the dependent variable. Values of the correlation coefficient are always ranged between positive one and negative one. A correlation coefficient of positive one indicates that a perfect positive association between the two variables; while a correlation coefficient of negative one indicates that a perfect negative association between the two variables. A correlation coefficient of zero, on the other hand, indicates that there is no linear relationship between the two variables.

Table 4.2 Correlation matrix among dependent and independent variables.

	ROA		LQ
ROA	1	LQ	1
LQ	-0.045	CPA	0.150
CR	0.075	CR	-0.112
SIZ	0.647	GDP	-0.005
ME	-0.210	NIM	0.652
IDV	0.708	LG	-0.092
BIEX	0.310	BIEX	0.123

Source: E-views 7 output from private commercial banks financial statement

As indicated in the table above, credit risk and NBE bill had positive and weak correlation to ROA with coefficient of correlation 0.075 and 0.310 respectively. Income diversification and bank size had moderate and positive correlation to ROA with correlation coefficient of 0.708 and 0.647 correspondingly. Conversely liquidity and management efficiency had negative and weak correlation to ROA with coefficient of -0.045 and -0.210 respectively.

Similarly the correlation analysis is undertaken between dependent variable (liquidity) and explanatory variables (capital adequacy, credit risk, gross domestic product, net interest margin, loan growth and NBE bill). Liquidity is measured by the ratio of loan to deposit. Hence, the results have to be interpreted in reverse: positive sign of the coefficient means negative linear relationship with liquidity and conversely. Based on this credit risk, gross domestic product and loan growth had positive and weak correlation with LQ having a correlation coefficient of -0.112, -0.005, and -0.092 respectively. In contrary capital adequacy and NBE bill had negative and weak correlation with LQ and taking a correlation coefficient of 0.150, 0.123 respectively. But net interest margin had negative and moderate correlation with LQ and taking a correlation coefficient of 0.652.

4.2 Result of model test

4.2.1 Model 1(ROA) test

Hausman test

H₀: Random effect model is better than fixed effect model

H₁: Fixed effect model is better than random effect model

Table 4.3 Hausman test of Model-1(ROA) in

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	27.062361	7	0.0003

Reject H_0 since the p-value is less than the significance level of 0.01 (1%). Therefore fixed effect model is preferable than random effect model.

Redundant fixed effect test

H_0 : Pooled OLS is better than fixed effect model

H_1 : Fixed effect model is better than pooled OLS model

Table 4.4 Redundant fixed effect test of Model-1(ROA) in appendix-3

Effects Test	Statistic	d.f.	Prob.
Cross-section F	8.089588	(7,49)	0.0000
Cross-section Chi-square	49.158068	7	0.0000

Reject H_0 since the p-value is less than the significance level of 0.01 (1%). Therefore fixed effect model is preferable than random effect model.

4.2.2 Model 2 (LQ) Test

Hausman test

H_0 : Random effect model is better than fixed effect model

H_1 : Fixed effect model is better than random effect model

Table 4.5 Hausman test of Model-2 (LQ) in appendix -3

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	38.671493	7	0.0000

Reject H_0 since the p-value is less than the significance level of 0.01 (1%). Therefore fixed effect model is preferable than random effect model.

Redundant fixed effect test

H_0 : Pooled OLS is better than fixed effect model.

H_1 : Fixed effect model is better than pooled OLS model.

Table 4.6 Redundant fixed effect test of Model-2 (LQ) in appendix-3

Effects Test	Statistic	d.f.	Prob.
Cross-section F	5.612293	(7,49)	0.0001
Cross-section Chi-square	37.680754	7	0.0000

Reject H_0 since the p-value is less than the significance level of 0.01 (1%). Therefore fixed effect model is preferable than random effect model.

4.3 CLRM Assumption and Diagnostic Test

Test for average value of the error term is zero ($E(u_i) = 0$) assumption

The constant term (i.e. α) was included in the regression equation. Therefore, the average value of the error term in this study is expected to be zero.

Test for homoscedasticity assumption ($\text{Var}(u_i) = \sigma^2$)

Robust regression technique was used for both models to control heteroscedasticity problem.

Test for absence of autocorrelation assumption ($\text{cov}(u_i, u_j) = 0$ for $i \neq j$)

Table 4.7. Durbin Watson test rejection and non-rejection region.

Reject Ho: positive Authocorrelation	Inconclusive	Do not reject Ho: no evidence of autocorrelation	Inconclusive	Reject Ho: Negative Authocorrelation
0	D_L 1.218	D_U 1.680	$4 - D_U$ 2.320	$4 - D_L$ 1.218 1.680 2.782

The study used the d_L and d_U values for 65 observations as approximation of 64 observations. As per the DW table in the appendix 6 for 65 observations with 7 variables at 1% level of significance, the d_L and d_U values are 1.218 and 1.680 respectively. Based on Eviews 7 result in appendix 3 the DW values for ROA and LQ for 64 observations were 2.131424 and 1.796900 respectively. The DW value of ROA and LQ lies between 1.680 and 2.320 where the null hypothesis of no autocorrelation is not rejected. Hence, there was no evidence of autocorrelation.

Test for absence of series multicollinearity assumption

Table 4.8 correlation matrix between explanatory variable of ROA and VIF

	LQ	CR	SIZ	ME	IDV	BIEX	VIF
LQ	1						1.433121
CR	0.091	1					1.698069
SIZ	-0.343	0.092	1				2.044056
ME	0.300	0.354	-0.281	1			1.609458
IDV	-0.244	0.081	0.467	-0.373	1		1.441435
BIEX	-0.478	-0.347	0.540	-0.178	0.218	1	2.261639

Source: E-views 7 output from private commercial banks financial statement

Table 4.9 correlation matrix between explanatory variable of LQ and VIF

	CR	LG	CPA	NIM	GDP	BIEX	VIF
CR	1						1.427031
LG	-0.38	1					1.336170
CPA	-0.302	0.200	1				1.309026
NIM	-0.032	-0.196	0.347	1			1.333544
GDP	0.158	-0.091	-0.155	-0.269	1		1.424076
BIEX	-0.357	-0.003	0.177	0.203	-0.497	1	1.535778

Source: E-views 7 output from private commercial banks financial statement

Based on the correlation matrix and VIF described in the table 4.8 and 4.9, the independent variables used to determine the impact of NBE bill purchase requirement on performance and liquidity of private commercial banks in Ethiopia had no serious multicollinearity problem.

Normality test

Table 4.10 Bera-Jarque statistics result for the regression models to test Normality

	ROA	LQ
Probability Jarque-Bera statistic	0.622	0.604

Source: E-views 7 output from private commercial banks financial statement

Based on the result described in appendix 4, the probability of Bera-Jarque of ROA and LQ indicated in the above table are 0.622 and 0.604 respectively. Hence, the null hypothesis that is the error term is normally distributed should not be rejected and it seems that the error term in all of the cases follows the normal distribution.

4.4 Result of regression analysis

4.4.1 Regression analysis between ROA and explanatory variables

Table 4.11 Regression results of Model-1(ROA)

Variable	Coefficient	p-value
LQ	0.033600	0.0019***
CR	0.084819	0.3831
SIZ	0.034516	0.0000***
ME	-0.004806	0.7083
IDV	0.251006	0.0077***
BIEX	-0.011432	0.0018***
DUM	0.100471	0.0025***
R ²	0.873132	
Adjusted R ²	0.836885	
Prob(F-statistics)	0.000000	
Durbin-Watson stat	2.131424	
*** Significant at 1%, ** Significant at 5% and * Significant at 10%		

Source: E-views 7 output from private commercial banks financial statement

Empirical model

$$\text{ROA} = -0.337 + 0.034\text{LQ} + 0.085\text{CR} + 0.035\text{SIZE} - 0.005\text{ME} + 0.251\text{IDV} - 0.011\text{BIEX} + 0.100\text{DUM}.$$

The R² values indicate that the explanatory power of the model and adjusted R² value which takes into account the loss of degrees of freedom associated with adding extra variables were inferred to see the explanatory powers of the models. As the regression result described in table 4.11, the R-squared statistics and the adjusted-R squared statistics of the model are 87.3% and 83.7% respectively. This indicates that the changes in the independent variables (liquidity, credit risk; bank size, management efficiency, income diversification and NBE bill) collectively explain 83.7% of the changes in the dependent variable (ROA) and the remaining 16.3% of changes was explained by other variables which are not included in the model. Thus these variables collectively, are good explanatory variables of the profitability of private commercial banks in Ethiopia. The null hypothesis of F-statistic (the overall test of significance) that the R² is equal to zero was rejected at 1% as the p-value was sufficiently low. Prob(F-Statistic) 0.000000 indicates strong statistical significance, which enhanced the reliability and validity of the model.

The value of beta in regression model indicates that the level of each coefficient of explanatory variable influence on the dependent variable positively or negatively. Moreover the P-value of each explanatory variable indicates the percentage or precession level of each variable is significant or not. In view of the results presented in table 4.11, NBE bill and liquidity have negative and statistically significant impact on profitability at 1% level of significance. On the other hand bank size and income diversification have positive and statistically significant impact on performance at 1%. In contrary management efficiency and credit risk have no significant impact on profitability of private commercial banks in Ethiopia.

Discussion of Empirical result

Liquidity: Liquidity defined as Deposit/Loans ratio. Consequently the result has to be interpreted in reverse: positive sign of the coefficient means negative impact and conversely. This ratio has performed a negative and statistically significant impact on profitability at 1% level of confidence with the coefficient of 0.033600 .this indicate that, all other variables holding constant a unit increase in liquidity would lead a decreasing of 0.033600 unit in profitability. This result showed liquidity has a significant and negative impact on profitability of private commercial banks in Ethiopia, which is in line with risk-return trade off theory of profitability (van Ommeren 2011) and empirical result of Kosmidou et al. (2007), Molyneux and Thorton (1992) and Tesfaye (2014) argue that liquid assets are usually associated with lower rates of return but it is contrary to the findings of (Bourke 1989 and Atanasoglou et al. 2005).

Bank size: As the result described in the same table, Size of the private commercial banks in Ethiopia has a positive and statistically significant impact on return on asset at 1% confidence level with coefficient of 0.034516 and . It could be stated that all other variables holding constant, a 1% increase/decrease in bank size would lead to increase/decrease in profitability (ROA) by 0.00034516 units. The result is in accordance with efficiency theory of profitability of Athanasoglou et al. (2006). This indicated that larger firms can obtain lower unit cost and higher profits through economies of scale. This enables large firms to acquire market shares, which may manifest in higher concentration and then profitability. In addition bank profitability is influenced by market share. It assumes that only large banks with differentiated products can influence prices and increase profits. They are able to

exercise market power and earn non-competitive profits Tregenna (2009). This result is also in line with the previous study carried out by (Flamini et al. 2009) on the profitability of banks in 41 Sub-Saharan African Countries.

Income diversification: as the result described in table 4.11, income diversification (ratio of non-interest income to total asset) had positive and statistically significant impact on return on asset with coefficient estimate of 0.251006 and p-value of 0.0077 which was statistically significant at 1% level of significance. It implies, holding other factors constant a unit increase in income diversification would lead to 0.251006 unit increases in return on asset and statically significant at 1% level of confidence. Based on portfolio balanced theory of profitability of Nzongang & Atemnkeng (2006), profitability of banks is determined by portfolio diversification and the desired portfolio composition of commercial banks. This means the bank can generate higher return when diversify its portfolio and had good portfolio management. The finding also supports the earlier studies of Tesfaye (2014) and Sufian & Habibullah (2009) and they suggests that revenues generated from new business units have significantly contributed to improve bank profitability. On the other hand, Stiroh and Rumble (2006) find that diversification benefits of the US financial holding companies are offset by the increased exposure to non-interest activities which are much more volatile but not necessarily more profitable than interest generating activities. The finding of this study implies that in the Ethiopian banking industry private commercial banks might offset the impact of NBE bill on their profit by increasing non-interest activities.

NBE bill (BIEX): As indicated in the Table 4.11 the coefficient estimates of NBE bill is - 0.011432. This means holding other factors constant, a 1% increase in investment in NBE Bill would lead to reduces return on asset by 0. 00011432 unit and the p value of NBE bill (i.e. 0.0018) reveals that it is statistically significant at 1% level of significance. Therefore, reject the null hypothesis and accept the alternative hypothesis. This result was consistence with the study of Tesfaye (2014) and Eden in the same year. Overall these indicate that the magnitude of the impact of NBE bill is not highly severe to result in losses in the period under consideration. Even as revealed in the dummy variable added to the research, banks profitability has positive association with the post bill purchase period and statically significant at 1% level of significant with the coefficient of 0.100471. In other words, the two period's comparison showed a relatively better profitability record for private

commercial banks during times of policy restrictions. In general, NBE bill highly affect interest income of private banks because the interest rate calculated on the bills (3%) is far less than the market lending rate which is 11.88% on average NBE (2013/14) having 8.88% difference and also incurred more cost (interest paid to depositors). However, the impact of the requirement of purchasing NBE bill on the profitability of private bank is mitigated by the excess liquidity standing of banks during the requirement period, the likely possibility to expand to other fee generating services (none interest income specially service charge and commission collected from foreign transactions), stable liability prices and banks discretion to adjust their asset prices. This is in line with the balanced portfolio theory of profitability of Nzongang & Atemnkeng (2006). It implies the ability to obtain maximum profits depends on the feasible set of assets and liabilities determined by the management and the unit costs incurred by the bank for producing each component of assets.

4.4.2 Regression analysis between LQ and explanatory variables

Table 4.12 Regression results of Model-2 (LQ)

Variable	Coefficient	p-value
CR	-1.762118	0.0118**
LG	0.048774	0.1507
CPA	1.395037	0.0465**
NIM	8.187290	0.0000***
GDP	0.031751	0.0003***
BIEX	0.061270	0.0410**
DUM	0.571181	0.0326**
R ²	0.755696	
Adjusted R ²	0.685894	
Prob(F-statistics)	0.000000	
Durbin-Watson stat	1.796900	
*** Significant at 1%, ** Significant at 5% and * Significant at 10%.		

Source: E-views 7 output from private commercial banks financial statement

Empirical Model

$$\text{LQ} = 4.948 + 1.501\text{CPA} - 3.347\text{CR} - 0.472\text{SIZ} + 6.118\text{ROA} + 0.007\text{LG} + 0.129\text{BIEX} - 1.203\text{DUM}$$

The R-squared statistics and the adjusted-R squared statistics of the model was 75.6% and 68.6% respectively. This indicates that the changes in the independent variables (capital

adequacy, credit risk, liquidity, bank size, loan growth, and exposure to NBE bill) collectively explain 68.6% of the changes in the dependent variable (liquidity) and the remaining 31.4% of changes is explained by other factors which are not included in the model. Thus these variables collectively, are good explanatory variables of the liquidity of commercial banks Ethiopia. The null hypothesis of F-statistic (the overall test of significance) that the R^2 is equal to zero was rejected at 1% as the p-value was sufficiently low. Prob (F-Statistic) 0.000000 indicates strong statistical significance, which enhanced the reliability and validity of the model.

The dependent variable (liquidity) in this model is measured by the ratio of loan to deposit. Consequently results of the explanatory variables have to be interpreted in reverse: positive sign of the coefficient means negative impact on liquidity and conversely. As the result gross domestic product and net interest margin had negative and statistically significant impact on liquidity of private commercial banks at 1% level of significance. Similarly capital adequacy and NBE bill had negative and statistically significant impact on liquidity of private commercial banks at 5%, level of significance. On the other hand credit risk had positive and statistically significant impact on liquidity of private commercial banks in Ethiopia at 5% level of significance. However, loan growth of private commercial bank in Ethiopia had negative relation but statistically had no significant impact on liquidity.

Discussion of Empirical result

Credit risk (CR): The value of the coefficient was -1.762118 with a p-value 0.0118. This indicated that credit risk had positive and statistically significant impact on liquidity position of private commercial banks in Ethiopia at 5% level of significance. The findings presented that taking all other independent variables constant, a one unit increase/decrease credit risk would lead to a 1.8 unit adjustment by increase /decrease on liquidity position by holding liquid asset in the total asset portfolio. The results of the analysis presented a direct impact. This could be a sign of prudent policy of banks with a better portfolio quality, there is less incentive for bank to reduce lending and improvement may be the result of better internal risk management. This result is consistent with the results identified by (Vodova 2011, Daniel 2015, Tseganesh 2012 & Berhanu 2015).

Capital Adequacy (CPA). CPA had negative and statistically significant impact on the liquidity of private banks at 5% level of significance. It is opposite to the assumption. This

was in accordance with financial fragility and crowding out of deposits hypothesis theory of liquidity. Evidence found include from Diamond & Rajan (2000, 2001) where research on “Financial Fragility Structure” stating that depositors will be charged a nominal fee for the intermediary service of loaning out their respective deposits. However, this fee differs according to the borrowers’ capability of repayment. For those with higher risk borrowing but are reluctant to incur higher cost, will provoke depositors to withdraw their funds. In extreme scenarios, the possibility of bank runs. Bank runs will definitely cause liquidity problems to banks.

It is also found in Gorton and Winston (2000) proposing the “Crowding Out Effect” indeed meaning for preference of banks to shift investors’ funds to capital accounts in purpose to meet higher capital requirements. Yet investments in capital accounts are prone to financial volatility and cyclical ups and downs. Also in facts, capital investments are not insured and cannot be withdrawn as desired. This indeed lowers liquidity creation. Similarly, Heuvel (2007) argued that higher capital requirements hinder the amount of asset a bank can hold issuing deposits. Hence, higher capital requirement regulations can be very costly to banks. Therefore, private commercial banks in Ethiopia are found in growing stage and focusing in capital investment and fulfilling the capital requirement from September 2011. Hence, these can reveal capital adequacy has negative impact on liquidity of private commercial banks in Ethiopia.

Gross national product (GDP): The coefficient value of GDP was 0.031751 with a p-value 0.0003. this indicated that a growth rate of GDP had negative and statistically significant impact on liquidity of private commercial banks in Ethiopia at 5% level of significance. The findings presented that taking all other independent variables constant a 1% increase/decrease in growth rate of GDP would lead to 0.031751 unit decrease/increase in liquidity of private commercial banks in Ethiopia. In reference to Paineira (2010), research on liquidity preference during different business cycle states that banks liquidity fondness is low in the course of economic boom. Where, banks confidently expect to profit by expanding loan able funds to sustain economic boom, while restrict loan able funds during economic downturn to prioritize liquidity. To sum up, banks prefer high liquidity due to lower confidence in reaping profits during economic downturn. Aspachs et al (2005) has also inferred that banks prioritize liquidity when the economy falls, during risk lending

opportunities, while neglecting liquidity during economic boom when lending opportunities may be favorable. Furthermore, the result was also consistent with the results identified by Valla et al (2006)

Net interest margin (NIM): The researcher find net interest margin had a negative and statistically significant impact on the liquidity of private commercial banks at 1% level of significance, which was in line with the researcher prior expectation. As indicated in the Table 4.12 the coefficient estimates of return on asset was 8.18729 with a p-value of 0.0000. This implied that, holding other variables constant a unit increase in net interest margin would lead to 8.18729 unit declines in liquidity of private commercial banks. This is logical: increase in interest margin stimulates bank to focus more on lending activity and as a result, the share of liquid assets is decreasing. This supported by Angbazo 1997 and Drakos 2003 where their studies reveal that when a bank needs to sacrifice liquidity to achieve a higher profitability which in turn increases the liquidity risk and liquidity ratio. Liquidity need is actually a constraint for a bank from investing all its cash as profit comes from either bank lending activities or by investing it.

NBE bill (BIEX): As indicated in the Table 4.12 the coefficient estimates of NBE bill is 0.061270 with p-value of 0.0410. This means holding other factors constant, a 1% increase investment in NBE Bill would lead a decline in liquidity by 0.0006127 and the p-value of NBE bill (i.e. 0.0410) reveals that it is statistically significant at 5% level of significance. Therefore, reject the second null hypothesis and accept the alternative hypothesis. As revealed in the dummy variable added to the research, banks liquidity has negative association with the post bill purchase period with coefficient of 0.571181 and p-value 0.0326. This showed that holding other variables constant, the liquidity of private commercial banks decreased by 0.00571181 unit in post period than pre period of the requirement when a 1% increase in purchasing NBE bill and statistically significant at 5% level of significance. In other words, the two period's comparison showed lower liquidity record for private commercial banks during times of policy restrictions. This was as result of the requirement of purchasing NBE bill creating maturity mismatches because Private Banks collect savings mostly at two to three-year maturity and even shorter in some cases and Fulfilling the 27 percent requirement means that they have to freeze these resources for 5 years.

Chapter Five

5.1 Conclusion and recommendation

5.1.1 Conclusion

The major objective of the study was to examine the impact of National Bank of Ethiopia's directive on the profitability and liquidity of private commercial banks. The study has taken one of the top issues; the requirement to purchase NBE bill, and analyzed its impact on profitability and liquidity of private commercial. The panel data were used for the sample of eight commercial banks in Ethiopia from 2007 to 2014 with a total of 64 observations. Data were presented by using descriptive statistics, balanced correlation and regression analysis for profitability and liquidity ratios were conducted. Before performing OLS regression the researcher uses model specification test to select the appropriate model for regression analysis. Based on the result of model specification test, the researcher had used the fixed effect model. Furthermore, the models were tested for the classical linear regression model assumptions and the results showed that all the tests are satisfactory in all regressions.

The study finds that purchasing NBE bill has had a negative and significant impact on the profitability of private commercial banks because they have been offered very low interest rate (3%) by NBE which is less than cost of collecting saving on average 5.38% NBE (2013/14) from the public. This even makes private commercial banks to incur net loss of 2.38%. Not only incurring a net loss of 2.38% but also the interest rate calculated on the bills is far less than the market lending rate which is 11.88% on average NBE (2013/14) having 8.88% difference. This difference made private commercial banks to loss substantial amount of income. However, the magnitude of the impact of NBE bill is not highly severe to result in loss in the period under consideration. Even as revealed in the dummy variable added to the research, banks profitability has positive association with the post bill purchase period and statistically significant at 1% level of significance. In other words, the two period's comparison showed a relatively better profitability record for private commercial banks after the application of the requirement. Therefore, In spite of the negative relationship, the bill seems contributed positively to profitability by moping the excess liquidity holding of banks. In addition, it forces private commercial banks search for other fee generating sources which have positively contributed for their profitability. This can be inferred from the positive and significant relationship between the income diversification (the ratio of other income to total

asset) and profitability. Furthermore, the Banks cost related to bill purchase to some extent seems covered by the borrowers (stable liability prices and banks discretion to adjust their asset prices) but the increase in rate has not resulted in materialized high default risk. Since the requirement was undertaken during the time when banks were excessively liquid, the result of the study strongly supports the above argument.

Similarly the requirement of purchasing NBE bill had negative and significant impact on the liquidity position of private commercial banks in Ethiopia. The magnitude of the impact of NBE bill is relatively severe to result in liquidity risk. As revealed in the dummy variable added to the research for pre and post policy periods comparison, banks liquidity has negative association with the post bill purchase period and statistically significant at 5% level of significance. In other words, the two period's comparison showed that lower liquidity record for private commercial banks during times of policy restrictions. This is due to the fact that the requirement of purchasing NBE bill has a possibility of creating maturity mismatches because Private Banks collect savings mostly at two to three-year maturity and even shorter in some cases and fulfilling the 27 percent requirement means that they have to freeze these resources for 5 years. This requirement has also been applied at the time when private commercial banks have concentrated on capital investment from their own capital and to fulfill the capital requirement set by NBE. Such a move coupling with purchasing requirement of NBE bill have highly magnified the liquidity problem of private commercial banks in Ethiopia. Furthermore The Ethiopian economy continued to grow and the overall economic performance reflected the rapid expansion of the country. Then Real GDP continued to grow on average by 10.9 percent in the past decade (2003/04- 2012/13). During the F.Y 2012/13, the real GDP revealed a remarkable growth of 9.7 and 10.3 percent in 2013/14, this can encourage investment and banks confidently expect to profit by expanding loan able funds to satisfy the financial needs of investors. Therefore, the liquidity of private commercial banks decreased in the periods under consideration.

5.1.2 Recommendation

For policy makers

Even if the magnitude of the impact of NBE bill is not highly severe and a better profit after the application of the requirement, the result of this study also revealed that NBE bill had negative and significant impact on the profitability (ROA) of private commercial banks in Ethiopia. This is an indicator that private commercial banks might be incurred a loss in long run. This in turn could induce banks to engage in riskier activities and /or to invest in ways to circumvent regulation and affect the financial system as whole. Therefore it is better for the policy makers to minimize either the percentage of the requirement to purchase the NBE bill from newly disbursed loans or increase the interest rate paid for the bill.

Another major problem which the researcher has identified is the liquidity problem because of maturity mismatch. Private Banks collect savings mostly at two to three-year maturity and even shorter in some cases and fulfilling the 27 percent requirement means that they have to freeze these resources for 5 years. Hence, it is better if policy makers decrease tenure years for the collection of principal of the bills purchased by private commercial banks.

For private commercial banks

The finding of this research showed that income diversification (ratio of non-interest income to total asset) had positive and significant impact on return on asset. Therefore, private commercial banks should search other fee generating sources which can positively contribute for profitability to offset the impact of the requirement on their performance. Moreover, they should use revenue maximization strategy than cost minimization because the result of the impact of management efficiency (operating cost/total income) on ROA indicated that it had negative impact but not had significant impact on the profitability of private commercial banks. On the other hands, private commercial banks diversify their service especially in interest free banking service to minimize their deposit mobilization cost.

In relation to liquidity, private commercial banks minimize their capital investment until NBE taking corrective action and making big deal with fixed time depositors to extend the maturity date instead of making aggressive competition by paying higher interest for shortly maturing fixed time deposit because this create maturity mismatch between their asset and liability. The researcher also recommends private commercial banks to use different

mechanisms such as shortening asset maturities, improving the average liquidity of assets, issuing more equity, reducing contingent commitments, and obtaining liquidity protection in order to improve their liquidity position depending on the nature, severity and duration of the liquidity shock and potential sources of funding.

Further research

The study is reflected the historical impact of NBE bill on the profitability and liquidity of private commercial banks in Ethiopia and focused on private commercial banks which are operated more than eight years. Hence, for future research, this study can be extended using unbalanced panel data to cover all private commercial banks in Ethiopia and to measure its long run impact on the profitability and liquidity of private commercial banks in Ethiopia.

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Cross-section random effects test equation:

Dependent Variable: ROA

Method: Panel Least Squares

Date: 10/26/15 Time: 23:02

Sample: 2007 2014

Periods included: 8

Cross-sections included: 8

Total panel (balanced) observations: 64

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.336795	0.050698	-6.643098	0.0000
LQ	0.033600	0.007654	4.389918	0.0001
CR	0.084819	0.084942	0.998553	0.3229
SIZ	0.034516	0.005158	6.691588	0.0000
ME	-0.004806	0.008187	-0.586990	0.5599
IDV	0.251006	0.068028	3.689770	0.0006
BIEX	-0.011432	0.003691	-3.096948	0.0032
DUM	0.100471	0.033090	3.036279	0.0038

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.873132	Mean dependent var	0.027052
Adjusted R-squared	0.836885	S.D. dependent var	0.011799
S.E. of regression	0.004765	Akaike info criterion	-7.653220
Sum squared resid	0.001113	Schwarz criterion	-7.147232
Log likelihood	259.9030	Hannan-Quinn criter.	-7.453886
F-statistic	24.08782	Durbin-Watson stat	2.131424
Prob(F-statistic)	0.000000		

Redundant Fixed Effects Tests

Equation: Untitled

Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	8.089588	(7,49)	0.0000
Cross-section Chi-square	49.158068	7	0.0000

Cross-section fixed effects test equation:

Dependent Variable: ROA

Method: Panel Least Squares

Date: 10/26/15 Time: 23:03

Sample: 2007 2014

Periods included: 8

Cross-sections included: 8

Total panel (balanced) observations: 64

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.207630	0.037461	-5.542621	0.0000
LQ	0.030827	0.008375	3.680728	0.0005
CR	-0.066804	0.068223	-0.979211	0.3317
SIZ	0.020569	0.003951	5.205782	0.0000
ME	0.008109	0.007830	1.035668	0.3048
IDV	0.413874	0.083755	4.941481	0.0000

BIEX	-0.011602	0.004550	-2.549992	0.0135
DUM	0.105334	0.040747	2.585097	0.0124
R-squared	0.726517	Mean dependent var	0.027052	
Adjusted R-squared	0.692332	S.D. dependent var	0.011799	
S.E. of regression	0.006545	Akaike info criterion	-7.103875	
Sum squared resid	0.002399	Schwarz criterion	-6.834015	
Log likelihood	235.3240	Hannan-Quinn criter.	-6.997564	
F-statistic	21.25230	Durbin-Watson stat	1.197795	

Model-2

Correlated Random Effects - Hausman Test

Equation: Untitled

Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob
Cross-section random	38.671493	7	0.0000

** WARNING: estimated cross-section random effects variance is zero.

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob
CR	-1.762118	-0.589754	0.470010	0.0873
LG	0.048774	0.027820	0.000144	0.0811
CPA	1.395037	-0.207850	0.138987	0.0000
NIM	8.187290	8.600095	0.278714	0.4343
GDP	0.031751	0.030200	0.000006	0.5241
BIEX	0.061270	0.107024	0.000585	0.0584
DUM	0.571181	0.958102	0.045478	0.0696

Cross-section random effects test equation:

Dependent Variable: LQ

Method: Panel Least Squares

Date: 10/26/15 Time: 21:19

Sample: 2007 2014

Periods included: 8

Cross-sections included: 8

Total panel (balanced) observations: 64

Variable	Coefficient	Std. Error	t-Statistic	Prob
C	-0.218434	0.142881	-1.528790	0.1327
CR	-1.762118	0.850213	-2.072560	0.0435
LG	0.048774	0.030373	1.605834	0.1147
CPA	1.395037	0.441449	3.160134	0.0027
NIM	8.187290	1.171866	6.986541	0.0000
GDP	0.031751	0.009282	3.420699	0.0013
BIEX	0.061270	0.036876	1.661515	0.1030
DUM	0.571181	0.330216	1.729718	0.0900

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.755696	Mean dependent var	0.499131
Adjusted R-squared	0.685894	S.D. dependent var	0.095077
S.E. of regression	0.053286	Akaike info criterion	2.824604
Sum squared resid	0.139130	Schwarz criterion	-2.318616
Log likelihood	105.3873	Hannan-Quinn criter.	-2.625270
F-statistic	10.82639	Durbin-Watson stat	1.796900
Prob(F-statistic)	0.000000		

Redundant Fixed Effects Tests

Equation: Untitled

Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob
Cross-section F	5.612293	(7,49)	0.0001
Cross-section Chi-square	37.680754	7	0.0000

Cross-section fixed effects test equation:

Dependent Variable: LQ

Method: Panel Least Squares

Date: 10/26/15 Time: 21:20

Sample: 2007 2014

Periods included: 8

Cross-sections included: 8

Total panel (balanced) observations: 64

Variable	Coefficient	Std. Error	t-Statistic	Prob
C	-0.042637	0.142885	-0.298403	0.7665
CR	-0.589754	0.631372	-0.934082	0.3543
LG	0.027820	0.035027	0.794247	0.4304
CPA	-0.207850	0.296838	-0.700215	0.4867
NIM	8.600095	1.313624	6.546847	0.0000
GDP	0.030200	0.011247	2.685265	0.0095
BIEX	0.107024	0.034960	3.061378	0.0034
DUM	0.958102	0.316563	3.026578	0.0037
R-squared	0.559823	Mean dependent var	0.499131	
Adjusted R-squared	0.504801	S.D. dependent var	0.095077	
S.E. of regression	0.066906	Akaike info criterion	-2.45459	
Sum squared resid	0.250678	Schwarz criterion	-2.18473	
Log likelihood	86.54695	Hannan-Quinn criter.	-2.34828	
F-statistic	10.17452	Durbin-Watson stat	1.314381	
Prob(F-statistic)	0.000000			

Appendix 3 regression result

Dependent Variable: ROA
Method: Panel Least Squares
Date: 10/26/15 Time: 23:03
Sample: 2007 2014
Periods included: 8
Cross-sections included: 8
Total panel (balanced) observations: 64
White period standard errors & covariance (no d.f. correction)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.336795	0.046744	-7.205029	0.0000
LQ	0.033600	0.010257	3.275806	0.0019
CR	0.084819	0.096364	0.880192	0.3831
SIZ	0.034516	0.004952	6.969501	0.0000
ME	-0.004806	0.012770	-0.376311	0.7083
IDV	0.251006	0.090267	2.780700	0.0077
BIEX	-0.011432	0.003458	-3.305852	0.0018
DUM	0.100471	0.031570	3.182501	0.0025

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.873132	Mean dependent var	0.027052
Adjusted R-squared	0.836885	S.D. dependent var	0.011799
S.E. of regression	0.004765	Akaike info criterion	-7.653220
Sum squared resid	0.001113	Schwarz criterion	-7.147232
Log likelihood	259.9030	Hannan-Quinn criter.	-7.453886
F-statistic	24.08782	Durbin-Watson stat	2.131424
Prob(F-statistic)	0.000000		

Dependent Variable: LQ
Method: Panel Least Squares
Date: 10/26/15 Time: 21:17
Sample: 2007 2014
Periods included: 8
Cross-sections included: 8
Total panel (balanced) observations: 64
White period standard errors & covariance (no d.f. correction)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.218434	0.142023	-1.538019	0.1305
CR	-1.762118	0.673730	-2.615465	0.0118
LG	0.048774	0.033408	1.459939	0.1507
CPA	1.395037	0.683119	2.042157	0.0465
NIM	8.187290	1.350868	6.060762	0.0000
GDP	0.031751	0.008077	3.930890	0.0003
BIEX	0.061270	0.029198	2.098434	0.0410
DUM	0.571181	0.259682	2.199541	0.0326

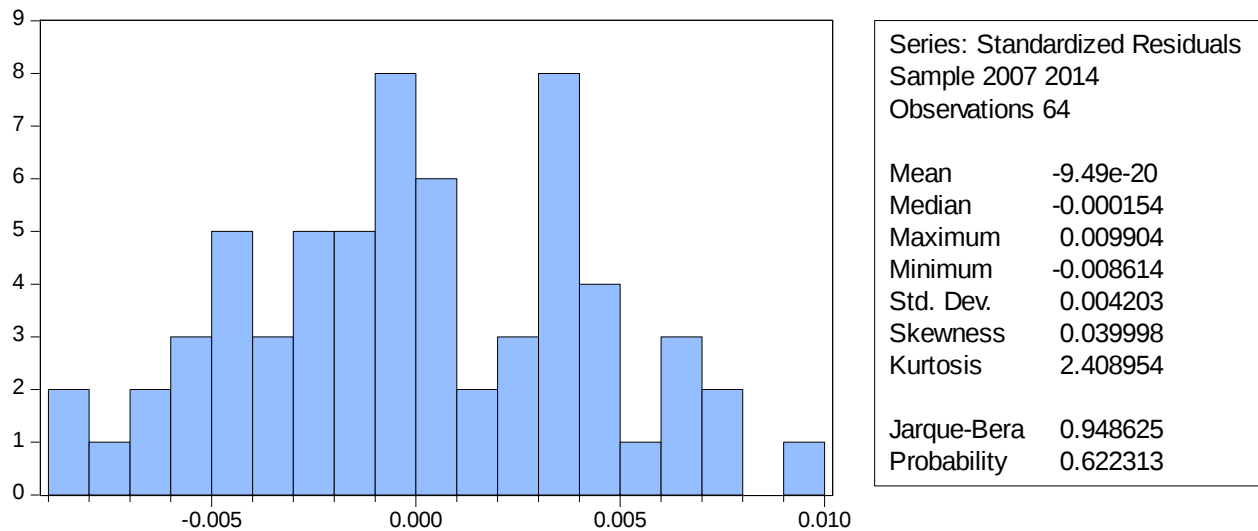
Effects Specification

Cross-section fixed (dummy variables)

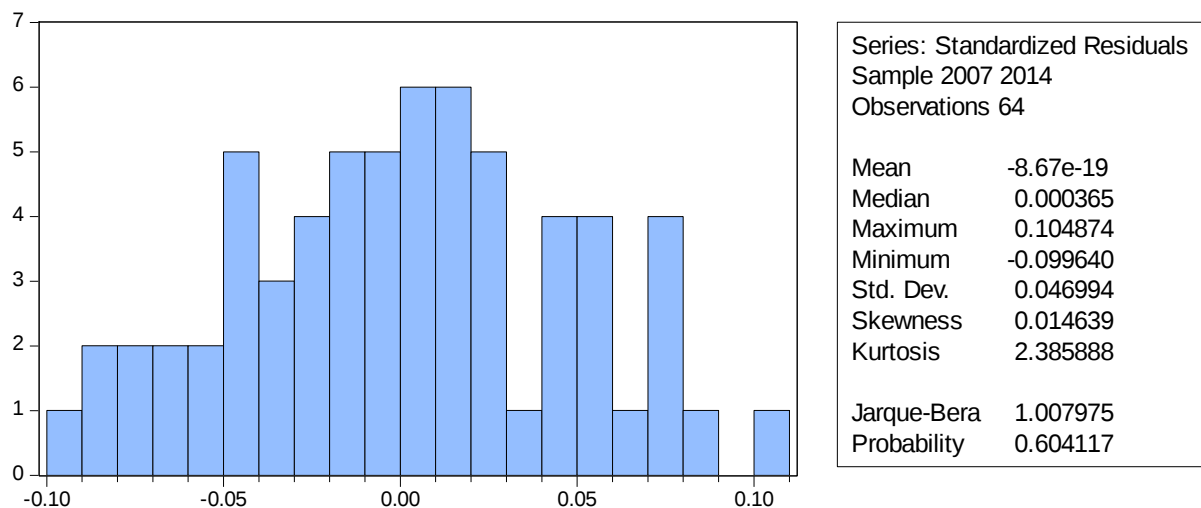
R-squared	0.755696	Mean dependent var	0.499131
Adjusted R-squared	0.685894	S.D. dependent var	0.095077
S.E. of regression	0.053286	Akaike info criterion	-2.824604
Sum squared resid	0.139130	Schwarz criterion	-2.318616
Log likelihood	105.3873	Hannan-Quinn criter.	-2.625270
F-statistic	10.82639	Durbin-Watson stat	1.796900
Prob(F-statistic)	0.000000		

Appendix 4 Normality

Model 1 (ROA)



Model 2 (LQ)



Appendix 5 VIF

Variance Inflation Factors

Date: 11/02/15 Time: 19:42

Sample: 2007 2014

Included observations: 64

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.000866	1176.425	NA
LQ	7.18E-05	38.92291	1.433121
CR	0.004970	7.056281	1.698069
SIZ	9.68E-06	1243.955	2.044056
ME	6.74E-05	15.26619	1.609458
IDV	0.006092	11.71177	1.441435
BIEX	8.00E-08	4.516161	2.261639

Variance Inflation Factors

Date: 11/02/15 Time: 22:38

Sample: 2007 2070

Included observations: 64

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.022864	285.9534	NA
CR	0.453806	5.929989	1.427031
LG	0.001396	2.444450	1.336170
CPA	0.096561	22.93264	1.309026
NIM	1.877897	21.96912	1.333544
GDP	0.000141	194.3739	1.424076
BIEX	5.90E-06	3.066723	1.535778

Appendix 6 Durbin Watson test table

	<u>K₁</u>		<u>K₂</u>		<u>K₃</u>		<u>K₄</u>		<u>K₅</u>		<u>K₆</u>		<u>K₇</u>		<u>K₈</u>		<u>K₉</u>		<u>K₁₀</u>	
N	dL	dU	dL	dU	dL	dU	dL	dU	dL	dU	dL	dU	dL	dU	dL	dU	dL	dU	dL	dU
6	0.390	1.142																		
7	0.435	1.036	0.294	1.676																
8	0.497	1.003	0.345	1.489	0.229	2.102														
9	0.554	0.998	0.408	1.389	0.279	1.875	0.183	2.433												
10	0.604	1.001	0.466	1.333	0.340	1.733	0.230	2.193	0.150	2.690										
11	0.653	1.010	0.519	1.297	0.396	1.640	0.286	2.030	0.193	2.453	0.124	2.892								
12	0.697	1.023	0.569	1.274	0.449	1.575	0.339	1.913	0.244	2.280	0.164	2.665	0.105	3.053						
13	0.738	1.038	0.616	1.261	0.499	1.526	0.391	1.826	0.294	2.150	0.211	2.490	0.140	2.838	0.090	3.182				
14	0.776	1.054	0.660	1.254	0.547	1.490	0.441	1.757	0.343	2.049	0.257	2.354	0.183	2.667	0.122	2.981	0.078	3.287		
15	0.811	1.070	0.700	1.252	0.591	1.465	0.487	1.705	0.390	1.967	0.303	2.244	0.226	2.530	0.161	2.817	0.107	3.101	0.068	3.374
16	0.844	1.086	0.738	1.253	0.633	1.447	0.532	1.664	0.437	1.901	0.349	2.153	0.269	2.416	0.200	2.681	0.142	2.944	0.094	3.201
17	0.873	1.102	0.773	1.255	0.672	1.432	0.574	1.631	0.481	1.847	0.393	2.078	0.313	2.319	0.241	2.566	0.179	2.811	0.127	3.053
18	0.902	1.118	0.805	1.259	0.708	1.422	0.614	1.604	0.522	1.803	0.435	2.015	0.355	2.238	0.282	2.467	0.216	2.697	0.160	2.925
19	0.928	1.133	0.835	1.264	0.742	1.416	0.650	1.583	0.561	1.767	0.476	1.963	0.396	2.169	0.322	2.381	0.255	2.597	0.196	2.813
20	0.952	1.147	0.862	1.270	0.774	1.410	0.684	1.567	0.598	1.736	0.515	1.918	0.436	2.110	0.362	2.308	0.294	2.510	0.232	2.174
21	0.975	1.161	0.889	1.276	0.803	1.408	0.718	1.554	0.634	1.712	0.552	1.881	0.474	2.059	0.400	2.244	0.331	2.434	0.268	2.625

22	0.997	1.174	0.915	1.284	0.832	1.407	0.748	1.543	0.666	1.691	0.587	1.849	0.510	2.015	0.437	2.188	0.368	2.367	0.304	2.548
23	1.017	1.186	0.938	1.290	0.858	1.407	0.777	1.535	0.699	1.674	0.620	1.821	0.545	1.977	0.473	2.140	0.404	2.308	0.340	2.479
24	1.037	1.199	0.959	1.298	0.881	1.407	0.805	1.527	0.728	1.659	0.652	1.797	0.578	1.944	0.507	2.097	0.439	2.255	0.375	2.417
25	1.055	1.210	0.981	1.305	0.906	1.408	0.832	1.521	0.756	1.645	0.682	1.776	0.610	1.915	0.540	2.059	0.473	2.209	0.409	2.362
26	1.072	1.222	1.000	1.311	0.928	1.410	0.855	1.517	0.782	1.635	0.711	1.759	0.640	1.889	0.572	2.026	0.505	2.168	0.441	2.313
27	1.088	1.232	1.019	1.318	0.948	1.413	0.878	1.514	0.808	1.625	0.738	1.743	0.669	1.867	0.602	1.997	0.536	2.131	0.473	2.269
28	1.104	1.244	1.036	1.325	0.969	1.414	0.901	1.512	0.832	1.618	0.764	1.729	0.696	1.847	0.630	1.970	0.566	2.098	0.504	2.229
29	1.119	1.254	1.053	1.332	0.988	1.418	0.921	1.511	0.855	1.611	0.788	1.718	0.723	1.830	0.658	1.947	0.595	2.068	0.533	2.193
30	1.134	1.264	1.070	1.339	1.006	1.421	0.941	1.510	0.877	1.606	0.812	1.707	0.748	1.814	0.684	1.925	0.622	2.041	0.562	2.160
31	1.147	1.274	1.085	1.345	1.022	1.425	0.960	1.509	0.897	1.601	0.834	1.698	0.772	1.800	0.710	1.906	0.649	2.017	0.589	2.131
32	1.160	1.283	1.100	1.351	1.039	1.428	0.978	1.509	0.917	1.597	0.856	1.690	0.794	1.788	0.734	1.889	0.674	1.995	0.615	2.104
33	1.171	1.291	1.114	1.358	1.055	1.432	0.995	1.510	0.935	1.594	0.876	1.683	0.816	1.776	0.757	1.874	0.698	1.975	0.641	2.080
34	1.184	1.298	1.128	1.364	1.070	1.436	1.012	1.511	0.954	1.591	0.896	1.677	0.837	1.766	0.779	1.860	0.722	1.957	0.665	2.057
35	1.195	1.307	1.141	1.370	1.085	1.439	1.028	1.512	0.971	1.589	0.914	1.671	0.857	1.757	0.800	1.847	0.744	1.940	0.689	2.037
36	1.205	1.315	1.153	1.376	1.098	1.442	1.043	1.513	0.987	1.587	0.932	1.666	0.877	1.749	0.821	1.836	0.766	1.925	0.711	2.018
37	1.217	1.322	1.164	1.383	1.112	1.446	1.058	1.514	1.004	1.585	0.950	1.662	0.895	1.742	0.841	1.825	0.787	1.911	0.733	2.001
38	1.227	1.330	1.176	1.388	1.124	1.449	1.072	1.515	1.019	1.584	0.966	1.658	0.913	1.735	0.860	1.816	0.807	1.899	0.754	1.985
39	1.237	1.337	1.187	1.392	1.137	1.452	1.085	1.517	1.033	1.583	0.982	1.655	0.930	1.729	0.878	1.807	0.826	1.887	0.774	1.970
40	1.246	1.344	1.197	1.398	1.149	1.456	1.098	1.518	1.047	1.583	0.997	1.652	0.946	1.724	0.895	1.799	0.844	1.876	0.749	1.956
45	1.288	1.376	1.245	1.424	1.201	1.474	1.156	1.528	1.111	1.583	1.065	1.643	1.019	1.704	0.974	1.768	0.927	1.834	0.881	1.902
50	1.324	1.403	1.285	1.445	1.245	1.491	1.206	1.537	1.164	1.587	1.123	1.639	1.081	1.692	1.039	1.748	0.997	1.805	0.955	1.864
55	1.356	1.428	1.320	1.466	1.284	1.505	1.246	1.548	1.209	1.592	1.172	1.638	1.134	1.685	1.095	1.734	1.057	1.785	1.018	1.837
60	1.382	1.449	1.351	1.484	1.317	1.520	1.283	1.559	1.248	1.598	1.214	1.639	1.179	1.682	1.144	1.726	1.108	1.771	1.072	1.817
65	1.407	1.467	1.377	1.500	1.346	1.534	1.314	1.568	1.283	1.604	1.251	1.642	1.218	1.680	1.186	1.720	1.153	1.761	1.120	1.802
70	1.429	1.485	1.400	1.514	1.372	1.546	1.343	1.577	1.313	1.611	1.283	1.645	1.253	1.680	1.223	1.716	1.192	1.754	1.162	1.792
75	1.448	1.501	1.422	1.529	1.395	1.557	1.368	1.586	1.340	1.617	1.313	1.649	1.284	1.682	1.256	1.714	1.227	1.748	1.199	1.783
80	1.465	1.514	1.440	1.541	1.416	1.568	1.390	1.595	1.364	1.624	1.338	1.653	1.312	1.683	1.285	1.714	1.259	1.745	1.232	1.777
85	1.481	1.529	1.458	1.553	1.434	1.577	1.411	1.603	1.386	1.630	1.362	1.657	1.337	1.685	1.312	1.714	1.287	1.743	1.262	1.773
90	1.496	1.541	1.474	1.563	1.452	1.587	1.429	1.611	1.406	1.636	1.383	1.661	1.360	1.687	1.336	1.714	1.312	1.741	1.288	1.769
95	1.510	1.552	1.489	1.573	1.468	1.596	1.446	1.618	1.425	1.641	1.403	1.666	1.381	1.690	1.358	1.715	1.336	1.741	1.313	1.767
100	1.522	1.562	1.502	1.582	1.482	1.604	1.461	1.625	1.441	1.647	1.421	1.670	1.400	1.693	1.378	1.717	1.357	1.741	1.335	1.765
150	1.611	1.637	1.598	1.651	1.584	1.665	1.571	1.679	1.557	1.693	1.543	1.708	1.530	1.722	1.515	1.737	1.501	1.752	1.486	1.767
200	1.664	1.684	1.653	1.693	1.643	1.704	1.633	1.715	1.623	1.725	1.613	1.735	1.603	1.746	1.592	1.757	1.582	1.768	1.571	1.779