ST. MARY'S UNIVERSITY SCHOOL OF GRADUATE STUDIES

DETERMINANTS OF LIQUIDITY OF COMMERCIAL BANKS IN ETHIOPIA

By

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DECLARATION

I, the undersigned, declare that this thesis is my original work, presented under the guidance of Zenegnaw Abiy (PhD). All sources of materials used for the thesis have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or in full to any other higher institution for the purpose of earning any degree.

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ENDORSEMENT

This thesis has been submitted to St. Mary's University, School of Graduate Studies for examination with my approval as a university advisor.

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St. Mary University, Addis Ababa   **June, 2017**

Acknowledgement

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List of Acronyms

BIS: Bank International Settlement

BSIZE: Bank Size

CAP: Capital Adequacy

CBE: Commercial Bank of Ethiopia

FEM: Fixed Effect Model

GDP: Growth Domestic Product

LG: Loan Growth

LOLR: Lender of Last Resort

MFI: Micro Finance Institution

MOFED: Ministry of Finance and Economic Development

NBE: National Bank of Ethiopia

NPL: Non-Performing Loan

NPV: Net Present Value

OECD: Organization for Economic Corporation and Development

UK: United Kingdom

Abstract

The main objective of this paper was to study and identify the main determinants of Ethiopia commercial banks liquidity. In order to achieve the objective a secondary source of data were collected from eight commercial banks in the sample covering the period from 2005 to 2016 and analyzed them with panel data regression analysis. The result of regression analysis showed that Actual reserve ratio had positive and statistically. Bank size, loan growth and GDP had negative and statistically significant impact on banks liquidity measured by Liquid asset to total asset. Capital adequacy, inflation and non performing loan had insignificant effect on liquidity. Since, commercial banks do not respond to the dynamics of economic growth which can be taken as an indication of ineffective competition and efficiency in the Banking sector, NBE should come out with strict rules and regulations for control mechanism of firm specific and macroeconomic factors.

Key words:- Bank's liquidity, commercial banks,

CHAPTER ONE

INTRODUCTION

1.1.Background of the study

Banks are financial institutions that play intermediary function in the economy through channelling financial resources from surplus economic units to deficit economic units. Especially in developing countries like Ethiopia, the role of capital market is nil, and as a result commercial bank become the most dominant financial institutions in the financial system. For banks to be effectively discharge their responsibilities of a availing funds to customers, mars, they must be in a healthy condition. As it was pointed out by Diamond and Dybvig (1983), one of the key reasons why banks may not be in healthy condition is their role in transforming maturity and providing insurance to depositors potential liquidity needs.

Bank's liquidity indicates the ability to finance its transactions efficiently. If the bank is unable to do this it is known as the liquidity risk. As this risk increases the bank is considered unable to meet its obligations (such as deposits withdrawal, debt maturity and funds for loan portfolio and investment). Bank for International Settlements (BIS, 2008) explains liquidity as bank's ability to finance increases in assets and meets its obligations without losses. A bank should acquire proper liquidities when needed immediately at a sensible cost.

According to Malik and Rafique (2013), when a bank is not adequately manage its liquidity, it may lead to insolvency (in case of low liquidity) or low profitability (in case of high liquidity) and ultimately destroy the wealth of shareholder and breakdown of entire financial institution. Hence, maintaining the optimum level of liquidity is very important in order to make the bank successfully functioning and profitable. In this regard, the study made by Greuning and Bratonovic (2004) suggested that, in order to manage liquidity of banks, they must have a well defined liquidity management policy that is communicated in the whole organization and there must be a liquidity control strategy that specifies certain rules regarding management of assets and liabilities.

Linking financial innovation with financial fragility in that neglect of risks can lead to over issuance of innovative securities (Gennaioli et al. 2012). Since the Ethiopian financial sector comprised of mainly banks which accounts for about 94% of the total assets with remaining

held by insurance companies and micro finance institutions (MFIs) with 3% each (Pfister et al. 2008). Hence, the process of financial intermediation in the country depends heavily on banks. With the absence of secondary market the banking sector in Ethiopia currently acts as the link that holds the country's economy together. Thus, keeping their optimal liquidity for banks in Ethiopia is not only important for the banking sector but also for the economy as a whole. However, on the area of factors affecting commercial banks liquidity is unexplored part in Ethiopia. Therefore, this study is important to assess the determinants of liquidity of commercial banks in Ethiopia.

1.2. Banking in Ethiopia

Modern banking in Ethiopia started in 1905 with the establishment of Abyssinian Bank which was based on a fifty year agreement with the Anglo-Egyptian National Bank. In 1908 a new development bank (SocieteNationaled'Ethiope Pour le Development del'Agricultureetdu Commerce) and two other foreign banks (Banque de l'Indochine and the Compagniedel'Afrique Orientale) were also established (Degefe 1995 cited in Geda 2006). As noted in Geda (2006) these banks were criticized for being wholly foreign owned. In 1931 the Ethiopian government purchased the Abyssinian Bank, which was the dominant bank, and renamed it the Bank of Ethiopia i.e., the first nationally owned bank on the African continent (Gedey 1990, pp. 83, cited in Geda 2006).

During the five-years of Italian occupation (1936-1941) banking activity of the country was relatively expanded. In that time, the Italian banks were particularly active. As a result, most of the banks that were in operation during this period were Italian banks namely, Banco di Italy, Banco di Roma, Banco di Napoli, BancoNacionale, Casa de Creito and Society Nacionale di Ethiopia. After independence from Italy's brief occupation, where the role of Britain was paramount owing to its strategic planning during the Second World War, Barclays Bank was established and it remained in business in Ethiopia between 1941 and 1943 (Degefe 1995 cited in Geda 2006). Following this, in 1943 the Ethiopian government established the State Bank of Ethiopia. As noted in Degefe (1995 cited in Geda 2006) the establishment of the Bank by Ethiopia was a painful process because Britain was against it. The Bank of Ethiopia was operating as both a commercial and a central bank until 1963 when it was remodeled into today's National Bank of Ethiopia (the Central Bank, re-established in 1976) and the Commercial Bank of Ethiopia (CBE). After this period many other banks were established; and just before the 1974 revolution those banks were in operation (Degefe 1995

cited in Geda 2006). As stated in Degefe (1995 cited in Geda 2006), all privately owned financial institutions including three commercial banks, thirteen insurance companies, and two non-bank financial intermediaries were nationalized on January 1975. The nationalized banks were reorganized and one commercial bank (the CBE), a national bank (recreated in 1976), two specialized banks i.e., the Agricultural & Industrial Bank, renamed recently as the Development Bank of Ethiopia and a Housing & Saving Bank, renamed recently as the Construction & Business Bank, and one insurance company (Ethiopian Insurance Company) were formed. Following the regime change in 1991 and the liberalization policy in 1992, these financial institutions were reorganized to work to a market-oriented policy framework. Moreover, new privately owned financial institutions were also allowed to work alongside the publicly owned ones. As a result, currently, the country has two public-owned and sixteen private banks, which are operating throughout the country (NBE 2015/2016).

Any banks operating in Ethiopia shall statutorily require to complying with the reserve and liquidity requirement directive of the National Bank of Ethiopia (NBE) as a means of effectively managing the liquidity positions of banks. As a matter of fact, the first strategy to liquidity management in Ethiopia is compliance with these statutory reserve requirement and liquidity ratios as stipulated by the NBE directives. To this regard, strategic measures has been employed by the NBE to improve banking system liquidity & stability and a steady flow of credit to the real sector of the economy includes the continuous reduction of the statutory reserve requirement and liquidity ratio. For instance, NBE has reduced statutory reserve requirement from 15% to 10% and then to 5% and liquidity ratio requirement from 25% to 20% and then to 15% under Directives No. SBB/45/2008, SBB/46/2012 & SBB/55/2013 and Directives No.SBB/44/2008, SBB/45/2012 & SBB/57/2014, respectively.

As per NBE's lastly replacement liquidity requirement directives No. SBB/57/2014, "liquid assets" includes cash, deposits with the National Bank and other local and foreign banks having acceptance by the National Bank, other assets readily convertible into cash expressed and payable in Birr or foreign currency having acceptance by the National Bank, deposits held in Organization for Economic Cooperation and Development (OECD) member countries' currencies and payable by banks of OECD member countries and in such other currencies as may be approved by the National Bank as well as securities issued by OECD member countries denominated in currencies of such countries and such other assets as the National Bank may from time to time declare to be liquid assets; and "current liabilities"

refs to the sum of demand (current) deposits, savings deposits and time deposits and similar liabilities with less than one- month maturity.

Thus this study will focuses in the context of Ethiopia to assess the determinants of liquidity of commercial banks in Ethiopia

1.3.Statement of the problem

Liquidity is the ability of the bank to fund asset growth and meet its obligations as they fall due without incurring acceptable losses (BIS, 2008). In fact, the Basel Committee (2009) explained that the viability of commercial banks depends on the liquidity position of the bank. The optimal level of liquidity is strongly linked to effective banking operations if liquidity is not generated properly, which can lead to insolvency (in case of low liquidity) and low profitability (in the case of high liquidity) and finally destroyed shareholders value and may be harmful to other banks and because of the contagion effect.

The ultimate role of a bank is to channel funds from surplus economic units to deficit economic units. They also provide a channel for policy makers to conduct monetary policies that control the price and foreign exchange stability. However, the activity of the bank is not without problems, since banks have an ultimate role in the maturity transformation of short-term deposits into long-term loans that inherently exposed for liquidity risk. An illiquidity bank means that it cannot obtain sufficient funds, either by increasing liabilities or by converting assets promptly, at a reasonable cost. Under critical conditions, lack of enough liquidity even results in bank's bankruptcy. A reduction in funding liquidity then caused significant distress. Liquidity and liquidity risk is very acquainted and important topic.

The reforms in the banking environment in Ethiopia have brought about many structure changes in the banking sector of the country and have also encouraged private banks to enter and expand their operations in the industry (Lelissa, 2007). Despite these changes, currently the banking industry in Ethiopia is characterized by operational inefficiency, little and insufficient competition and perhaps can be distinguished by its market concentration towards the big government owned commercial bank and having uncial bank and having undiversified ownership structure. The existence of less efficiency and little insufficient competition in the country's banking industry is a clear indicator of relatively poor

performance of the sector compared to the developed world financial institutions (Abera, 2012).

The financial sector of Ethiopian is basically bank-based as the secondary market still not established in the country. Banks take over the financial sector in Ethiopia and as such the process of financial intermediation in the country depends heavily on banks. Hence, keeping their optimal liquidity for banks in Ethiopia is very important to meet the demand by their present and potential customers. On the other hand, in Ethiopia studies in relation to determinants of banking industry's liquidity considering both internal and external factors are very scanty. Banks in Ethiopia has been holding an increasing share of their balance sheet in liquid assets, such as cash and government securities, prior to the onset of the recent Commercial Bank of Ethiopian deposit mobilization plan Tseganesh (2012), which tries to identify the impact of some bank-specific and macroeconomic variables of Ethiopian banks liquidity. Indeed, in reaction to the funding and liquidity pressures experienced during the past three years, banks, in aggregate, began to hold considerably more liquid assets. While there was an opportunity cost of holding liquid assets given their relatively low return, banks and supervisors recognized the operational benefits of additional liquidity, along with the benefits in terms of market perception. As liquidity problems of some banks during global financial crisis showed, liquidity is very important for functioning of financial market and the banking sector (Vodova, 2013). Therefore, there is interesting to examine the determinants of bank liquidity.

Researchers aremade in different countries used on the determinant of liquidity. Vodová(2013) measures liquidity ration in three ways that are the ration of to total asset, ration of liquated asset to deposit with short term borrow and ration of liquated asset to deposit. On other study he included additional measurement loan to total asset ratio and loan to deposit ratio.El Mehdi Ferrouhi and AbderrassoulLehadiri(2013) used six different dependent variable to determine the effect of liquidity of Moroccan bank.

Now a day's liquidity is major issue in the banking industry and this is the reason that the National Bank of Ethiopia is strictly follow banks. The national bank of Ethiopia had regulated banks to maintain liquidity requirement consistent with reserve requirement of banks. Any licensed commercial bank shall maintain liquid assets of not less than fifteen percent (15%) of its net current liabilities and all commercial banks shall submit to the Banking Supervision Directorate of the National Bank properly certified liquidity positions

report of the week ended each Wednesday not later than Tuesday of the following week using the form (NBE Directives No. SBB/57/2014).

There are different studies made in Ethiopia by using different measurement for instant Mekbib (2016) used three dependent variable in his study, liquid asset to total deposit & short term borrowing ratio, liquid asset to total asset ratio and loans to deposit &short term borrowing ratio. Berhanu (2015) used liquid asset to total asset ratio, loan to deposit and short term financing and net interest margin on his study. Alemayehu (2016) only used liquid asset to total deposit ratio to measure the determents of liquidityusing data from 2002 to 2013.

The researcher had also study on the determents of liquidity by using liquid asset to total asset ratio as liquidity measurement and used seven independent variable which is driven from Vodova(2013) and Alemayehu(2016) studies. This research includes current data because Alemayehu studies included data before 2013 but this study had used data up to 2016 and aimed to contribute to the current literature by providing some evidence on the current liquidity position of banks. So this study identifies the factors that influence bank's liquidity in Ethiopian context.

1.4. Objective of the study

There are many factors that determine banks liquidity. This study is mainly focused on the determinants of liquidity on Ethiopian private commercial banks which enables them to determine their liquidity requirement and ensures their ability to meet up the depositors demand on their financial obligations and maximizing their shareholders value.

1.4.1.   General Objective of the Study

The general purpose of this study is to assess the internal and external factors that affect Commercial banks Liquidity.

1.4.2.   Specific Objective of the Study

The specific objective of this study mainly had purposes.

- To examine the effect of non-performing on bank's liquidity.
- To examine the effect capital on bank's liquidity.
- To study the effect of bank size on bank's liquidity.

- To examine the effect actual reserve ratio on bank's liquidity.
- To examine the effect loan growth on bank's liquidity.
- To study the effect of GDP growth rate on bank's liquidity
- To examine the effect if inflation rate on banks liquidity.

1.5. Hypotheses of the study

The purpose of this study is mainly focuses on to identify the determinants of banks liquidity in Ethiopia private commercial banks. In order to evaluate and identify the determinants and to break down the research questions, the following major hypothesis will be tested in the case of Ethiopian private commercial banks.

H1: Percentage of non-performing loan in the total volume of loan has negative and significant effect on bank's liquidity.

H2: Capital adequacy has positive and significant effect on bank's liquidity.

H3: Bank size has positive and significant effect on bank's liquidity.

H4: Actual Reserve Ratio has negativeand significant effect on bank's liquidity.

H5: Loan growth has negative and significant effect on bank's liquidity.

H6: GDP growth rate has negative and significant effect on bank's liquidity

H7: Inflation rate has negative and significant effect on banks liquidity.

1.6. Significance of the study

The study would have great contribution to the existing knowledge in the area of factors determining commercial banks liquidity in the context of Ethiopia. This in turn contributes to the well being of the financial sector of the economy and the society as a whole. Also the research will give importance points to the banking sector to act on their liquidity policy by using the opportunities that NBE allowed them and how to manage their liquidity position. Furthermore, the study will help other researchers as a source of reference and an initial point for those who want to make further study on the area of banks liquidity.

1.7. Scope and Limitation of the Study

This research mainly concentrated on the determinant of liquidity on the commercial bank in Ethiopia. The researcher includes commercial banks established in Ethiopia and made the analysis using secondary source of data. The study had taken in to account the performance of banks for the last 12 years that is from 2005 to 2016.As a result, the research included banks that start operation before 2005, which include one government owed commercial bank and 7 private commercial banks who operate in Ethiopian. The reasoning behind choosing these eight banks is due to their availability of data, number of branches and geographical coverage, and working experience for the specific duration of 2005 to 2016 namely Commercial Bank of Ethiopia (CBE), Awash International Bank S.C (AIB),Dashen Bank S.C(DB), Bank of Abyssinia S.C(BOA),Wegagen Bank S.C(WB), United Bank S.C(UB),Coopertative Bank of Oromia S.C(CBO) and Nib International Bank S.C(NIB).

1.8.Organization of the study

This research was organized in five chapters. Chapter one provides the general introduction about the whole report. Chapter two describes the review of related literatures. Chapter three provide detail description of the methodology employed by the research. Chapter four contains data presentation, analysis and interpretation. Finally, the last chapter concludes the total work of the research and gives relevant recommendations based on the findings.

CHAPTER TWO

LITERATURE REVIEW

2.1. Theoretical Literature

In determining liquidity of commercial banks, several theories have been advanced. Bank' s liquidity have attracted both theoretical and empirical interest, and several studies attempt to assess whether and how bank's liquidity is determined.This chapter informs both the theoretical and empirical foundation upon which the ideas and opinions developed in its study were constructed and discuss the variables that influences the safety and soundness of commercial bank in terms of liquidity in Ethiopia. The chapter reviews literature containing thoughts and ideas shared by various authors and researchers, some regulator bodies and findings of past research on internal and external factors affecting liquidity of commercial bank of Ethiopia. This chapter consists of concepts of bank liquidity, theoretical literature of determinants of bank liquidity, theoretical model, conceptual framework, review of empirical studies International and discuss the knowledge gap.

2.1.1. Liquidity at a Bank

According to (Douglas, 2014) Liquidity at a bank is a measure of its ability to readily find the cash it may need to meet demands upon it. Liquidity can come from direct cash holdings in currency or on account at the Federal Reserve or other central bank. More commonly it comes from holding securities that can be sold quickly with minimal loss. This typically means highly creditworthy securities, including government bills, which have short-term maturities

Bank liquidity is ability to attain customers demand and provide proceeds in the outward appearance of loans and overdrafts. Liquidity as a company's ability to meet its maturing short-term obligations and if liquidity is insufficient serious financial difficulty may occur (Shim and Siegel 2007). Poor liquidity is comparable to a person having a fever; it is a symptom of a fundamental problem. Yuqi (2008) defined that liquidity is a risk not having enough current assets like cash and quickly saleable securities to satisfy current obligations of depositors mainly during the time of economic stress. Therefore, without required liquidity

and funding to meet obligations, a bank may fail. Liquidity is current assets which should be managed efficiently to safeguard the firm against the risk of illiquid (Pandey 2010). Lack of liquidity in extreme situations can lead to the firm's insolvency. Thus if the firm does not invest sufficient fund in current assets, it may become illiquid which is risky. Hence, insufficient liquidity is one of the major reasons of bank failure. Liquidity is necessary to enable banks providing funds on demand and credits needed by customers which are associated with the default risk.

Additionally (Douglas, 2014) stated that bank's liquidity situation, particularly in a crisis, will be affected by much more than just this reserve of cash and highly liquid securities. The maturity of its less liquid assets will also matter, since some of them may mature before the cash crunch passes, thereby providing an additional source of funds. Or they may be sold, even though this incurs a potentially substantial loss in a fire sale situation where the bank must take whatever price it can get. On the other side, banks often have contingent commitments to pay out cash, particularly through lines of credit offered to its retail and lines of credit that allow them to borrow within set limits at any time.) Of course, the biggest contingent commitment in most cases is the requirement to pay back demand deposits at any time that the depositor wants.

2.1.2. Theories of Bank Liquidity

In selecting a theoretical framework, many contending theories were considered as possible explanatory frameworks within which to fit the determinants of Bank liquidity. In the banking theory and practice, there are no generally accepted indicators measuring the liquidity of banks. In spite of the fact that there are not enough acceptable indicators for measuring the liquidity, different authors (Sinkey, 2000; Koch et.al. 2000) offered their own approaches for measuring and expressing the liquidity of individual banks and the banking system, as a whole. However, for the purposes of this study it can be recommended to utilize more liquidity indicators, which were aggregated from the data from individual financial reports filed by commercial banks.

2.1.3. Funding Liquidity

It may be defined as the ability of banks to settle obligations with immediacy (Drehmann and Nikolaou, 2009). The Basel Committee on Banking Supervision defines funding liquidity as the ability of banks to meet their liabilities, unwind or settle their positions as they come due.

The common element in these various concepts of liquidity is that liquidity is the ability to obtain cash either by turning assets into cash at short notice or by having access to credit, including from central banks.

2.1.4. Balance Sheet Liquidity

It refers broadly to the cash-like assets on the balance sheet of a firm. For non-financial firms, balance sheet liquidity is often measured by the short-term liquid assets on their balance sheet. For banks, which must manage their liquidity very closely, balance sheet liquidity is reflected in a detailed breakdown, by maturity, of their assets and liabilities – especially those coming due in the short term. In the event of a run on banks or faced with asset liability mismatch, balance sheet liquidity provides an assurance of easy conversion of banking assets into cash to help maintain depositors' confidence.

2.1.5.Inventory Management Model

Baumol's (1952) inventory management model and Miller and Orr's (1966) model which recognized the dynamics of cash flows are some of the earlier research efforts attempted to develop models for optimal liquidity and cash balances, given the organization's cash flows the focus was on using quantitative models that weighed the benefits and costs of holding cash (liquidity). These earlier models help financial managers understand the problem of cash management, but they rest on assumptions that do not hold in practice. The model postulates that firms identify their optimal level of cash holdings by weighting the marginal costs and marginal benefits of holding cash. The benefits related to cash holdings are: reducing the likelihood of financial distress, allows the pursuance of investment policy when financial constraints are met, and minimizes the costs of raising external funds or liquidating existing assets. The main cost of holding cash is the opportunity cost of the capital invested in liquid assets. Firms will therefore trade-off holding cash and investing it depending on its investment needs.

2.1.5.1. Demand for Money Model

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.

2.1.5.2.Keynes -Liquidity Preference Theory

The economics and finance literature analyze possible reasons for firms to hold liquid assets. Keynes (1936) identified three motives on why people demand and prefer liquidity. The transaction motive, here firms hold cash in order to satisfy the cash inflow and cash outflow needs that they have. Cash is held to carry out transactions and demand for liquidity is for transactional motive. The demand for cash is affected by the size of the income, time gaps between the receipts of the income, and the spending patterns of the cash available. The precautionary motive of holding cash serves as an emergency fund for a firm. If expected cash inflows are not received as expected cash held on a precautionary basis could be used to satisfy short-term obligations that the cash inflow may have been bench marked for. Speculative reason for holding cash is creating the ability for a firm to take advantage of special opportunities that if acted upon quickly will favour the firm.

2.1.5.3. Theory of Corporate Liquidity

Almeida et al. (2002) proposed a theory of corporate liquidity demand that is based on the assumption that choices regarding liquidity will depend on firms' access to capital markets and the importance of future investments to the firms. The model predicts that financially constrained firms will save a positive fraction of incremental cash flows, while unconstrained firms will not. Empirical evidence confirms that firms classified as financially constrained save a positive fraction of their cash flows, while firms classified as unconstrained do not. The cost incurred in a cash shortage is higher for firms with a larger investment opportunity set due to the expected losses that result from giving up valuable investment opportunities. Therefore, it is expected a positive relation between investment opportunity and cash

holdings. The theory further predicts that firms with better investment opportunities have greater financial distress costs because the positive Net Present Value (NPV) of these investments disappears (almost entirely) in case of bankruptcy. In this case, firms with better investment opportunities will keep higher levels of cash to avoid financial distress. To the extent that liquid assets other than cash can be liquidated in the event of a cash shortage, they can be seen as substitutes for cash holdings. Consequently, firms with more liquid asset substitutes are expected to hold less cash.

2.1.6.   Theory of Bank Liquidity Requirements

Charles C. Florian H. and Marie H(2012) theory of Bank Liquidity Requirements states that, not only does cash mitigate the liquidity risks attendant to exogenous shocks, it also mitigates endogenous (banker chosen) default risk. In the model, costly state verification makes debt the optimal form of outside finance (Calomiris 1991). There is a conflict of interest between the banker/owner and the depositors with respect to risk management; the banker suffers a private cost from managing risk, and does not always gain enough as the owner to offset that cost (Tirole 2010).Greater cash holdings increase the marginal gain to the banker from managing risk, and thereby encourage greater risk management. Diamond and Dybvig (1983), physical costs of liquidation make liquidity risk (the possible need to finance early consumption) costly, which could motivate the holding of inventories of liquid assets. In Calomiris and Kahn (1991), depositors receive noisy and independent signals about the risky portfolio outcome of the bank. By holding reserves, banks insulate themselves against the liquidity risk of a small number of misinformed early withdrawals in states of the world where the outcome is actually good. Without those reserves, banks offering demandable debt contracts (which are optimal in the Calomiris-Kahn model) would unnecessarily subject themselves to physical liquidation costs when they fail to meet depositor's requests for early withdrawal.

2.1.7.Financial Intermediation Theory

According to the theory of financial intermediation, an important role of banks in the economy is to provide liquidity by funding long term, illiquid assets with short term, liquid liabilities (Wang, 2002). Through this function of liquidity providers, banks create liquidity as they hold illiquid assets and provide cash and demand deposits to the rest of the economy. Krueger (2002) emphasize the "preference for liquidity" under uncertainty of economic

agents to justify the existence of banks: banks exist because they provide better liquidity insurance than financial markets. However, as banks are liquidity insurers, they face transformation risk and are exposed to the risk of run on deposits. More generally, the higher is liquidity creation to the external public, the higher is the risk for banks to face losses from having to dispose of illiquid assets to meet the liquidity demands of customers (Horne and Wachowicz, 2000). A usual justification for the existence of deposit-taking institutions, thereby giving also an explanation for the economically important role of banks in providing liquidity, was initially modeled by (Bryant 1980 and Diamond and Dybvig 1983). They showed that by investing in illiquid loans and financing them with demandable deposits, banks can be described as pools of liquidity in order to provide households with insurance against peculiar consumption shocks (Weisel, Harm, and Brandley, 2003).

2.1.8.Liquidity measurement theory

Banks generally face liquidity risk which increases in times of crisis and then endanger the functioning of financial markets. Vento and Ganga (2009), defined three methods to measure liquidity risk: the stock approach, the cash flows based approach and the hybrid approach. The first approach looks at liquidity as a stock. This approach aims to determine the bank's ability to reimburse its short-terms debts obligations as a measurement of the liquid assets' amount that can be promptly liquidated by the bank or used to obtain secured loans. The idea behind this model is that each financial institution is exposed to unexpected cash outflows that may occur in the future due to unusual variations in the timing or extent therefore needs a quantity much higher than the cash amount required for banking projects. The second approach aims to safeguard the bank's ability to meet its payment obligations and calculating and limiting the liquidity maturity transformation risk, based on the measurement of liquidity-at-risk figures. The last approach combines elements of the stock approaches and of the cash flows based approaches.

2.2.   Empirical Studies

2.2.1.Empirical study in case of Developed Country

In this section empirical studies that have been made regarding on the determent of liquidity in commercial banks is analyzed.

Vodová(2010), the study aims to identify determinants of liquidity of Slovak commercial banks. The researchers consider bank specific and macroeconomic data over the period from 2001 to 2010 and analyze them with panel data regression analysis. Conclude that bank liquidity drops mainly as a result of the financial crisis. Bank liquid assets, or more precisely the share of liquid assets in total assets and in deposits and short term funding, decreases also with higher bank profitability, higher capital adequacy and bigger size of bank. Big banks rely more on the interbank market or on a liquidity assistance of the Lender of Last Resort. Liquidity measured by the share of loans in total assets and in deposits and short term borrowing increases with the growth of gross domestic product: borrowers reduce their debt during expansionary phases and increase the demand for loans in recessions. This fact is also the reason why banks tend to lend more (and thus decrease their liquidity) even in periods of higher unemployment and lower profitability. Also interest rates (on loans, on interbank transaction and monetary policy interest rates), interest rate margin, the share of non-performing loans and the rate of inflation have no statistically significant effect on the liquidity of Slovak commercial banks.

The study conducted by Rauch et al. 2009 attempted to measure the liquidity creation of all 457 state owned savings banks in Germany over the period 1997 to 2006 and it analyzed the influence of monetary policy on bank liquidity creation using bank balance sheet data and general macroeconomic data. To measure the monetary policy influence, the study developed a dynamic panel regression model with the expected factors of monetary policy interest rate, where tightening monetary policy expected to reduces bank liquidity, level of unemployment, which is connected with demand for loans having negative impact on liquidity, savings quota affect banks liquidity positively, level of liquidity in previous period has positive impact, size of the bank measured by total number of bank customers have negative impact, and bank profitability expected to reduce banks liquidity. The control variable for the general macroeconomic influence shows that there is a positive relationship between the general health of the economy and the bank liquidity creation. The healthier the economy is the more liquidity is created. It was also found that banks with a higher ratio of interest to provision income create more liquidity. Other bank-related variables, such as size or performance revealed no statistically significant influence on the creation of liquidity by the banks.

Bank-specific and macroeconomic determinants of liquidity of English banks were studied by(Aspachs et al. 2005). The researchers used unconsolidated balance sheet and profit and loss data, for a panel of 57 UK-resident banks, on a quarterly basis, over the period 1985 to 2003. They assumed that the liquidity ratio as a measure of the liquidity should be dependent on following factors: Probability of obtaining the support from LOLR(Lender of last resort), which should lower the incentive for holding liquid assets, interest margin as a measure of opportunity costs of holding liquid assets expected to have negative impact, bank profitability, which is according to finance theory negatively correlated with liquidity, loan growth, where higher loan growth signals increase in illiquid assets, size of the bank expected to have positive or negative impact, gross domestic product growth as an indicator of business cycle negatively correlated with bank liquidity, and short term interest rate, which should capture the monetary policy effect with expected negative impact on liquidity.

Entirely unique is the approach of (Fielding and Shortland 2005). The researchers estimated a time-series model of excess liquidity in the Egyptian banking sector. They considered these determinants of liquidity: level of economic output, discount rate, rate of depreciation of the black market exchange rate and violent political incidence expected to have positive impact on bank liquidity whereas, cash-to-deposit ratio and impact of economic reform expected to have negative impact on bank liquidity. The expected impact of reserve requirements was ambiguous. According to the result of the study while financial liberalization and financial stability are found to have reduced excess liquidity, these effects have been offset by an increase in the number of violent political incidents arising from conflict between radical Islamic groups and the Egyptian state.

Lucchetta (2007) made empirical analysis of the hypothesis that interest rates affect banksrisk taking and the decision to hold liquidity across European countries. The liquidity measured by different liquidity ratios should be influenced by: Behaviour of the bank on the interbank market the more liquid the bank is the more it lends in the interbank market, interbank rate as a measure of incentives of banks to hold liquidity, monetary policy interest rate as a measure of banks' ability to provide loans to customers, share of loans on total assets and share of loan loss provisions on net interest revenues, both as a measure of risk-taking behaviour of the bank, where liquid banks should reduce the risk-taking behaviour, and bank size measured by logarithm of total bank assets. The results of the study revealed that the risk-free interest rate negatively affects the liquidity retained by banks and the decision of a bank to be a lender in

the interbank market. Conversely, the inter-bank interest rate has a positive effect on such decisions. Typically, it is the smaller, risk-averse banks that lend in the inter-bank markets. Meanwhile, the risk-free interest rate is positively correlated with loans investment and bank risk-taking behaviour.

2.2.2. Related empirical studies in Ethiopia

The study conducted by Mekbib(2016) on the determinants of liquidity in commercial banks of Ethiopia: the case of selected private banks. The general objective of the study was to identify the determinants of banks liquidity in Ethiopian private commercial banks. The researcher collected data from a sample of six private commercial banks in Ethiopia over the period from 2000 to 2015. Bank's liquidity is measured in three ratios: liquid asset to deposit, liquid asset to total asset and loan to deposit ratios. The findings of the study revealed that, bank size and loan growth has negative and statistically significant impact on liquidity; while non-performing loans, profitability and inflation have positive and statistically significant impact on liquidity of Ethiopian private commercial banks. However, capital adequacy, interest rate margin, real GDP growth rate , interest rate on loans and short term interest rate have no statistically significant effect on the liquidly of Ethiopian private commercial banks.

Study conducted by Alemayehu(2016), Determinants of liquidity of Commercial Banks of Ethiopia.The researcher had categorized the independent factors into bank specific factors andmacroeconomic factors. The bank specific factors include Bank Size, Capital Adequacy, Profitability, Non-Performing Loans, and Loan Growth while the macroeconomic factors includeGross Domestic Product, General Inflation and National bank Bill. The findings of the studyshow that capital strength and profitability had statistically significant and positive relationshipwith banks' liquidity. On the other hand, loan growth and national bank bill had a negative andstatistically significant relationship with banks' liquidity. However, the relationship for inflation,non-performing loans, bank size and gross domestic product were found to be statisticallyinsignificant.

The study conducted by Tseganesh(2012) on the determinants of bank liquidity and their impact on the financial performance: empirical study on commercial banks in Ethiopia. It also attempts to examine the possible factors that on the determinants of bank's liquidity. Balanced fixed effect panel regression was used for the data of eight commercial banks in the

sample covered the period from 2000 to 2011. Eight factors affecting banks liquidity were selected and analyzed. The results of panel data regression analysis showed that capital adequacy, bank size, share of non-performing loans in the total volume of loans, interest rate margin, inflation rate and short term interest rate had positive and statistically significant impact on banks liquidity. Real GDP growth rate and loan growth had statistically insignificant impact on banks liquidity.

2.3 Summary of Literature and Knowledge gap

In line with the above theoretical as well as empirical reviews, liquidity is important to all business specially for banking industry since their function is creation of liquidity both on the asset and liability side of their balance sheet. It also revealed that banks liquidity can be affected by different factors such as bank specific, macroeconomic and regulatory factors. While this study will be focus on some of the bank specific and macroeconomic factors affecting liquidity.

As it was discussed in the literature review part, liquidity of banks can be affected by bank specific as well as macroeconomic factors. It was also discussed that some factors which have significant impact on liquidity of banks in one country may not have the same impact on another country. Thus it is important to identify the determinants of liquidity of Ethiopian commercial banks.

There are also number of studies made in Ethiopia by using different dependant and independent variables and studies are made on private commercial bank Mekbib(2016) and other study was made by including private and government banks. Since the banking industry is in the growth stage with opening of new banks and the absence of active secondary stock exchange in the country, it is important to notify the important determinants of banks liquidity and its impact on financial performance by making empirical investigation to already established banks. Therefore, the study investigated some of bank specific and macroeconomic factors affecting banks liquidity by using current available data.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1. Research Methodology

In this chapter, the researcher would brief about the research methodology. The researcher adopts secondary data from different resources. Quantitative methods approach would be used to meet the objective of the study and to answer research questions and to test hypotheses under it. The panel data ordinary least square/OLS regression model would used for the sample of eight commercial banks having twelve years experience (i.e. from 2005 to 2016). Structured document survey used to collect the necessary data from audited financial statements of each commercial bank in the sample for bank specific factors and annual reports of National Bank of Ethiopia/NBE and Ministry of Finance and Economic Development/MoFED for macro factors. And the data were analyzed by using Eviews8 soft ware package.

3.2. Method of Data Collection

The research used secondary source of data to determine banks liquidity. Since the study used quantitative research approach, banks annual audited financial reports were collected from sample banks and different directives were collected form National bank of Ethiopia. Other published and unpublished documents were also used to construct the literature part of this thesis.

3.3. Population of the Study

The study populations are all commercial banks in Ethiopia. There are seventeen commercial banks in Ethiopia that are one government owned and sixteen privately owned banks which are; Commercial bank of Ethiopia(CBE), Dashen Bank S.C (DB), Awash International Bank S.C (AIB), Wegagen Bank S.C (WB), United Bank S.C (UB), Nib International Bank S.C (NIB), Bank of Abyssinia S.C (BOA), Lion International Bank S.C (LIB), Cooperative Bank of Oromia S.C (CBO), Berehan International Bank S.C (BIB), Buna International Bank S.C (BUIB), Oromia International Bank S.C (OIB), Zemen Bank S.C (ZB), Addis International

Bank S.C (AIB), Abay Bank S.C (AB), Enat Bank S.C (EB) and Debub Global Bank S.C (DGB).

3.4.   Sample and Sampling Techniques

The total population of the banks is seventeen but for the study purpose the researcher used sample of eight banks. These banks were selected because the operation times of the others are less than ten years. The study covered a period of 12 years from 2005-2016and included all commercial banks, with 10 and above establishment year. This sample Banks are selected based on their establishment year and their service year. The sample banks are Commercial bank of Ethiopia (CBE), Dashen Bank S.C (DB), Awash International Bank S.C (AIB), Wegagen Bank S.C (WB), United Bank S.C (UB), Nib International Bank S.C (NIB), Bank of Abyssinia S.C (BOA) and Corporative bank of Oromia(CBO). Therefore, the matrix for the frame will be 12*8 that includes 96 observations.

3.5. Model specification and variable definition

To investigate the determinates of Banks specific and macroeconomic factors of Commercial Banks liquidity, the general multivariate /regression model is adapted from Vodova(2011) :

LIQit=   + $_1$**NPL**it+ $_2$**CAP**it+ $_3$**BSZ**it+ $_4$**LG**it+ $_5$**RR**it+ $_6$**GDP**it+ $_7$**INF**it+ **μ**it

= constant term

LIQ i,t: is liquidity ratio of ith bank on year t

NPLi,t: is the non-performing loan of ith bank on the year t.

CAPi,t: is capital adequacy of ith bank on the year t.

BSIZE i,t: is the size of ith bank on the year t.

LG i,t: is the loan growth of ith bank on the year t.

GDP t: is the real domestic product/GDP growth of Ethiopia on the year t.

INFt: is the overall inflation rate in Ethiopia on the year t.

μi t: is a random error term

Variable Definition

According to (Bessis, 2009) Liquidity risk can be measured by two main methods: liquidity gap and liquidity ratios. The liquidity gap is the difference between assets and liabilities at both present and future dates. At any date, a positive gap between assets and liabilities is equivalent to a deficit.

Dependent variable

Liquidity ratios are various balance sheet ratios which should identify main liquidity trends. These ratios reflect the fact that bank should be sure that appropriate, low-cost funding is available in a short time. This might involve holding a portfolio of assets than can be easily sold (cash reserves, minimum required reserves or government securities), holding significant volumes of stable liabilities (especially deposits from retail depositors) or maintaining credit lines with other financial institutions. For the purpose of this research the researcher used the ration of liquid asset to total asset.

$$L1 = \text{Liquid assets/Total Asset}$$

According to (Vodová 2010) The liquidity ratio L1 should give us information about the general liquidity shock absorption capacity of a bank. As a general rule, the higher the share of liquid assets in total assets, the higher the capacity to absorb liquidity shock, given that market liquidity is the same for all banks in the sample. Additionally liquidity ratio L1 measures the liquidity of a bank assuming that the bank cannot borrow from other banks in case of liquidity need. Nevertheless, high value of this ratio may be also interpreted as inefficiency, since liquid assets yield lower income liquidity bears high opportunity costs for the bank. Thus it is necessary to optimize the relation between liquidity and profitability.

As per NBE's last replaced liquidity requirement directives No. SBB/57/2014, "liquid assets" includes cash, deposits with the National Bank and other local and foreign banks having acceptance by the National Bank, other assets readily convertible into cash expressed and payable in Birr or foreign currency having acceptance by the National Bank, deposits held in Organization for Economic Cooperation and Development (OECD) member countries' currencies and payable by banks of OECD member countries and in such other currencies as may be approved by the National Bank as well as securities issued by OECD member countries denominated in currencies of such countries and such other assets as the National

Bank may from time to time declare to be liquid assets. For the purpose of this research, the liquid assets include cash on hand (local and foreign), deposits with the National Bank Ethiopia and other local and foreign banks having acceptance by the National Bank and treasury bills.

Independent variable

Non-performing loans

Non-performing loans are loans that a bank customer fails to meet his contractual obligations on either principal or interest payments exceeding 90 days. This measures the quality of banks asset. Unlike other firms, banks' assets are composed of large amount of loans. Non-performing loans (NPLs) are the main contributor to liquidity risk, which exposes banks to insufficient funds for operations. Liquidity risk is the outcome of credit risk, which is the inability of borrowers to meet their repayment obligation. According to Dolan and Collender (2001), credit risk is measured by the percentage of non-performing loans to total loans.

H1: The share of non-performing loans in the total volume of loans & advances has negative and significant effect on bank's liquidity

Capital adequacy

Even though the reason why banks hold capital is motivated by their risk transformation role, recent theories suggest that bank capital may also affect banks' ability to create liquidity. These theories produce opposing predictions on the link between capital and liquidity creation. The "financial fragility-crowding out" theories predicts that higher capital reduces liquidity creation. Diamond and Rajan (2000, 2001) focus on financial fragility. On the other hand, "risk absorption" hypothesis, which is directly linked to the risk transformation role of banks, higher capital enhances banks' ability to create liquidity.

H2: Capital adequacy has positive and significant effect on bank's liquidity

Bank size

There is consensus in academic literature that economies of scale and synergies arise up to a certain level of size. Beyond that level, financial organizations become too complex to manage and diseconomies of scale arise. There are two opposing arguments both

theoretically as well as empirically regarding to the relationship between bank liquidity and size. The first view is too big to fail which considers negative relationship between size and liquidity whereas; the traditional transformation view suggests positive relationship (Iannotta et al. 2007). This study will uses the logarithm of total asset as a proxy to measure the bank size similar to Athanasoglou et al. (2008) and Sastrosuwito& Suzuki (2011).

H3: Bank size has positive and significant effect on bank's liquidity

Loan growth

The loan portfolio is typically the largest asset and the predominate source of revenue. Lending is the principal business activity for most commercial banks and loan is one of the greatest sources of risk to a banks safety and soundness. Since loans are illiquid assets, increase in the amount of loans means increase in illiquid assets in the asset portfolio of a bank. The proxy for loan growth was annual growth rate of gross loans and advances to customers.

H4: Loan growth has negative and significant effect on bank's liquidity

Actual Reserve ratio

Required reserves are the amount of funds that banks are required to keep on deposit in accounts designated for such purpose by the central bank. Required reserves constitute a monetary policy instrument which a central bank uses to varying degrees depending on the conditions of the financial system. The degree of monetary policy tightening using this instrument is determined by the required reserve ratio, which may be uniform or differentiated, and by the reserving base to which the ratio is applied. To this effect, reserve requirement may be applied to either total or fraction of deposits, or receivable liabilities may include other categories, such as liabilities in respect of loans and proceeds derived from securities issued. By changing the reserve ratio, the central bank induces a reduction or expansion of commercial banks' lending potential, and withdrawal and/or creation of liquidity. In market economies, required reserve ratio is used as an instrument for regulating bank credit potential rather than bank liquidity.

H5: Actual reserve ratio has positive and significant effect on liquidity.

Macroeconomic variables

Real GDP growth

GDP is a countries financial health indicator. In reference to Painceira (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. Aspachset 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 favourable. Thus, to best knowledge, banks forgo liquidity inducing lending during economic growth. Even Valla et al (2006) reported a negative relationship between liquidity and GDP real growth.

H6: Real GDP growth rate has negative and significant effect on bank's liquidity.

Inflation rate

An increase in the rate of inflation drives down the real rate of return not just on money, but on assets in general. The implied reduction in real returns exacerbates credit market frictions. Since these market frictions lead to the rationing of credit, credit rationing becomes more severe as inflation rises. As a result, the financial sector makes fewer loans, resource allocation is less efficient, and intermediary activity diminishes with adverse implications for capital/long term investment. In turn, the amount of liquid or short term assets held by economic agents including banks will rise with the rise in inflation.

H7: Inflation rate has negative and significant effect on bank's liquidity

Description of the variables and their expected relationship

Variables	Symbol	Operational Definition	Source	Expected sign
Dependant				
Liquidity (L1)	L1	The ratio of liquid asset to total asset	Annual report	NA
Independent				
Non-performing Loans	NPL	Share of non-performing loans on total volume of loans	Annual report	-
Capital Adequacy	CAP	Share of equity on total asset	Annual report	+
Size of the bank	BSize	Natural logarithms of total asset	Annual report	+
Loan Growth	LG	Annual change in total loans	Annual report	-
Actual Reserve ratio	ARR	Actual Reserve Ratio		+
Gross domestic product	GDP	Annual real Growth rate of gross domestic product	NBE Publication	-
Inflation	INF	Annual general consumer price index	CSA reports	-

3.6.Data Analysis

The nature of data used in this research enabled to use panel data model which was considered to have advantages over cross sectional and time series data. Panel data involves the pooling of observations on the cross-sectional over several time periods. The issue that may arise from the use of panel data is whether the individual effect is considered to be fixed or random. The choice between both approaches was done by running a Hausman test.

Data collected from different sources was analyzed using Eviews 8 software package. The multiple linear regressions model was run using OLS through EViews 8 econometric software package, to test the effect of investment on the performance on banks. But before running the regression analysis, diagnostic tests was performed to ensure whether the assumptions of the Classical Linear Regression Model (CLRM) are not violated.

This assumption was test before analyzing the regression result. The first assumption is errors have zero mean. According to Brooks (2008), if a constant term is included in the regression equation, this assumption will never be violated.

The second assumption is hetroskedasity. The assumption of homoscedasticity is that the variance of the errors is constant or equal. If the variance of the errors is not constant, this would be known as hetroskedasity (Guajarati, 2004). In order to test homoscedasticity the white test will be used.

The third assumption is the autocorrelation assumption that the covariance between the error terms over time is zero; it assumed that the errors are uncorrelated with one another. If the errors are not uncorrelated with one another, it would be stated that they are serially correlated. Usually, Durbin-Watson (DW) value in the main regression table is considered and used to test the presence of autocorrelation.

According to Brooks (2008) the fourth assumption is Normality of the error distribution assumed the errors of prediction (differences between the obtained and predicted dependent variable scores) are normally distributed. Violation of this assumption can be detected by constructing a histogram of residuals (Brooks, 2008).

Finally the fifth assumption is multicollinearity assumption which refers to the situation in which the independent variables are highly correlated. When independent variables are

multicollinear, there is overlap or sharing of predictive power. This may lead to the paradoxical effect, whereby the regression model fit the data well, but none of the explanatory variables (individually) has a significant impact in predicting the dependent variable (Gujarati, 2004).

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

This chapter of the research paper presents the data analysis and present the outcome of the results. To reach to the possible determinate of liquidity, the research used the annual balanced panel data, where all the variables are observed for each cross-section and each time period. The study has a time series segment spanning from the period 2005 up to 2016 and a cross section segment which considered eight Ethiopian commercial Banks that are: CBE, AIB, DB, WB, BOA, UB, NIB and CBO. Accordingly, the result of descriptive statistics, correlation analysis, the test of CLRM assumption and result of the regression analysis are presented in the following sub-sections.

4.1.Descriptive Statistics of the Data

The descriptive statistics for the dependent and independent variables for eight commercial banks of Ethiopia from year 2005 to 2016 with a total of 96 observations are presented below.

Table 4.1.Descriptive Statistics

Variables	Mean	Std.Dev.	Median	Maximum	Minimum	Observation
L1	35.26	16.25	33.50	94	13	96
ARR	2.91	0.68	2.94	4.17	1.79	96
BS	3.80	0.79	3.90	5.39	2.11	96
CAP	13.38	9.76	12.00	87	4	96
GDP	5.68	0.15	5.69	5.91	5.43	96
INF	16.20	14.75	10.58	55.2	2.70	96
LG	3.48	0.79	3.55	5.59	0.48	96
NPL	1.60	0.97	1.95	3.31	0.48	96

Source: - annual report of sample bank computed using EViews 8

For the total sample, the mean of dependent variable L1 was 35% with a maximum of 94% and a minimum of 13%. Regarding the standard deviation, it means the value of L1 deviate from its mean to both sides by 16.25 percent which indicate there was low variation from the mean.

The mean value of the independent variable ARR was 2.91 and maximum and the minimum value of 4.17 and 1.79 respectively. The standard deviation of the ARR was 0.68. The average value for BS as measured by natural log of total asset was 2.91 with standard deviation of 0.79, maximum of 5.39 and the minimum of 2.11.The average value for CAP was 13.38 with standard deviation of 9.76, maximum of 87 and minimum of 4.

The average value for the other independent variables LG and NPL was 3.48 and 1.60 with standard deviation of 0.79 and 0.97, maximum of 5.59 and 3.31 and minimum of 0.48 and 0.48 respectively. On the other hand, the Macroeconomic variables GDP and INF had an average value of 5.68 and 16.20 with maximum value of 5.91 and 55.20 and minimum value of 5.43 and 2.70.

4.2.Testing Assumption of CLRM

Before going further in to panel data econometric measurement, the first issue is to test the assumption of classical linear regression model (CLRM).

Five assumptions were made relating to the classical linear regression model (CLRM). These were required to show that estimation technique, ordinary least squares (OLS), had a number of desirable properties, and also hypothesis tests regarding the coefficient estimates could validly be conducted Brooks (2008).

Test1: The Error have Zero Mean $E(u_t) = 0$

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

Test2: Heteroskedasticity(u_t) = $2 <$

It has been assumed that the variance of the errors is constant, 2 this is known as the assumption of homoscedasticity. If the errors do not have a constant variance, they are said to be heteroscedastic Brooks (2008). To test this assumption the white test was used having the null hypothesis of heteroskedasticity. The result for this test shows:-

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	1.323043	Prob. F(7,67)	0.2533
Obs*R-squared	9.108125	Prob. Chi-Square(7)	0.2450
Scaled explained SS	102.5071	Prob. Chi-Square(7)	0.1010

Source: - annual report of sample bank computed using EViews 8

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

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

This assumption stated that the covariance between the error terms over time (or cross sectionals, for that type of data) is zero. In other words, it is assumed that the errors are uncorrelated with one another. If the errors are not uncorrelated with one another, it would be stated that they are 'auto correlated' or that they are 'serially correlated' Brooks (2008). Brooks (2008) noted that the test for the existence of autocorrelation is made using the Durbin-Watson (DW) test and Breusch-Godfrey test.

The lagged value of a variable is used in this research in order to adjust the autocorrelation. Legged the value is simply the value that the variable took during a previous period Brooks(2008). So from the regression result DW is 1.91 which is closed to two.

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

A normal distribution is not skewed and is defined to have a coefficient of kurtosis 3. JarqueBera formalizes this by testing the residuals for normality and testing whether the coefficient of skeweness and kurtosis are 0 and 3 respectively. Normality assumption of the regression model can be tested with the Jarque- Bera measure. If the JarqueBera value is greater than 0.05, it's an indicator for the presence of normality (Brook, 2008).

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

Series: Standardized Residuals
Sample 2006 2016
Observations 88
Mean   -2.02e-16
Median   0.077488
Maximum   12.60412
Minimum   -9.067834
Std. Dev.   4.455005
Skewness   0.052689
Kurtosis   3.059382
Jarque-Bera   0.053647
Probability   0.973533
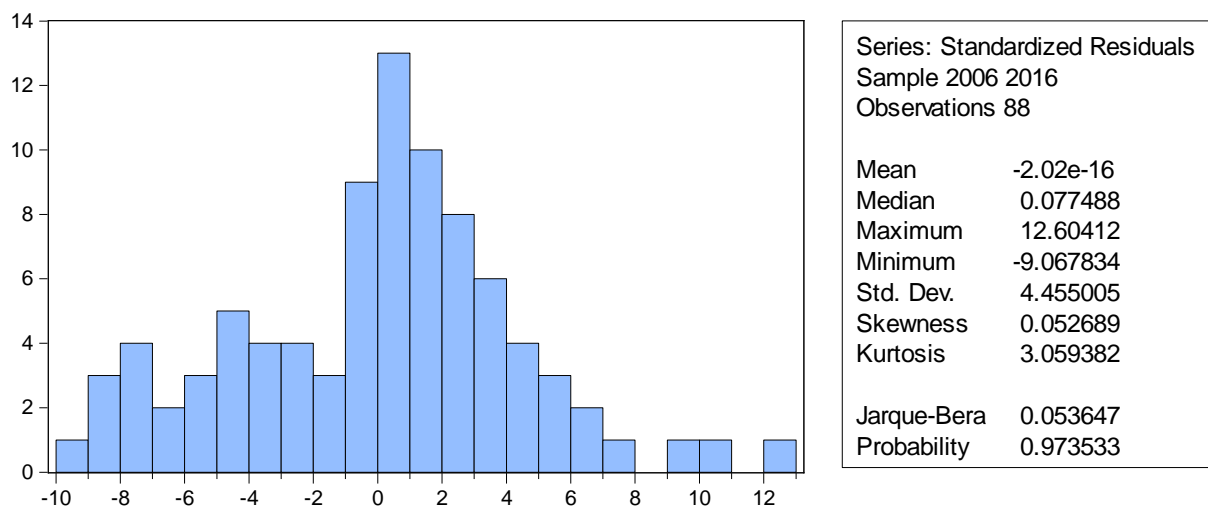
Source: - annual report of sample bank computed using EViews 8

The diagram witnesses that normality assumption holds the coefficient of kurtosis was close to 3, skewness was zero and the Jarque-Bera statistic has a value of 0.053647which is greater than 0.05. These imply that the data were consistent with a normal distribution assumption. Based on the statistical result, the study failed to reject the null hypothesis of normality.

Test5:   Multicollinearity Test

This assumption is concerned with the relationship between explanatory variables. If an independent variable is an exact linear combination of the other independent variables, then we say the model suffers from perfect Collinearity, and it cannot be estimated by OLS (Brooks, 2008). Multicollinearity condition exists where there is high, but not perfect,

correlation between two or more explanatory variables (Cameron &Trivedi, 2009; Wooldridge, 2006). Malhotra(2007) stated that Multicollinearity problem exists when the correlation coefficient among variables is greater than 0.75. Kennedy (2008) also suggests that any correlation coefficient above 0.7 could cause a serious Multicollinearity problem leading to inefficient estimation and less reliable results. This indicates that there is no a single agreed upon measure of Multicollinearity. In this research paper the researcher had 7 explanatory variables. The table below shows the correlation result for all the independent variables in this research.

	ARR	BS	CAP	GDP	INF	LG	NPL
ARR	1						
BS	0.666085	1					
CAP	-0.1501	-0.08348	1				
GDP	0.182051	0.250707	-0.16509	1			
INF	0.086163	0.000335	-0.01615	-0.18149	1		
LG	0.640249	0.646287	-0.24222	-0.01475	0.051394	1	
NPL	0.35342	0.129375	-0.31127	-0.43372	0.229825	0.298321	1

Source: - annual report of sample bank computed using EViews 8

This study show that there no correlation coefficient that exceeds 0.70. Consequently, in this study there is no problem of multicollinearity which enhanced the reliability for regression analysis.

4.3. Analysis and Interpretation of Regression Result

Dependent Variable: L1

Method: Panel Least Squares

Date: 05/19/17   Time: 09:5

Sample (adjusted): 2006 2016

Periods included: 11

Cross-sections included: 8

Total panel (balanced) observations: 88

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	203.8922	33.39015	6.106357	0.0000
ARR	33.18123	3.253357	10.19907	0.0000
BS	-14.70889	5.423276	-2.712178	0.0085
CAP	-0.138688	0.206539	-0.671487	0.5042
GDP	-33.55261	5.948153	-5.640845	0.0000
INF	-0.048592	0.038888	-1.249541	0.2158
LG	-8.571254	4.101552	-2.089759	0.0404
NPL	0.138114	0.945337	0.146100	0.8843
L1(-1)	0.305790	0.063156	4.841859	0.0000
D1	14.17991	6.774533	2.093121	0.0401
D2	-0.348390	5.389116	-0.064647	0.9486
D3	-14.90684	9.944497	-1.499004	0.1386
D4	27.88412	5.514742	5.056287	0.0000
D5	20.80379	5.568457	3.736006	0.0004

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.887653	Mean dependent var	32.90909
Adjusted R-squared	0.854116	S.D. dependent var	13.29129
S.E. of regression	5.076570	Akaike info criterion	6.291777
Sum squared resid	1726.695	Schwarz criterion	6.882960
Log likelihood	-255.8382	Hannan-Quinn criter.	6.529950
F-statistic	26.46828	Durbin-Watson stat	1.913196
Prob(F-statistic)	0.000000		

Thus, based on the result in above Table, the following model was developed to found the determinates of bank's liquidity.

LIQit= + $_1$**NPL**it+ $_2$**CAP**it+ $_3$**BSZ**it+ $_4$**LG**it+ $_5$**RR**it+ $_6$**GDP**it+ $_7$**INF**it+ **μ**it

On the above regression outputs the beta coefficient may be negative or positive; beta indicates that each variable's level of influence on the dependent variable. P-value indicates at what percentage or precession level of each variable is significant. The R-squared value measures how well the regression model explains the actual variations in the dependent variable (Brooks, 2008). R-squared statistics and the adjusted-R squared statistics of the model was 89% and 85% respectively. The adjusted *R* squared value 85% indicates the total variation of liquidity determinate was explained by the variables in the model. Thus these variables collectively, are good explanatory variables to know the determinate of bank liquidity. The regression F-statistic (26.46) and the p-value of zero attached to the test statistic reveal that the null hypothesis that all of the coefficients are jointly zero should be rejected. Thus, it implies that the independent variables in the model were able to explain variations in the dependent variable.

The coefficient for ARR is -33.18123 on L1 indicates that the banks had positive relationship with L1 and also the relationship is significant at 1% level of significant. The coefficient for LG is -8.5712 on L1 indicate that the loan growth of the banks had a negative relationship with L1 and the relationship is significant at 5% level of significant. The coefficient for CAP is -0.1386 on L1 indicate that the capital adequacy of the banks had a negative relationship with L1 but insignificant effect at 5% level of significant. The coefficient for NPL is 0.1381 on L1 indicate that the non performing loan had a positive relationship with L1 but

insignificant effect at 5% level of significant. The coefficient for GDP is -33.5526 on L1 indicate that GDP had a negative relationship with L1 and significant effect at 1% level of significant. The coefficient for INF is -0.0485 on L1 indicate that the inflation of the banks had a negative relationship with L1 and significant effect at 5% level of significant. The coefficient for BS is -14.7108 on L1 indicate that the bank size had a negative relationship with L1 and significant effect at 1% level of significant.

4.4.Determinants of banks liquidity-discussion

Capital adequacy and liquidity

According to the regression resultCapital adequacy has negative relationship with coefficientestimate of -0.1387 and the p value of 0.5042 reveals that it is statistically insignificant at 10% level of significanceon liquidity as of L1.According to regression result claim in the first hypothesis that there is significant relationship between Capital adequacy and liquidity of commercial banks was not supported.

This result is inconsistence with other prior studies that capital adequacy has a positve and significant effect on liquidity when measured by liquid asset to total asset,Alemayehu (2016) andVodova (2013).

According to this argument the higher capital to total assets ratio of banks the higher the capacity of the bank to absorb risks and create higher level of liquidity to the external public through deposits and loans. Higher capital ratio of banks create positive signal to the external public and attract more deposits. In turn this enable banks to hold more liquid assets that create better potential to liquidity creation to the external public. However, the coefficient value of the variable (i.e. -0.138688) indicate a percentage rise/decline in capital to total asset ratio of banks result in less proportionate. Generally, we reject the first research hypothesis (i.e. there is positive and significant relationship between capital adequacy and bank liquidity).

Bank size and liquidity

Bank size had negative and statistically significant effect with 1% significant level. It is found that bank size is significant at 1% interval with p-value 0.0085. From running the data, it is detected that bank size has a coefficient value of -14.7088.

Prior study made in other country consists with this finding that is bank size had a negative and significant effect on liquidity Vodova(2013).

From this research, when bank size increases by 1 percentage point, Ethiopian commercial bank's liquidity ratio decreases by 14.70 units, by holding other variables constant. As indicated earlier, a lower ratio means higher liquidity. Generally, the results in both cases revel that bigger banks have high amount of liquid assets.

Loan growth and liquidity

The coefficient signs of loan growth in L1 show negative impact on banks liquidity position and the result is significant at 5% level of significant.The result of the study supports working hypothesis that isthere is negative and significant effect on banks' loan growth and liquidity of commercial banks.

Accordingly the study the result is consistent with other prior study made in our country Alemayehu (2016) suggested that there's a negative and significant effect in loan growth and banks liquidity.

The negative impact of loan growth on banks liquidity was in line with the hypothesis which is based on the argument of taking loans as illiquid assets of banks. According to this argument when the amount of loans provided by banks increase, the amount of illiquid assets in the total assets portfolio of banks increase and lead to the reduction in the level of liquid assets held by banks. This finding reveals that larger amount of loans was provided from periodic deposits with affecting the amount of liquid assets held by the commercial banks in Ethiopia.

Non-performing loans and liquidity

According to the regression table NPLhas positive related with liquidity with a coefficient estimate of 0.13811and the p value of 0.8843 reveals that it is statistically insignificant effect at 10% level of significance. According to regression result claim in the first hypothesis that there is significant relationship between NPL and liquidity of commercial banks was not supported.

Accordingly the study the result is consistent with other prior study made in our country Alemayehu (2016) suggested that there's a negative and significant effect in loan growth and banks liquidity.

Actual reserve ratio

From the regression result ARR had a positive relationship with L1with a coefficient estimate of 33.18 and the p value of FA is 0.0000 reveals that it is statistically significant at 1% level of significance.

The result of the study supports working hypothesis that is there is positive and significant relation with L1. This implies that reserve plays a significant role on banks liquidity.

Real GDP growth rate and liquidity

Real GDP growth rate had statistically significant impact in 1% significant level on liquidity of commercial banks measured by L1 Ethiopian commercial banks. The coefficient sign for real GDP growth rate was negative and in line with the hypothesis. This negative sign indicates inverse relationship between real GDP growth and liquidity position measured by liquid asset to total asset. Thus, it implies that for one percent change in the real GDP growth rate, keeping other thing constant had resulted -33.55 unit adjustments on the levels of liquid asset to total asset (L1) in the portfolio in different direction.

This result is inconsistence with other prior studies that GDP has a negative and significant effect on liquidity when measured by liquid asset to total asset,Alemayehu (2016) and Vodova (2013).

Inflation Rate

Inflation had negative impact on banks liquidity measured by L1which was in line with hypothesis that, Inflation rate had insignificant impact on banks liquidity. The value of the coefficient in case of L1 (i.e. -0.048592) indicates for a percentage rise/decline in the general inflation rate of the country, commercial banks holding of liquid assets rise/decline by 4.8%.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

The preceding chapter presented the results and discussion, while this chapter deals with conclusions and recommendations based on the findings of the study. Accordingly this chapter is organized into two subsections.

5.1. Conclusion

Banks should remain liquid at all times to prevent falling in to liquidity crisis and cause distress in the overall economy. Thus, this study attempts to identify the determinants of liquidity of commercial banks in Ethiopia. This research also provides summary of previous studies on similar topics. Seven variables affecting banks liquidity were chosen and analyzed. The panel data was used for the sample of eight commercial banks in Ethiopia from 2005 to 2016 year and estimate using Fixed Effect Model (FEM). Data was presented by using descriptive statistics. The balanced correlation and regression analysis for liquidity ratios was conducted. Fixed Effect Model (EFM) was used based on convenience. Seven factors affecting banks liquidity were chosen and analyzed. From the list of possible explanatory variables proved to be statistically significant. The results of models enable us to make following conclusions.

- ➢ The result shows that Actual reserve ratio had a positive and significant impact with 1% level of significant on the liquidity. This implies that when banks reserve ratio determines banks liquidity.
- ➢ Bank size had a significant effect with 1% level of significant on the liquidity of commercial banks with a negative relationship. This implies that bank size has an inverse relationship with L1.
- ➢ The relation between the growth rate of GDP and bank liquidity found that negative and statistically significant effect with 1% level of significant on the liquidity of Ethiopians commercial banks.
- ➢ The study found that share of nonperforming loans has positive and statistically insignificant effect on liquidity measured by L1.
- ➢ Capital adequacy has a negative and insignificant effect on the L1 measured by liquid asset to total asset.

> Inflation had a negative and insignificant effect on the L1 measured by liquid asset to total asset.

5.2.Recommendations

This study was intended to identify the determinants of liquidity of Ethiopian private commercial banks; and hence on the basis of the findings of the study, the following recommendations were drown.

> External factors have influence on liquidity of Ethiopian banks so all commercial banks in Ethiopia that they cannot ignore the macroeconomic indicators when strategizing to improve on their position of liquidity. Thus, banks in Ethiopia should not only be concerned about internal structures and polices/procedures, but they must consider both the internal environment together in developing their strategies to efficiently manage their liquidity position.

> Ethiopian private commercial banks should have liquidity management policy to ensure that they are operating to satisfy their profitability target as well as the ability of meeting the financial demands of their customers by maintaining optimum level of liquidity.

> The banks must have extended their out reached of people by openings up more and more branches every year throughout the country, and have significantly improved their banking services by introducing new products and services like Agent Banking to serve unreached ones for collecting more fund from the public and promote people to make deposit by different mechanism like: giving incentive for deposit made with certain time and use good advertisement mechanism to show the importance of saving money.

> The negative relationship between bank size and liquidity revealed the "too big to fail" hypothesis, in which big banks may encourage to disburse more loans and advances. Thus, big banks needs to manage their liquidity position and shall give due attention on resource mobilization and liquidity management.

> Due to limited studies done in Ethiopia, more researchers are encouraged to conduct research on liquidity issues faced by banks in Ethiopia. This would actually benefit the policy makers to set up a better new policy. Researchers have examined the relationship between dependent variable (bank liquidity) and independent variables (ARR, bank size, gross domestic product, loan growth). Therefore, future research is

recommended to use more challenging independent variables (for example, short term government implications and others) to explain the dependent variable of bank liquidity ratio.

➢ In general, the findings of the study reveals that, bank specific variables have more statistically significant impact on the determination of liquidity of Ethiopian private commercial banks, since they are internal variables that can be controlled by management, special emphasis shall be given to those significant variables.

➢ Recommendation for further study: As this study identifies only limited bank specific and macroeconomic variables for a sample of eight private commercial banks in Ethiopia, there have to be further researches which include more bank specific variables, macroeconomic variables and regulatory factors that affect the liquidity of Ethiopian commercial banks.

Therefore, further investigation which includes the above variables might have a better role in identifying other factors contributing to liquidity of Ethiopian banks.

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APPENDIXES

Appendix 1- List of Commercial Bank in Ethiopia

No	Name of Banks	Year of establishment
1	Commercial bank of Ethiopia S.C (CBE)	1963
2	Awash International Bank S.C (AIB)	1994
3	Dashen Bank S.C (DB)	1995
4	Bank of Abyssinia S.C (BoA)	1996
5	Wegagen Bank S.C (WB)	1997
6	United Bank S.C(UB)	1998
7	Nib International Bank S.C(NIB)	1999
8	Cooperative Banks of Oromia S.C(CBO)	2005
9	Lion International Bank S.C(LIB)	2006
10	Oromia International Bank S.C(OIB)	2008
11	Zemen Bank S.C(ZB)	2009
12	Bunna International Bank S.C(BIB)	2009
13	Berhan International Bank S.C (BBI)	2010
14	Abay Bank S.C. (AB)	2010
15	Addis international Bank SC. (AdIB)	2011
16	Debub Global Bank S.C. (DGB)	2012
17	Enat Bank S.C. (EB)	2013

Appendix 2- Descriptive Analysis

	L1	ARR	BS	CAP	GDP	INF	LG	NPL
Mean	35.26	2.91	3.80	13.38	5.68	16.20	3.48	1.60
Median	33.50	2.94	3.90	12.00	5.69	10.58	3.55	1.95
Maximum	119.00	4.17	5.39	87.00	5.91	55.20	5.59	3.31
Minimum	13.00	0.00	0.00	0.00	5.43	2.70	0.00	0.00
Std. Dev.	16.25	0.68	0.79	9.76	0.15	14.75	0.79	0.97
Skewness	1.87	-1.43	-2.27	5.27	-0.07	1.69	-2.02	-0.59
Kurtosis	9.98	8.40	12.70	37.92	1.78	4.66	11.16	2.29
Jarque-Bera	250.5688	149.5453	459.1237	5321.109	6.062322	56.96691	332.0722	7.551404
Probability	0	0	0	0	0.04826	0	0	0.022921
Sum	3385	279.809	364.94	1284	545.2	1555.6	334.22	153.19
Sum Sq. Dev.	25088.49	43.8226	58.7812	9046.5	2.205533	20679.7	59.8902	89.15235
Observations	96	96	96	96	96	96	96	96

Appendix 3-Correlation Analysis

	L1	ARR	BS	CAP	GDP	INF	LG	NPL
L1	1	0.087655	0.038117	0.334187	-0.35926	0.119123	-0.084943	0.243345
ARR	0.087655	1	0.666085	-0.1501	0.182051	0.086163	0.640249	0.35342
BS	0.038117	0.666085	1	-0.08348	0.250707	0.000335	0.646287	0.129375
CAP	0.334187	-0.1501	-0.08348	1	-0.16509	-0.01615	-0.242223	-0.31127
GDP	-0.35926	0.182051	0.250707	-0.16509	1	-0.18149	-0.014745	-0.43372
INF	0.119123	0.086163	0.000335	-0.01615	-0.18149	1	0.051394	0.229825
LG	-0.08494	0.640249	0.646287	-0.24222	-0.01475	0.051394	1	0.298321
NPL	0.243345	0.35342	0.129375	-0.31127	-0.43372	0.229825	0.298321	1

Appendix 4-Test of Heteroskedasticity

Heteroskedasticity Test: Breusch-Pagan-Godfrey				
F-statistic	1.323043	Prob. F(7,67)		0.2533
Obs*R-squared	9.108125	Prob. Chi-Square(7)		0.2450
Scaled explained SS	102.5071	Prob. Chi-Square(7)		0.1010
Test Equation:				

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Dependent Variable: RESID^2				
Method: Least Squares				
Date: 05/13/17 Time: 03:54				
Sample: 1 93				
Included observations: 75				
C	-9370.04	5082.412	-1.84362	0.0697
ARR	-752.512	428.8902	-1.75456	0.0839
BS	928.541	638.5627	1.454111	0.1506
CAP	-28.3411	32.45652	-0.8732	0.3857
GDP	1785.507	1063.46	1.67896	0.0978
INF	-0.4083	6.363614	-0.06416	0.949
LG	-409.991	398.0621	-1.02997	0.3067
NPL	-26.5601	42.56935	-0.62393	0.5348
R-squared	0.121442	Mean dependent var		162.1608

		S.D. dependent var		854.2605
Adjusted R-squared	0.029652			
S.E. of regression	841.4999	Akaike info criterion		16.40879
Sum squared resid	47444184	Schwarz criterion		16.65599
Log likelihood	-607.33	Hannan-Quinn criter.		16.50749
F-statistic	1.323043	Durbin-Watson stat		1.318139
Prob(F-statistic)	0.253275			

Appendix 5-The Regression Result

Dependent Variable: L1				
Method: Panel Least Squares				
Date: 05/19/17 Time: 08:40				
Sample (adjusted): 2006 2016				
Periods included: 11				
Cross-sections included: 8				
Total panel (balanced)				

Variable	Coefficient	Std. Error	t-Statistic	Prob.
observations: 88				
C	203.8922	33.3902	6.1064	0.0000
ARR	33.1812	3.2534	10.1991	0.0000
BS	-14.7089	5.4233	-2.7122	0.0085
CAP	-0.1387	0.2065	-0.6715	0.5042
GDP	-33.5526	5.9482	-5.6408	0.0000
INF	-0.0486	0.0389	-1.2495	0.2158
LG	-8.5713	4.1016	-2.0898	0.0404
NPL	0.1381	0.9453	0.1461	0.8843
L1(-1)	0.3058	0.0632	4.8419	0.0000
D1	14.1799	6.7745	2.0931	0.0401
D2	-0.3484	5.3891	-0.0646	0.9486
D3	-14.9068	9.9445	-1.4990	0.1386
D4	27.8841	5.5147	5.0563	0.0000
D5	20.8038	5.5685	3.7360	0.0004
	Effects Specification			
Cross-section fixed				

(dummy variables)				
R-squared	0.887653	Mean dependent var		32.90909
Adjusted R-squared	0.854116	S.D. dependent var		13.29129
S.E. of regression	5.07657	Akaike info criterion		6.291777
Sum squared resid	1726.695	Schwarz criterion		6.88296
Log likelihood	-255.8382	Hannan-Quinn criter.		6.52995
F-statistic	26.46828	Durbin-Watson stat		1.913196
Prob(F-statistic)	0.000000			