ADDIS ABABA UNIVERSITY

COLLEGE OF BUSINESS AND ECONOMICS

DEPARTMENT OF ACCOUNTING AND FINANCE

THE IMPACT OF EXCHANGE RATE ON THE PROFITABILITY OF COMMERCIAL BANKS IN ETHIOPIA

A Thesis submitted to Department of Accounting and Finance, College of Business and Economics, Addis Ababa University in partial fulfillment of the Requirements for the Degree of Masters of Science in Accounting and

BY: TADESSE GETACHEW

STATEMENT OF DECLARATION

I, TadesseGetachew, declare that this thesis entitled “The Impact of Exchange rate on the profitability of banks in Ethiopia” submitted in partial fulfillment of the degree of Masters of Science in Accounting and Finance is an outcome of my own effort and study and that all sources of materials used for the study have been duly acknowledged. I have produced it independently except for the guidance and suggestion of the thesis advisor.

To the best of my knowledge, this study has not been submitted for any degree in this University or any other University.

By: TadesseGetachew

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This is to certify that the thesis prepared by TadesseGetachew, entitled: “The impact of exchange rate on the profitability of Commercial banks in Ethiopia” submitted in partial fulfillment of the requirements for the award of Master of Science in Accounting and Financecomplies with the regulations of the university and meets the accepted standards with respect tooriginality and quality.

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ABSTRACT

As a financial intermediary, commercial banks are more exposed to the effect of exchange rate. Exchange rate can affect bank performance both directly and indirectly. The direct effect is easy to identify and can be easily managed. However, the indirect effect of exchange rate on the profitability of commercial banks is very subtle. Basically, it emanates from the impact of exchange rate on the business of bank clients and the economy in general. Therefore, knowing the aggregate impact of exchange rate on the profitability of banks is very crucial to device an appropriate coping strategy. This study, is therefore seek to examine the composite impact of exchange rate on the profitability (ROE) of commercial banks in Ethiopia using a balanced panel data set of banks over the period of 2000-2014. Furthermore, this study tried to determine how exchange rate affects the growth of bank loan with the intension to identify whether one of the indirect effect of exchange rate on bank profitability is through its effects on loan growth. The empirical findings of this study suggest that exchange rate has statistically significant negative impact on the profitability of commercial banks in Ethiopia. The result of the model estimated to examine the impact of exchange rate on loan growth of commercial banks in Ethiopia showed that exchange rate has statistically significant positive impact on the loan growth of banks in Ethiopia. Moreover, from the independent variables included as control variables in the regression analysis, loan growth rate and GDP growth are found to have statistically significant positive impact on bank profitability in Ethiopia, while loan loss expense ratio (Loan loss expense to total loan) is found to have statistically significant negative impact on bank profitability in Ethiopia. Similarly, from control variable included in the loan growth model, number of bank branches, lending interest rate and deposit to loan ratio are found to have statistically significant negative impact on the bank loan growth in Ethiopia. The study recommends that the bank managers and governing body shall focus on the composite effect of exchange rate variation on the bank profitability and make sure to avail appropriate strategy to reduce its adverse effect on the profitability of their bank.

Key Words: Bank, Exchange rate, profitability, Ethiopia.

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LIST OF ACRONYMS

CLRM: Classical linear regression model

ECM: Error correction model

EMP: Exchange market pressure

ETB: Ethiopia birr

FDI: Foreign direct investment

GDP: Growth domestic Production

IMF: International monetary fund

NBE: National bank of Ethiopia

OLS: Ordinary least square

ROA: Return on asset

ROE: Return on equity

ROEA: Return on equity adjusted

ROAA: Return on asset adjusted

USD: United States dollar

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CHAPTER ONE

1 INTRODUCTION

1.1 Background of the study

Commercial banks play a critical role in economic development of countries. They channel funds from depositors to investors through their financial intermediation role. Beyond the intermediation function, the financial performance of banks has critical implications for economic growth of countries. Good financial performance rewards the shareholders for their investment. This, in turn, encourages additional investment and brings about economic growth. In order to provide a sustainable intermediation services in the economy and reasonable reward for the shareholders, banks need to be profitable. They can do so, if they generate necessary income to cover their operational cost. On the other hand, poor banking performance can lead to banking failure and crisis which have negative repercussions on the economic growth(Ongore and Kusa, 2013).

According to different studies (Rao and Lakew, 2012);Kanwal and Nadeem (2013); Pan and Pan (2014); Ongore and Kusa (2013);Kiganda (2014))and banking literature, the profitability of bank can be influenced by different factors. The performance of commercial banks can be affected by internal and external factors which can be classified into bank specific (internal) and macroeconomic variables (Ongore and Kusa, 2013). The internal factors are the individual bank characteristics that affect the profitability of banks and these factors are basically influenced by the decision of management and board. The external factors are a sector wide or country wide factors, which are beyond the control of the company. Generally, the bank specific factors may relate to a bank's overall managerial practices on different operational aspects of the bank while the external factors are related to the industry and macroeconomic variables; within which the bank operates.

Exchange rate is one of the macroeconomic variables that could influence banks profitability;itmay affect individual banks directly and/or indirectly. It directly affects the banks through the structure of assets and liabilities denominated in foreign currency, off-balance sheet exposure, and non-asset based services (Martin and Mauer, 2003).When

assets and liabilities are invoiced in foreign currency, exchange rate variations directly affect the values of the assets and the liabilities in terms of domestic currency, through recognition of gain or loss. If the amount of foreign currency assets and liabilities are the same, there is no direct effect of the exchange rate variation on the bank's balance sheet and income statement. The direct effect occurs when the banks do not hold the same amount of foreign currency assets and foreign currency liabilities. The indirect effects of the exchange rate on the banks performance can be channeled through its effect on the demand for loans, the extent of competition, and other aspects of banking conditions (Chamberlain etal., 1997).Exchange rate variation might affect the price of domestic products, import, export, and FDI etc. This in turn might influence banks portfolio and operation in different ways.Some studies (Rao and Lakew (2012), Kanwal and Nadeem (2013), Pan and Pan (2014), Ongore and Kusa (2013), kiganda (2014)) have examined the effect of these internal and external factors on the banks profitability. However, very few of these studies have assessed the impact of exchange rate (one of the macroeconomic factors) on banks profitability. For example, Kiganda (2014) on his study of the effects of macroeconomic factors on commercial banks profitability in Kenya found that exchange rate has negative insignificant effect on the banks profitability as expressed by ROA.

1.1.1 Overview of the Ethiopian exchange rate regime

In Ethiopia, the exchange rate policy has passed different regimes. Before 1992 the country was exercised a fixed exchange rate regime, when the rate is solely determined by the government. Since 1992 the country implemented an exchange rate policy which is more close to managedfloating, where there is a government intervention whenever necessary to stabilize the foreign exchange market (Nega, 2015).

Nega (2015) cited the work of Lencho (2013) indicated that, following the massive devaluation of 1992, which took place in an attempt to liberalize foreign exchange market; the National Bank has taken a number of initiatives. Accordingly, the fortnightly auction market for foreign exchange was introduced on May 1, 1993with two rates, namely the Dutch auction system (official rate) and marginal pricing auction system (marginal rate).

This change was adopted as part of a larger macro-economic adjustment program, with a view to achieving a market-determined exchange rate, improved allocation of foreign exchange and shifting transactions from the illegal to the official market (Aron 1998). The auction system was replaced by the daily inter-bank foreign exchange market in 2001. As the result, demand and supply factors were given more latitude in the determination of the exchange rate. However, the national bank of Ethiopia would manage the exchange rate pressure basically though reserve requirement. Thus, Ethiopia pursues a managed floating exchange rate regime.

Monitory policy has significant role in the foreign exchange rate management. The responsibility of formulation and implementation of monetary policy in Ethiopia is vested in the National Bank of Ethiopia (NBE). The principal objective of the monetary policy of the National Bank of Ethiopia is to maintain price & exchange rate stability and support sustainable economic growth of the country. Maintaining exchange rate stability is considered as the principal policy objective of NBE so as to be competitive in the international trade and to use exchange rate intervention as policy tools for monetary policy to affect both foreign reserve position and domestic money supply.

1.1.2 The trend of Ethiopian currency exchange rate

Nega (2015) cited the work of Derrese (2001) indicated that the official exchange rate ofEthiopian currency with US dollar was created (with theofficial exchange rate of 2.48 Birr per US dollar) on July 23, 1945. This rate was remained unchanged till 1964, when birr was devaluated to 2.50 per USD.After that, ETB was revalued to 2.30 per USD in 1971. Finally, Birr had been pegged to theUS Dollar at a constant exchange rate, $1= 2.07 Birr till the significant devaluation was taken by the transitional government of Ethiopia in 1992, when it was devaluated by 58.6%(i.e from 2.07 to 5 birr per USD. As was discussed above, the devaluation of 1992 was accompanied by the change of exchange rate regime from fixed to amanaged floating exchange rate regime.

Following the change of exchange rate regime to a managed floating, the Ethiopian currency has experienced a depreciating trend. During the past decade, Ethiopian birr has

been significantly depreciated against major foreign currencies (USD and Euro). For example, the exchange rate of ETB to USD has depreciated from 8.3:1 in 1999/2000 to 19.87:1 in 2013/2014(NBE, 2014).

Abebe (2006) on his study that estimated an index of exchange market pressure (EMP) for Ethiopia over the period of November 2001 to December, 2005 revealed that in majority of the cases (in 42 months out of the 49 months considered) the Ethiopian foreign exchange market was characterized by depreciation pressure.This depreciating trend of the home currency may affect the economic performance of different sectors and as a result, the performance of commercial banks might also be indirectly affected.

Generally, the variation in exchange rate could result from demand and supply pressure and/or policy decision of the country. Once occurred, variation in exchange rate may affect a number of macroeconomic factors and industries, particularly the banking industry.

As already discussed above, exchange rate variations affect bank performance. In addition to its direct impact on the value of the foreign assets and liabilities held by banks, the change in exchange rate couldalso indirectly affect the profitability of commercial banks.Because of this direct and indirect effect of exchange rate on the banks profitability, it is not possible to easily determine the direction and magnitude of the overall impact of the exchange rate variation on the profitability of banks.

The fast growth of the import and export business volume of the country[1] in which commercial banks play an intermediary role may also increase the exchange rate risk exposure of the Ethiopian commercial banks. This is partly due to the fact that banks may hold large foreign currency reserve to meet the demand of importers.

Hodrick (1990) (cited in Taiwo and Adesola(2013)) shows that the effect of the volatility of foreign exchange on stock market might result from the fact that companies in developing countries are import dependent and this means a negative implication for the economy in general and the stock market in particular. Erratic changes in the exchange

[1] According to NBE annual report for the period of 2013/14, import and export of goods and services has grown from USD 984 million and USD 1,959.8 million in 1990/2000 to USD 6,437.6 million and USD 16,345.3 million in 2013/14 respectively.

rate not only undermine the goal of price stability but also reduce real output, trade, capital flows and investment (IMF, 1984) cited in Abebe, (2006)

Despite a concerted effort the researcher wasn't find any empirical study on the impact of exchange rate on the profitability of Ethiopian commercial banks. Previous studies on Ethiopian banks have emphasized other aspects of bank performance. For instance, Rao and Lakew (2012) studied determinates of profitability of commercial banks, Kapur and Gualu (2012) studied the relationship between ownership structure and profitability of commercial banks in Ethiopia.

Hence, this warrants conducting an empirical study on the impact of exchange rate variation on the profitability of the Ethiopian commercial banks. On the other hand, having an understanding on how the exchange rate could impact the bank's profitability is paramount both to bank managers and policy makers.

1.2 Statement of the problem

Currently, the Ethiopian exchange rate is characterized by a managed floating regime. Under this regime, exchange rate is determined by demand and supply force. However, central bankcan intervene through setting floor rate and reserve requirement as deemed necessary. Since the introduction of a managed floating exchange rate regime, the Ethiopian currency has been continuously depreciating against major hard currencies.

As a financial intermediary, the variation in exchange rate could affect the performance of commercial banks in different ways, which is basically classified as a direct and indirect effect.The direct effect of exchange rate on bank profitability can be easily determined by measuring the change in the value of foreign currency denominated asset and liability.When home currency is depreciated, banks recognize accounting gain on their foreign currency denominated asset and loss on foreign currency denominated liability. For example, Ethiopian banks have enjoyed a huge gain on their foreign currency reserve in the month of September 2010,consequent to the government decision to substantially devaluate the home currency. One of the private banks, Dashen Bank S.C. alone obtained

Birr 402,950,212 as Windfall Gain[2] resulted from this devaluation. Similarly, banks recognize losses and gain on asset and liability denominated by foreign currency as home currency appreciates in value.

Unlike the direct effect,the indirect effect of exchange rate variation on the banks profitability, which basically emanate from the influenceof exchange variation on the businesses in general and import and export trade in particular is very subtle and cannot be easily determined. However, it is crucial to know how exchange rate variation aggregately affect the profitability of commercial banks and focusing on the direct effect of exchange rate variation alone may lead banks to wrong operational and strategic decisions. .

As already noted, Ethiopian birr has been continuously depreciating against major hard currencies and how this depreciating trend aggregately affects the Ethiopian commercial banks performance (profitability) is not clearly known.

Despite a concerted effort, the researcher was not find an empirical study conducted on the effect of exchange rate on the profitability of Ethiopian commercial banks. Study by Rao and Lakew (2012) carried out to explore the key determinates of profitability of the commercial banks operating in Ethiopia failed to include exchange rate as a factor determines bank profitability.

Hence, this study is conducted to empirically investigatethe composite effect of exchange rate variation on the profitability of commercial banks in Ethiopian and will contribute to bridge the knowledge gap with this regard.

The researcher believes that the empirical findings of this study will potentially help bank managers toclearly understand how the exchange rate variation aggregately affect banks profitability and devise appropriate policies, procedures and mechanisms to reduce the exchange rate risk exposure of their banks.

1.2 Research objectives

Exchange rate is one of the macro economic variables that affect the performance of banks. It also affects different aspects of the economy ranging from commodity price to

[2] Taken from the 2010-11 annual report of Dashen Bank, page 30

the flow of foreign direct investment. This in turn may affect the profitability of banks in one way or the other. Therefore, the main objective of this study is to empirically investigate the overall effect of exchange rate on the profitability of commercial banks of Ethiopia.

The specific objectives of this study are to:

i. Evaluate how the variation of ETB to USD exchange rateaffects the profitability of Ethiopian commercial banks.
ii. Examine whether the impact of exchange rate on bank profitability emanates from its effect on the bank loan growth

1.4 Research Hypothesis

Based on the overarching objective of the study (i.e. assessing the impact of exchange rate on the profitability commercial banks in Ethiopian) and specific objectives mentioned above, the following hypothesis are developed to be tested.

1.4.1 Hypothesis for the impact of exchange rate on bank profitability

As already mentioned, this paper aims to determine the effect of exchange rate on the profitability of banks in Ethiopia. Accordingly, a research hypothesis is developed in line to the primary objective of the study as indicated by H1 below.

H1. Exchange rate does not affect bank profitability in Ethiopia

Though the main objective of this study, as already mentioned is to determine the impact of exchange rate on the profitability of banks in Ethiopia, the effect of other variables which are identified in literature as determinants of bank profitability is also analyzed by including in the estimated regression model as control variables. The variables included in the models are loan loss expense ratio, loan growth rate, total deposit, GDP growth and total asset. In literature, these variables are usually classified as internal and external factors. Accordingly, from the variables listed above, GDP growth is external factor while the remaining are bank specific or internal factors.

Loan loss expense ratio is incorporated in to the regression analysis as independent variable as a proxy for credit risk. Miller and Noulas (1997) and Thakor (1987) identified that accumulation of unpaid loans would decrease the profitability of bank. Hence, the coefficient of loan loss expense ratio is expected to be negative.

The annual loan portfolio growth and total deposit is expected to have positive significant relation with the profitability of banks in Ethiopia. In the literature, mixed relationships are found between bank size (total asset) and bank profitability. For example, Micco et al. (2007) found no correlation between the relative bank size and bank profitability, i.e., positive but not statistically significant. On the other hand, Rao and Lakew (2012), Sufian and Habibullah (2009) and Kosmidou (2008) had found a positive relation between bank size (total asset) and bank profitability. Conversely, the study finding by Sufian and Chong (2008) indicated a negative significant relation between bank profitability and bank size.

Different studies (Kanwal&Nadeem (2013), Pan and Pan (2014) and Dietrich and Wanzenried (2011)) have found a positive relation between GDP growth and bank profitability. Accordingly, positive significant relation is expected between GDP growth and the profitability of banks in Ethiopia.

Therefore, in addition to the primary hypothesis indicated above, this study tried to test the following hypothesesbased on the theoriesdeveloped in relation to bank profitability.

H2: There is a negative significant relation between loan loss expense ratio and bank profitability.

H3: There is significant positive relation between loan growth and bank profitability

H4: There is significant positive relation between deposit and bank profitability

H5: There is significant positive/negative relation between bank size (total asset) and bank profitability.

H6: There is significant positive relation between GDP and bank profitability.

1.4.2 Hypothesis for the impact of exchange rate on bank Loan Growth

Based on the second objective (identifying impact of exchange rate on bank loan growth) the following hypothesis are formulated.

H1: There is no relation between exchange rate variation and bank loan growth.

The second primary objective of this study is to identify how exchange rate affects bank loan growth which is one of the factor for bank profitability. For this purpose a separate regression model is identified and other variables, which identified in literature as determinates of bank loan growth are included in the model as control variables. These variables are number of branches, lending interest rate, deposit to loan ratio, bank size (total asset) and GDP growth.

Therefore, the following additional hypothesis are formulated based on the assessment of literatures on the determinants of bank loan growth.

H2: There is positive significant relation between number of bank branches and loan growth.

H3: There is significant positive relation between deposit to loan ratio and bank loan growth.

H4: There is negative significant relation between lending interest rate and bank loan growth.

H5: There is positive significant relation between bank size (total asset) and bank loan growth.

H6: There is positive significant relation between GDP and bank loan growths.

1.5Significance of the study

Banks can easily identify the direct effect of exchange rate variation on their profitability through accounting adjustment (recognizing gain or loss) on foreign currency denominated asset and liability. However, it is not easy to determine the direction and magnitude of its indirect effect on bank's performance resulted bychanges in macroeconomic factors that caused by exchange rate variation.

Therefore, this study, being providing an empirical finding on the composite impact of exchange rate variation on the Ethiopian commercial banks profitability; could provide a vital insight to bankers on how the exchange rate variation indirectly affects banks profitability beyond and above its direct impact. The study result can be a potential input for the bank managers to devise strategy that can help to maximize gain or minimize losses that emanate from exchange rate variation.

The study result may also be a useful input for bank regulators and supervisors to induce commercial banks to have proactive exchange rate risk management strategy that encompasses both the direct & indirect impact of exchange rate variation on banks profitability.

Lastly, this study will contribute its share to the scantly available literature on the Ethiopian banking sector.

1.6Scope of the study

Though, the target population is all commercial banks operating in the country, this study is focused on commercial banks that have been in operation for at least fifteen years. Fifteen years period is considered with the intention to includethe effect of currency devaluations taken by the government at different time. Accordingly, seven banks are selected for the study. From the total seven banks selected for the study, six of them are private commercial banks and one is government bank.

1.7 Structure of the thesis

The research report is presented in five chapters.Chapter one presents the background of the study, statement of the problem, objectives of the study,significance of the study, scope and structure of the study.

Chapter twosummarizes the result of in depth literature review relevant to the study.It focuses on the theoretical aspect and empirical findings on the determinants of bank

profitability in general and the impact of exchange rate variation on the profitability of commercial banks in particular.

Chapter three discuss the type and design of the study, provide information about the study participants, sources of data, data collection tools, the procedure of data collection and data analysis technique employed to arrive on the research findings.

Chapter four present the finding of the study, analysis and interpretation of the findings. It also briefly state whether the result of this study conforms or negate with the literature review results.

Chapter Five deals with the brief summary of the findings of the research, conclusions drawn from the analysis and recommendation thereof.

CHAPTER TWO

2 REVIEW OF RELATED LITERATURE

2.1 Theoretical review of exchange rate issues

Exchange Rate refers to the price paid in one currency to acquire the one unit of foreign currency or the foreign currency received to sell one unit of home currency.There are many factors that determine the currency exchange rate, which are basically the macro economic factors. A currency can depreciate or appreciate against other currency largely due the changes in these economic factors. The exchange rate of countries can be determined either by the country's monetary authority and/or supply and demand depending on the exchange rate regime the country peruses (Jeffrey 2008).

2.1.1 Exchange rate regime

Exchange rate regime is the way a country manages its currency in respect to foreign currencies and the foreign exchange market. It is closely related to monetary policy and the two are generally dependent on many of the same factors.As noted in NBE policy framework (2009, P. 15), there are various types of exchange rate regimes that are being practiced by countries. The main types include floating, pegged floating and fixed exchange rate regime.

Floating Exchange Rate: They are the most common exchange rate regimes today. However, since central banks frequently intervene to avoid excessive appreciation/depreciation, these regimes are often called *managed float* or a *dirty float*.

Pegged Floating Exchange Rate: Here, the currency is pegged to some band or value, either fixed or periodically adjusted. Pegged floats are:

- *Crawling bands*: the rate is allowed to fluctuate in a band around a central value, which is adjusted periodically. This is done at a preannounced rate or in a controlled way following economic indicators.
- *Crawling pegs*: Here, the rate itself is fixed, and adjusted as above.

- *Pegged with horizontal bands*: The currency is allowed to fluctuate in a fixed band (bigger than 1%) around a central rate.

Fixed Exchange Rate: Fixed rates are those that have direct convertibility towards another currency. In case of a separate currency, also known as a currency board arrangement, the domestic currency is backed one to one by foreign reserves. A pegged currency with very small bands (< 1%) and countries that have adopted another country's currency and abandoned its own also fall under this category (NBE policy frame work, 2009).

In a free floating exchange rate regime, the total pressure in the foreign exchange market is reflected in observed changes in exchange rate. At the other extreme, in a fixed exchange rate regime, foreign exchange market conditions are completely captured by changes in reserves. But, in mixed exchange rate regimes such as in a managed floating, a part of the pressure is absorbed by a change in exchange rate and a part by changes in reserves. Under such circumstances, neither the reserve changes nor the exchange rate movements capture the extent or nature of the exchange market disequilibrium (Abebe, 2006).

The choice of exchange rate regime is determined by various factors, such as the objective pursued by the policy makers, the sources of shocks hitting the economy and the structural characteristics of the economy. But once the choice is made, the authorities are presumed to adjust their macroeconomic policies (especially fiscal and monetary policies) to fit the chosen exchange rate regime (Abebe, 2006).

Many central banks practice “managed floating,” whereby they intervene in the foreign exchange market by “leaning against the wind.” To do so, a central bank sells foreign exchange when the exchange rate is going up, thereby dampening its rise, and buys when it is going down. The motive is to reduce the variability in the exchange rate (Jeffrey 2008).

Countries pursue different exchange rate policies to ensure the proper functioning of the exchange rate regime they have implemented. An exchange rate policy implies a systematic effort on the part of the monetary authorities to influence the level or rate of

change of the exchange rate. A variety of policy instruments are potentially available to influence the exchange rate, including foreign exchange market intervention, domestic monetary policy, various forms of controls on international trade and capital flows, and official announcements of future policies(Glick and Hutchison, 1989).

2.1.2 Exchange rate and economy

The performance of the country's economy can affect the profitability of banks. The effect of exchange rate on the economy in general could therefore affect the bank performance. Different studies assessed the relation between exchange rate and economy. For example,

Charles (2006) showed that exchange rate is one of the most important economic adjustment instrument and one of the most difficult and controversial economic policy tools. The study argues that a depreciation of the exchange rate only offer protection to domestic industry when the domestic cost of production increases much less than the rate of depreciation, while prices of imported equivalent increases by the full amount of the depreciation.

Obadan (2006) put forward an argument that the exchange rate plays a role in connecting the price system in different countries thus enabling traders to compare price directly. Changes in exchange rate have a powerful effect on imports and exports of the countries through effects on relative prices of goods.

Agu (2002) as cited in Adesola&Taiwo (2013) shows that optimal exchange rate policies must be aimed at cooling real exchange rate (RER) that maintain internal and external balance in an economy. Internal balance here is defined in terms of the level of economic activities consistent with satisfactory control of inflation and full employment of resources. External balance on the other hand is defined in term of payment equilibrium, sustainable current account deficit finance in a lasting basis of expected capital flow. Any distribution in the real exchange rate will mostly probably lead to instability in both external and internal balance.Generally, exchange rate has critical influence on the import and export business, maintaining internal and external balance in an economy and viewed as an instrument for economic adjustment.

2.1.3Foreign Exchange Risk for commercial banks

Foreign Exchange risk arises when a bank holds assets or liabilities in foreign currencies and impacts the earnings and capital of bank due to the fluctuations in the exchange rates (Sabri 2011). Exchange rate can move in either upward or downward direction at any time. This uncertain movement poses a threat to the earnings and capital of commercial banks.

The direct foreign exchange risk can be either *Transactional* or it can be *Translational.* Transactional risk, as the name implies is because of transactions in foreign currencies and translational risks is an accounting risk arising because of the translation of the assets held in foreign currency. The indirect exchange rate risk is basically emanate from economic exposure which reflected through demand for bank loan and the bank loan performance.

According to Sabri2011, foreignexchange risk of a commercial bank comes from its very trade and non-trade services. Foreign Exchange Trading Activities (Saunders & Cornett, 2003 cited in Sabri 2011)include:

- The purchase and sale of foreign currencies to allow customers to partakein and complete international commercial trade transactions.
- The purchase and sale of foreign currencies to allow customers (or thefinancial institution itself) to take positions in foreign real and financial investments.
- The Purchase and sale of foreign currencies for hedging purposes to offsetcustomer (or financial institution itself) exposure in any given currency.
- To purchase and sale of foreign currencies for speculative purposes baseon forecasting or expecting future movements in Foreign Exchange rates.

The commercial bank is exposed to foreign exchange risk only up to the extent to which it has not hedged or covered its position. In some of the above mentioned trade activities (the first two activities), commercial banks play a role on behalf of customer and the

foreign exchange risk is transferred to the customer as the bank takes agency role.Third activity of bank involves hedging and there is no risk in this as well as the bank has hedged its risk by pre-determining the exchange rate with other financial institutions using different financial instruments. The fourth one involves the risk which may result in the gain or loss due to unexpected outcome.

2.1.4Exchange Rate Volatility

The Exchange rate volatility measures the degree to which the exchange rate fluctuates or varies overa period of time. Exchange rate is said to be more volatile if there are more frequent ups and downs or less volatile if there are lesser changes in it over a period of time. There is a real time fluctuation in floating exchange rate (Sabri, 2011).

2.1.4.1 Causes of exchange rate volatility

There is a variety of factors contributing to the fluctuation of an exchange rate. These include the openness of an economy, the domestic and foreign money supplies, the exchange rate regime, interest rates, central bank independence, and levels of output, income, inflation, and unpredictable circumstances. The degree of the impact of each of these factors varies and depends on a particular country's economic condition (Stancik, 2006). The study further explained how these factors contribute to exchange rate fluctuation as summarized below.

Inflation -Changes in market inflation cause changes in currency exchange rates. A country with a consistently lower inflation rate exhibits a rising currency value while a country with higher inflation typically sees depreciation in its currency and is usually accompanied by higher interest rates.

Interest rate-Changes in interest rate affect currency value and exchange rate. Increases in interest rates cause a country's currency to appreciate because higher interest rates provide higher rates to lenders, thereby attracting more foreign capital,which causes a rise in exchange rates.

Balance of payment-acountry with deficit in balance of payment due to spending more of its currency on importing products than it is earning through sale of exports causes depreciation. Balance of payments fluctuate exchange rate of its domestic currency.

Government debt- A country with government debt is less likely to acquire foreign capital, leading to inflation. Foreign investors will sell their bonds in the open market if the market predicts government debt within a certain country. As a result, a decrease in the value of its exchange rate will follow.

Political stability- A country's political state and economic performance can affect its currency strength. A country with less risk for political turmoil is more attractive to foreign investors, as a result, drawing investment away from other countries with more political and economic instability. Increase in foreign capital, in turn, leads to an appreciation in the value of its domestic currency. A country with sound financial and trade policy does not give any room for uncertainty in value of its currency. But, a country prone to political confusions may see depreciation in exchange rates.

Recession-When a country experiences a recession, its interest rates are likely to fall, decreasing its chances to acquire foreign capital. As a result, its currency weakens in comparison to that of other countries, therefore lowering the exchange rate.

Speculation -If a country's currency value is expected to rise, investors will demand more of that currency in order to make a profit in the near future. As a result, the value of the currency will rise due to the increase in demand. With this increase in currency value results a rise in the exchange rate as well.

Economists believe that macroeconomic fundamentals determine exchange rates in the long run. The value of a country’s currency is thought to react positively, for example, to such fundamentals as an increase in the growth rate of the economy, an increase in its trade balance, a fall in its inflation rate, or an increase in its real (i.e. inflation-adjustedinterest rate(Jeffrey, 2008).

2.1.5 Exchange rate and bank performance

According to Popper (1996) exchange rate fluctuations affect banks both directly and indirectly. The direct effect comes from banks' holdings of assets (or liabilities) with net payment streams denominated in a foreign currency. Foreign exchange rate fluctuations alter the domestic currency values of such assets. This explicit source of foreign exchange risk is the easiest to identify, and it is the most easily hedged.

He further explained that a bank without foreign assets or liabilities can also be indirectly exposed to currency risk because the exchange rate can affect the profitability of its domestic banking operations. For example, consider the value of a bank's loan to an exporter. An appreciation of the home currency might make it more difficult for the exporter to compete against foreign firms. If the appreciation thereby diminishes the exporter's profitability, it may also diminish the probability of timely loan repayment and, correspondingly, the profitability of the bank. As the exchange rate is linked to foreign competition, to the demand for loans, or to other aspects of banking conditions; it will affect even "domestic" banks.

Similarly, Mbutor (2010) mentioned that owing to information asymmetries, depreciation inexchange rate might cause lending to decline in twodifferent ways. First, if such depreciation worsensborrowers' balance sheets, then the default risk will beenlarged and banks would shy away from making loans.On the other hand, if banks are exposed to short termliabilities in foreign currencies, then such liabilities will beamplified to the tune of the extent of depreciation of thelocal currency and any other associated costs, thus, dampening their potential to create credit.

Likewise, using a bank's loan to an exporter as an example, Chamberlain et al. (1997) demonstrate that banks that perfectly hedge their accounting exposure could still be exposed to significant foreign exchange risk if exchange rate movements significantly affect cash flows, competitiveness, and credit risk of banks' customers (i.e. indirect or economic exposures). This indicates that the sources of foreign exchange risk of banks are far more than just their holdings of net foreign assets.

Wong et al (2008) indicated that the direct effect of individual banks exchange rate exposure can be discerned largely from their accounting data, while the indirect exposure, which arises from impacts of exchange rate fluctuations on the economy in general and banks' customers in particular, is more subtle.

Foreign exchange risk also may be linked to other types of market risk, such as interest rate risk. Interest rates and exchange rates often move simultaneously. So, a bank's interest rate position indirectly affects its overall foreign exchange exposure. The foreign exchange rate sensitivity of a bank with an open interest rate position typically will differ from that of a bank with no interest rate exposure, even if the two banks have the same actual holdings of assets denominated in foreign currencies. Therefore, the vulnerability of the bank as a whole to foreign exchange fluctuations depends on more than just its holdings of foreign exchange (Popper 1996).

Generally, Foreign exchange rate movements could be an important source of risk for banking institutions. In the worst case, large foreign exchange losses may lead to bank failures. In the literature, a large number of empirical works have been carried out to examine the foreign exchange exposure of banks. However, most of these studies mainly focused on banking markets which are well developed market, by comparison, studies focusing on less developed banking markets are relatively scant.

2.1.6Commercial banks Foreign Exchange Risk Management

Banks can manage their foreign currency risk in different ways. One of the techniques by which foreign exchange risk can be mitigated is hedging. It is way by using which a bank eliminates or minimizes its risk exposure. Hedging can be done using different ways:

- Foreign Currency Assets & Liabilities Matches: It is a hedging techniques by which commercial banks matches its assets and liabilities in foreign currencies to ensure a profitable spread by dealing in foreign currency.

- Hedging using Derivatives: A commercial bank uses foreign currency derivatives to hedge foreign exchange risk. There are different kinds of foreign currency derivatives, these are:
    a. Foreign Currency Futures
    b. Foreign Currency Swap
    c. Foreign Currency Options
    d. Foreign Currency Forward Contracts
- Hedging through Diversification of Foreign Asset-Liability Portfolio: It is a hedging technique by which commercial Banks try to mitigate the foreign currency risk on its individual currency by holding multicurrency Asset-Liability Positions. Holding assets and liabilities in various foreign currencies does not reduce the risk of the portfolio of assets and liabilities of a bank alone but also significantly lower the cost of capital. The main reason for this is the differential inflation and interest rates in different countries. Almost all commercial banks hold such type of multicurrency asset-liability portfolios (Sabri 20119).

2.2 Review of Empirical studies: Exchange rate variation on banksprofitability

According to different studies (Rao and Lakew (2012), Kanwal and Nadeem (2013), Pan and Pan (2014), Ongore and Kusa (2013), kiganda (2014)), the factors that affect the profitability of a bank could be broadly classified as bank specific or internal and external factors. The bank specific factors relate to a bank's overall managerial practices on capital structure, liquidity management, credit risk, loan portfolio management, expense management and diversification of a bank's line of products or activities. The external factors generally relate to the industry and macroeconomic variables within which the bank operates. The external factors include factors related to the level of competition in the industry to which the bank belongs (concentration), barriers related to entry to and exit from the industry, the pace of economic growth, the nature of the regulation and supervision of the banking industry, inflation, financial deepening, and monetary and physical policies, among others. The external factors can be further classified in to industry specific factors and macro-economic factors. Macroeconomic factors that affect

the bank performance include GDP, inflation rate, exchange rate etc (Rao and Lakew (2012).

Kanwal and Nadeem (2013) and Pan and Pan (2014)) indicated that the change in these macroeconomic factors affect the profitability of commercial banks in different extent and magnitude. For example, Kanwal and Nadeem (2013) in their study of the impact of Macroeconomic variables on the profitability of listed commercial banks in Pakistan, have found that; GDP has positive insignificant impact on the ROA of the bank, but insignificant negative impact on ROE while Inflation rate on the other hand, has a negative link with all profitability measures (ROA, ROE). Overall, the selected macroeconomic factors are found to have a negligible impact on earnings of commercial banks. However, the impact of exchange rate on the banks profitability was not assessed in this study.

In contrast, Pan and Pan (2014) in their study of the impact of macroeconomic factors on the profitability of China's commercial banks found that macroeconomic factors do have a substantial influence to the earning power of commercial banks. Economic growth, inflation, interest rates and money supply growth have positive correlations with bank profitability. Again this study didn't address the impact of exchange rate variation on the banks profitability. There are alsoother studies conducted on the impact of macroeconomic factors on the banks profitability. However, as indicated by the result of the two studies cited above, the findings on the impact of macroeconomic variables on banks profitability are not consistent. Most of these studies hadn't assessed the impact of exchange rate on the banks profitability as one of the Macroeconomic variables. However, there are other studies which tried to investigate the impact of exchange rate variation on the banks profitability; the empirical findings of these studies are summarized as follows.

Kiganda (2014) undertook a study to examine the effect of Macroeconomic Factors on Commercial Banks Profitability in Kenya with Equity Bank Limited in focus. He analyzed the effect of macroeconomic factors (real GDP, inflation and exchange rate) on the profitability of equity bank limited by taking data for the period of 2008 to 2012. The profitability of the bank (dependent variable) is represented by ROA. The results indicated that macroeconomic factors (real GDP, inflation and exchange rate) have insignificant

effect on bank profitability in Kenya at 5% level of significance. The study concludes that macroeconomic factors including exchange rate do not affect bank profitability in Kenya.

Dietrich and Wanzenried (2011) carried out a study to identify the factors that influence the profitability of commercial banks in Swaziland for the period 1999 to 2006 by taking data from 453 banks. They used ROAE and ROAA alternatively as dependent variables and considered eleven bank specific and five industry-specific and macroeconomic factors as explanatory variables in their analysis. The study found a positive and significant relationship between bank profitability (measured in terms of ROAA) and equity to total assets and GDP growth rate, whereas bank size and cost to income ratio were found to be negatively and significantly associated with bank profitability.

Taiwo and Adesola (2013) examined the effect of exchange rate on the performance of Nigerian banks for the period between 1970- 2005. They used two different dependent variables: ratio of loan loss to total advance and capital deposit ratio to represent the performance of the bank. The effect of exchange rate on these two proxies of bank performance was empirically tested with two different modes. The regression results for the model tested the relation of loan loss to total advance and exchange raterevealed that there exist a positive relationship between exchange rate and loan loss which may explain the tendency of bank to accumulate bad loans as a result of fluctuating exchange rate. *The* result of the second model indicated that capital deposit ratio does not have significant relationship with exchange rate.

Another study on Nigeria bank by Osuagwu (2014), found that exchange rate is significant as a determinant of bank profitability through return on equity and non-interest margin, but not significant to return on asset as a measure of profitability. The researcher mentioned thatthe insignificance of exchange rate to return on asset is perhaps attributed to thefact that a very large percentage of bank assets are fixed or off balance sheet items. The variability of the assetportfolio of banking firms is not largely responsive to the variations in exchange rate.

Choi, et al. (1992) had conducted study on 48 largest US commercial banks by using monthly data over the period of January 1975 to December 1987.They observed that bank stock returns respond negatively to interest rates and the impact of the exchange rate depends on the banks' net position in foreign currencies. Their results confirmed that a depreciation of foreign currencies negatively influenced bank stock returns.

Another studyby;He et al. (2014) examined the effect of foreign exchange rate fluctuation on the profitability of US based commercial banks. The study was conducted on 22 large US based banks for a period of 40 years. The study basically evaluated how the US bank earning (net income) respond to the changes in value of the foreign currencies relative to US dollar. The regression result indicated that the value of the dollar relative to a basket of global currencies considered in the study (i.e. European currencies and Asian currencies) is positively related to the returns generated by the largest U.S. based banks.
Merikas (1999) also finds that stock returns of Greek banking institutions are also impacted by exchange rate fluctuations.

Babazadeh&Farrokhnejad (2012) examined the effects of foreign exchange changes on Banks' operations and profits by applying Error Correction Model (ECM) on one of the commercial banks in Iran for the period of five years from 2006 to 2010.The results explain that exchange rate was significant determinant of profits.

Even though much effort was made, the researcher was not find an empirical study conducted on the impact of exchange rate on the profitability of Ethiopian commercial banks. One study by Rao and Lakew (2012) carried out to explore the key determinates of profitability of the commercial banks operating in Ethiopian using unbalanced panel data set of banks over the period of 1999/00-2008/09. They assessed the effect of internal factors (capital structure, liquidity, credit risk on loan portfolio, asset quality and expense management) and external factors (industry specific and macroeconomic factors) against the commercial banks ROAA. The result of the study indicates that the most determinants of bank profitability in Ethiopia are the internal factors, factors over which a bank's management has control and the external factors are found to be statistically insignificant. However, the effect of exchange rate variation was not addressed in this study.

From the studies reviewed, it is noted that the impact of exchange rate on the banks profitability is inconsistent. Some researchers(Kiganda (2014), Taiwo and Adesola (2013))found that exchange rate has insignificant effect while others(Osuagwu (2014), He et al (2014) and Babazadeh and Farrokhnejad (2012)) claimed that exchange rate has positive significant effect on the bank's profitability. Moreover, Choi et al (1992) claimed that the effect of exchange rate on banks profitability depends on the banks net position of foreign currency.

This study will therefore investigate the effects of exchange rate on the Ethiopian banks profitability and will provide empirical evidence that can contribute for bridging this inconsistency.

CHAPTER THREE

3 RESEARCH DSIGN AND METHODS

This chapter contains the research methodology to be employed in order to address the research objective. It gives a detailed schema on the procedures the researcher pursues to conduct this research.

It presents the research approach, source & type of data, sampling design and techniques, data collection method, method of data analysis and presentation, variable definition and model specification.

3.1 Research approach

As stated above, the objective of this study is to investigate the impact of exchange rate on the profitability of Ethiopian commercial banks. In order to achieve this objective, the study employed quantitative research methodology and panel data. Quantitative research is a means for testing objective theories by examining the relationship among variables (Creswell 2009).As noted by prominent scholars, a quantitative panel data give more informative data, more variability, less linearity among variables, more degrees of freedom and more efficiency. All this could minimize the bias that might result if individuals or firms are aggregated into broad aggregates.

3.2Research Methods

3.2.1 Source and type of Data

This research is done exclusively based on secondary data. The required secondary data is obtained from annual financial statements of sample commercial banks, NBE report, and NBE web resources. In order to enhance the accuracy of data to be used in the analysis, data pertinent to annual profit, loan portfolio, deposit, equity and operating expense and profit is collected from the audited financial statements of the sample commercial banks.

Data on the average annual exchange rate is gathered from NBE annual report and web site.

3.2.2Sampling Design and Techniques

The number of banks operating in Ethiopia are 18[3] as of June 2014, of which 16 banks are privately owned while the remaining two are Government banks (NBE Quarterly Bulletin Volume 30). The magnitude and diversification of income of the government banks is quite different from the private bank's income. The volume of their business and other privilege like financing sources which private banks have no access may help government banks to be in better position with regard to sensitivity to exchange rate variation. Because of this immense capacity, the impact of exchange rate on the profitability of government bank might not as visible as the private banks. Hence, from government banks, commercial bank of Ethiopia is excluded from the sample because of the reason explained above.

Therefore, the target population of this study is the 18 commercial banks operating in the country as of June 2014 including the government banks. From the 18 commercial banks, a sample of 7 banks are selected for this study using Judgmental sampling technique. Judgmental sampling, is the deliberate choice of a respondent/unit due to the qualities the individual/entity possesses (Tongco, 2007 cited in Addaeetal. 2014)).

The technique was applied to the study to select the sample in view of the fact that,the commercial banks to be included in the sample should be those which has been in operation for the past fifteen years

The list of all commercial banks (Population) with the year of their establishment is indicated in Appendix 1.

Accordingly, seven commercial banks are included in the sample; based on the stated purpose and selection criteria. The sample constitutes 39% of the total population of commercial banks operating in Ethiopia including government owned commercial banks. Thus the sample size determined can fairly represent the population and the researcher

[3] This excludes Development Bank of Ethiopia

believes generalizing the findings to the population based on this sample size is reasonable.

3.2.3. Data collection Method

Financial figures of the sample commercial banks for the study period (2000-2014) is collected from NBE report organized from audited financial statements of each sample commercial banks annual return. Exchange rate GDP data were obtained from NBE annual report available on the NBE's web site.

3.2.4. Method of Data analysis and presentation

3.2.4.1. Variable specification

Two regression models are specified to measure the impact of exchange rate variation on the profitability of commercial banks in Ethiopia. The first model is to determine the overall impact of exchange rate variation on the profitability of banks in Ethiopia while the second model is specified to determine how exchange arte variation affected the loan portfolio growth of commercial banks in Ethiopia. The second model is estimated to further substantiate the result of the first model. Return on equity (ROE) is specified as dependent variable for the first model to measure thebank profitability while loan growth is identified as dependent variables for the second model. . Six independent variables are also identified and included in the models specified corresponding to each dependent variables.

3.2.4.1.1 Dependent variables

- Return on equity (ROE)

Net interest margin (NIM), return on asset (ROA) and return on equity (ROE) are the frequently used ratios in measuring bank profitability (Rao and Lakew, 2012). Return on Assets (ROA) indicates how effectively a bank manages its assets to generate income

(Davydenko as cited in Kiganda, 2014) and it is computed as the banks' after tax profit over total assets. In contrast, the return on equity (ROE), the ratio of net profit toequity, measures the extent to which the bank's management is generating returns using the equity of the bank's shareholders. Net interest margin, which is computed as a percentage of earningreflects the extent to which a bank's earning assets are profitable (Rao and Lakew, 2012).

According to Flemini et.2009 as cited in Kiganda, (2014), ROA may be biased due to off-balance-sheet activities.Similarly, a potential weakness of NIM may be that, as banks move toward more other fee-generating activities, NIM will decline in importance as a measure of profitability (Osuagwu, 2014).Because of this, ROE is used in this study as a measure of bank profitability.

- Loan Growth

Popper (1996) argues thata bank without foreign assets or liabilities can be exposed to currency risk. This is mainly due to the fact that exchange rate can affect the profitability of its domestic banking operations. For example, exchange rate may diminish loan servicing capacity of the bank customers and their demand for loans. As bank Profit is also a function of loan growth, any factor that affects bank loan growth could also impact its profitability. Therefore, loan growth as measured by annual change in loan portfolio is used in the model as proxy dependent variable for bank profitability.

3.2.4.1.2. Independent variables

- Exchange rate

The major trading currencies of Ethiopia and her international trading partner is USD. However, other currencies like Euro and UK pound sterling also used as means for foreign transactions to some extent. This may induce the performance of Ethiopian commercial banks to be affected by the exchange rate variation of ETB against these currencies, mainly because of the reserve of these foreign currencies held to facilitate import and export trading. However, as the exchange rate of ETB against other hard currencies

usually goes in the direction of exchange rate between ETB and USD, the exchange rate of ETB against USD is used as independent variables to measure the impact of exchange rate on the profitability of Ethiopian commercial banks.

Official exchange rate between ETB and USD is used in the study. Official exchange rate refers to the exchange rate determined by national authorities or the rate determined in the legally sanctioned exchange market. The average annual exchange rate declared by NBE is used in the study. Exchange rate is included in both models as a variable that explain bank profitability (ROE) and loan growth which is a factor for bank profitability.

- Loan loss ratio- LLR

The ratio of loan loss expense to total loans (LLR) is a measure of the strength of environmental variables on bank performance(Osuagwu, 2014). A high ratio of loan loss expense reduces the revenue and profit accruing to a bank. This ratio also measures credit risk (Kumbakhar et al., 2001, Zhao &Murinde, 2011 in Osuagwu, 2014)
Any factor that induces the deterioration of banks portfolio quality, which usually resulted in the recognition of large loan loss expense, could directly have a bearing on the banks profitability. Therefore, loan loss expense ratio is included in the first model as independent variable.

- Lending interest rate

Interest rate is an important macroeconomic determinant of bank performance.Ogunleye (2001) indicated that when interest rates rise or fall, it exerts an impact on banks' profits through adjustment to revenues.
Empirical evidence from Molyneux and Thornton (1992)indicate that high interest rate is significantly associated with higherbank profitability, i.e. a significant positive relationship. Conversely,Naceur (2003) highlights a negative relationship between interestrates and bank profitability. This contradiction is a reasonable justification for further empirical analyses. Therefore, lending interest rateis included in the second model

as an independent variable. The sum of average interest on saving and interest spread was used as proxy measure for average lending interest rate.

- GDP growth

Rao and Lakew (2012) find that GDP has positive impact on bank profitability. There is also empirical evidence of a negative relationship between the growth in real GDP and NPLs (Salas and Suarina, 2002; Rajan& Dhal, 2003). The explanation provided by the literature for this relationship is that strong positive growth in real GDP usually translates into more income which improves the debt servicing capacity of borrower, which in turn contributes to lower non-performing loans. GDP is a factor affecting bank loan growth. Therefore, change in real GDP is included in the two models as independent variables.

- Deposit to loan ratio

Banks with higher deposit ratio are expected to expand the supply of loans more than banks with lower deposit ratios i.e. there should be a positive association between them. Hence, deposit to loan ratio which is measured by yearend total deposit divided by loan is included in the second modelas independent variable.

- Loan growth rate

Bank profitability is also a function of loan growth. Accordingly, the annual growth rate of bank loan portfolio is included as explanatory variable in the first model. As noted above, loan growth is specified as dependent variable and here it included as independent variable to measure its effect on bank profitability.Loan growth is expected to have positive relation with bank profitability.

- Total Asset

The natural log of total asset is included as explanatory variable in both models specified to measure the impact of exchange rate on bank profitability and loan growth. There is inconsistent finding with regard to the relation between bank profitability and bank size as measured by total asset of the bank.

For instance, Sufian, F. and Habibullah(2009) for Bangladeshi banks, Kosmidou (2008) for Greece banks, have found economies of scale for larger banks, while Pasiouras and Kosmidou (2007) for domestic banks in Europe, Dietrich and Wanzenried(2011) for Banks in Switzerland have found diseconomies of scale for larger banks.Thus, the sign of bank size on profitability is subject to empirical study. However, its effect on bank loan growth expected to be positive.

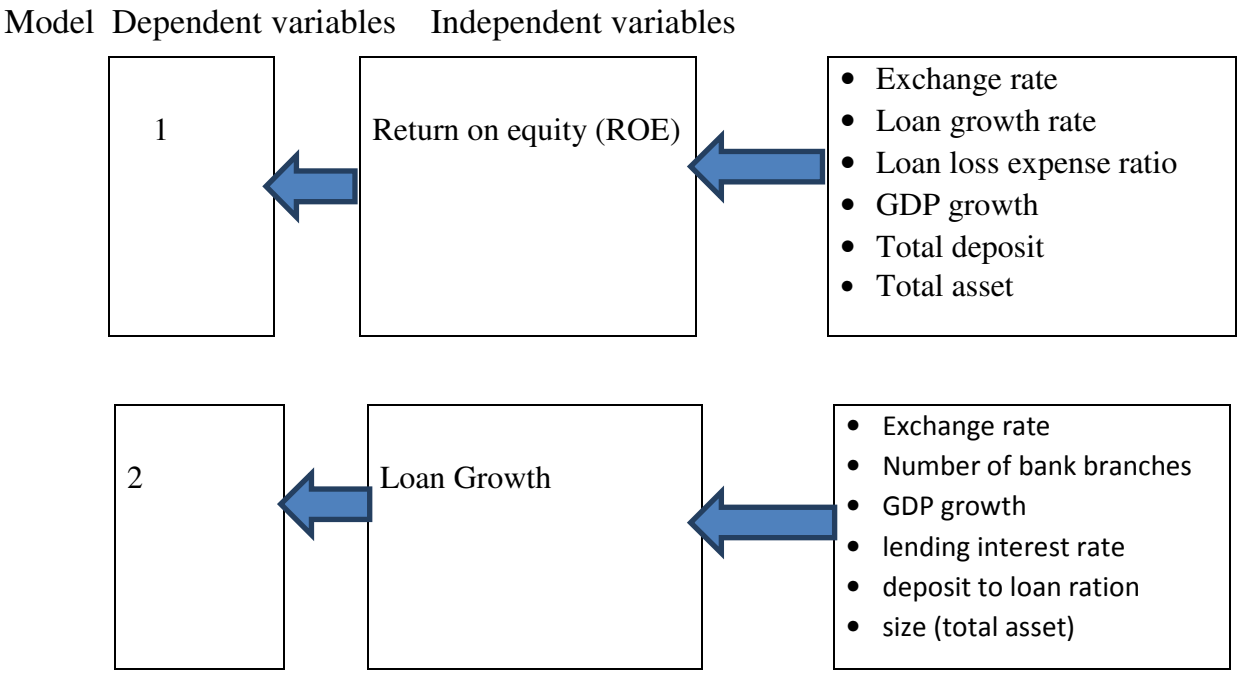
- Total deposit

The natural logarithm of total bank deposit is included in the model specified to determine the impact of exchange rate variation on the profitability of commercial banks in Ethiopia. It is expected that bank deposit volume is positively associated with the profitability of commercial banks in Ethiopia.

- Number of branches

Number of bank branch network is included in the regression model specified to evaluate the effect of exchange rate variation on the loan growth of commercial banks in Ethiopia. Number of bank branch is expected to have positive effect on the loan growth of commercial banks in Ethiopia.

Fig: 3.2.4.1 Variable specification



Source: Researcher's own conceptualization

3.2.4.2Model specification

Two econometric models are specified to measure how exchange rate variations affected the Ethiopian bank profitability and other variable (loan growth) that contributed for the bank profitability.

Accordingly, the first econometric model indicated by equation 3.2.4.1.1 is developed to measure the impact of exchange rate on the profitability of Ethiopian commercial banks. The bank profitability (dependent variable) is represented by return on equity (ROE)

which is calculated by dividing the after tax net profit by average equity. This model is further adjusted to include control variables as indicated by equation 3.2.4.1.2

The second econometric model as represented by equation 3.2.4.1.3 is specified to determine how exchange rate variations affect the loan growth of commercial banks in Ethiopia. Again this model is adjusted to include other independent variables as a control variable (see equation 3.2.4.1.4).

- **Model specified to measure the impact of exchange rate on ROE**

$ROE_{it} = \beta_0 + \beta_{it} USD + \mu_{it}$ 3.2.4.1.1

Where;

ROEit = Return on equity of bank i at time t,

β0=the constant term,

βi, = the coefficients of the explanatory variables,

USD=the exchange rate of USD to ETB at time t,

μit = the error term.

Since there are other factors that could influence the profitability of banks, failure to include some of these critical factors to the model may result in exaggerated estimates of the changes in the bank return on equity (ROE) attributable to exchange rate variation. Therefore, model indicated by equation 3.2.4.1.2 is specified to include key control variables that could affect bank's profitability (ROE).

The control variables included in the model are loan growth, loan loss expense ratio, total deposit,total asset and GDP growth.

$ROE_{it} = \beta_0 + \beta_{it} USD + \beta_{it} LONGRW + \beta_{it} LLEXPR + \beta_{it} GDP + \beta_{it} \log(TDPO) + \beta_{it} \text{Log}(TA) + \mu_{it}$ 3.2.4.1.2

Where;

ROEit = the return on equity of bank i at time t.

USD it= exchange rate of USD to Birr assigned to bank i at time t.

LONGRW =Loan Growth rate of bank i at time t.

LLEXPR= loan loss expense ratio of bank i at time t.

GDP=Growth domestic production assigned to bank i at time t.

Log (TDPO) = the natural logarithm of total deposit of bank i at time t.

Log (TA) = the natural logarithm of total asset of bank i at time t.

The impact of each of the explanatory variables on the profitability of Ethiopian commercial banks is assessed using the above multivariate regression equation by using the statistical significance of the coefficients (βi).

- **Model specified to measure the effect of exchange rate on bank loan growth**

$$LONGRW = \beta 0+\beta itUSD+\mu it \qquad 3.2.4.1.3$$

$$LONGRWit=\beta 0+\beta itUSD +\beta itNBB +\beta itLIR+\beta itLog(TA)+ \beta it\ DPOLNR+ \beta it\ GDP + \mu it \qquad 3.2.4.1.4$$

Where;

LONGRWit = loan growth of bank i at time t.

USD it= exchange rate of USD to Birr assigned to bank i at time t.

NBBit = the number branches of bank i at time t.

LIRit= lending interest rate assigned to of bank i at time t.

Log(TA)- natural logarithm of total asset of bank i at time t.

DPOLNR=deposit to loan ratio of bank i at time t.

GDP=Growth domestic production assigned to bank i at time t.

Table 3.2.4.1.1: Measurement of study variables

Variables	**Measurement**
ROE	Net income after tax divided by total equity capital
LLEXPR	Loan loss expense divided by average loan *100%
LONGRW	((Loan at time t-loan at time t-1)/loan at time t-1)*100%
USD	ETB: USD at time t
ΔGDP	The annual growth in real GDP computed as follows.(GDP t-GDPt-1)/GDP t*100%
LIR	Average deposit interest rate plus bank spread
DPOLNR	Total deposit at time" t" divided by total loan at time "t"
Log (TA)	Total asset at time t in natural logarithm form
Log (TDPO)	Total deposit at time t in natural logarithm form
NBB	Number of bank branch at time t

Source: Researcher's own computation

Descriptive data analysis is employed to analyze this quantitative research data. Thetechniques used included; descriptive statistics, correlation and regression analysis. Oso and Onen (2009) cited in kiganda 2014) asserted that correlation is used when a researcher wants to describe the association between two or more variables in terms of magnitude and direction while regression analysis is used when a study is about prediction of variables from other predictor variables. Ordinary Least Square(OLS)is employed as the estimation technique. The method of OLS is extensively used in regression analysis primarilybecause it is initiatively appealing and mathematically much simpler than any other econometric technique (Gujarati, 2004).Data analysis is conducted using Econometric estimation software named Eviews 8. Tables and figures are used for the presentation of data.

CHAPTER FOUR

4. DATA ANALYSIS AND DISCUSSSION

4.1 Descriptive statistics

This section of the study presents the descriptive statistics of the dependent variables and explanatory variables included in the study. As already mentioned return on equity (ROE) is the dependent variable used to measure bank profitability in the model specified to determine the impact of exchange rate variation on the profitability of commercial banks in Ethiopia. Besides, loan growth rate is used as dependent variable to evaluate the impact of exchange rate on the loan portfolio of commercial banks in Ethiopia.

4.1.1. Descriptive statistics for the dependent variables

Return on equity (ROE): As indicated in table 4.1.1.1 below, on average the return on equity for Ethiopian commercial banks during the past decade and half was 23%. Although the ROE of each bank's selected in the study varies due to their size and time of establishment, the average return on equity of the Ethiopian commercial banks, as revealed by the descriptive statistics is quite in excess of what is considered to be favorable. Return on equity between 15%-20% is considered to be favorable (Fraker, 2006) cited in kanwal and nadeem(2013).

On the other hand, the minimum score indicates that, during the study period, the less profitable commercial bank in Ethiopia was realized ROE as low as -1%, while the most fortuned profitable bank had enjoyed the maximum ROE of 43%, which is nearly two fold of the average ROE indicated above.

The standard deviation of ROE (9%) revealed by the study is relatively low and it is an indication that most of the observations are concentrated around the mean value. Even though, there is no defined benchmark, the standard deviation of ROE for the Ethiopia commercial banks for the study period is found to be low when compared to the study

result on other countries. For example, Kanwal and Nadeem (2013) in their study of impact of macroeconomic variables on the profitability of listed commercial banks in Pakistan for the period of 2002-2011 found that the standard deviation of ROE was 316.46.

Table 4.1.1.1: Descriptive statistics for dependent variables

	Return on equity (ROE)	**Loan growth (LONGRW)**
Mean	23%	26%
Median	24%	22%
Maximum	43%	256%
Minimum	-1%	-13%
Std. Dev.	9%	29%

Source: Author's Eviews descriptive statistics output for dependent variables, 2015.

Loan Growth rate (LONGROW): Loan is the main source of income for all commercial banks and the growth of loan portfolio balance has critical implication for the profitability and growth of commercial banks. The dependent variable loan growth rate is the annual growth rate of loan portfolio. As it can be seen from table 4.1.1.1 above, the mean, minimum and maximum annual growth rate of Ethiopian commercial banks during the past decade and half were 26%, -13% and 256% respectively. This indicate that on average, the loan portfolio of the Ethiopian commercial banks were grown by 26% per annum. The minimum value of -13% indicate that there were a time when the loan portfolio of some banks showed a decreasing trend. The maximum growth rate of 256% is also indicate that banks that pursued the most aggressive loan growth was managed to increase the loan portfolio by two and half fold within a year period of time.

4.1.2. Descriptive statistics for explanatory variables

Exchange rate of ETB to USD: descriptive statistics revealed that the average exchange rate of USD to ETB during the past decade and half was birr 11.67 while the minimum and maximum exchange rate recorded during this period was ETB 8.33 and 19.07 respectively.

This indicate that ETB had been depreciated by 129% during the last 15 years (2000-2014).

Loan Growth rate (LONGRW): As illustrated above, the loan portfolio of commercial banks in Ethiopia had grown on average by 26% for the past decade and half years. The maximum loan growth per annum was 256% and there was also an incidence of reduction in loan portfolio balance for some banks as the minimum growth indicated in the descriptive statics depicted by table 4.1.2.1 is -13%.

Gross domestic production (GDP) –the natural logarithm of GDP was used in regression analysis. However, the descriptive analysis is calculated based on the default value. The mean value of GDP growth rate for the past 15 years (2000-2014) was 8.66%. The maximum and minimum GDP growth rate was being 12.64% and -2.10% respectively. Since economic growth and financial sector performance are positively correlated (Levine, 2000), the growth in GDP during the last decade and half is intuitively believed to contribute for the growth and performance of commercial banks in Ethiopia.

Total deposit (TDPO)-the natural logarithm of total saving deposit is used in the regression analysis. However, the actual deposit balance is used for the analysis of descriptive statistics. Accordingly, the descriptive statistics revealed that the mean value of saving deposit of the commercial banks included in this study was Birr 3.67 billion for the 15 years of study period. The average deposit to loan ratio for the study period was 141% and it indicate that commercial banks in Ethiopiahad either hold nearly half of their deposit either to honor withdrawal requirement or shifted to other investment. The maximum deposit balance as revealed by the descriptive statistics was birr 17.77 billion, this resulted in the maximum deposit to loan ratio of 218% indicating that some of the commercial banks had not effectively utilized the deposit they had mobilized. This might be an indication of inefficiency unless the deposit in excess of the loan amount was partly channeled to other productive investment. Given the NBE policy[4] that limit bank's

[4] NBE directive number SBB/60/2015 limits the investment of banks in allied and non-banking business. Accordingly, banks prohibited to invest more than 5% the subscribed capital of any insurance company and 10% of non-banking business.

investment in allied business, those banks with very high deposit to loan ratio had most probably hold the excess deposit amount in liquid form.

In contrary, the minimum deposit balance for the study period was birr 76 million. The minimum deposit to loan ratio of 33% indicate that some banks had a deposit portfolio balance less than the amount they loaned up. In this case, the loan amount in excess of the deposit balance had been financed by the banks own fund. This kind of bank might be highly prone to liquidity risk and the chance of dishonoring client deposit withdrawal is more probable. The standard deviation of birr 3.68 billion indicated that that the deposit balance of many banks for the study period were fairly far from the mean value.

Total asset (TA)-the descriptive statistics revealed that the average total asset of the commercial banks included in this study was 5.1 billion birr during the study period. The asset of these banks was grown on average by 26.3% during those period. As it can be seen from the descriptive statistics of loan growth, loan portfolio had grown on average by 26% during the period considered in this study. This shows that from the average growth (i.e 26.3%) of the total asset of thecommercial banks included in the study, the growth in loan portfolio was constituted the major portion as evidenced by the average growth rate of 26% which is almost nearer to the growth rate of total asset. The total asset of the largest bank for the study period was birr 22 billion as indicated by the descriptive statistics. Conversely, the smallest bank had own a total asset of birr 214 million during the study period as shown by the minimum value of the descriptive statistics. The maximum growth in total asset was 112.7% and the minimum growth rate was -1.91% as indicated by the descriptive statistics. The standard deviation of 4.69 billion birr indicate that the total asset of the commercial banks included in this study was relatively far from the mean value indicated for the study period.

Lending interest rate (**LIR**)-the descriptive statistics of lending interest rate indicated that during the past fifteen years,on average, Ethiopian banks had charged their clients a lending interest rate 8.6%. There was also a bank that had charged interest rate as lower as of 4% as indicated by the minimum value of the descriptive statistics. On the other hand, the bank that can be viewed relatively expensive had charged the maximum interest rate of 13% during those periods. The standard deviation of 2.1% indicated that the lending

interest rate charged by the banks included in the study is fairy distributed among the mean value.

Loan loss expense ratio (LLEXPR)- Loan loss expense ratio which is measured by dividing loan loss expense provision to average loan outstanding is an indication of the credit risk for the commercial banks. As it can be seen from table 4.1.2.1, the mean value of the loan loss expense to loan ratio for the Ethiopian commercial banks for the study period was 1% while the maximum and minimum value was 5% and zero respectively. The standard deviation of 1% indicate that loan loss expense ratio for the Ethiopian commercial banks during the study period was fairly distributed along the mean value.

Number of bank branches (NBB): during the last fifteen years, the Ethiopian commercial banks included in this study had owned 44 branches on average. The smallest bank operated with few branches had owned 9 branches while the bank with many branch network had owned 152 branches. The standard deviation of 29 is also indicate that the number of branches owned by the banks included in the study is significantly vary compared to the mean value.

Table 4.1.2.1: Descriptive statistics for explanatory variables

	USD	LONGRW	GDP	TDPO-Birr	DPOLNR	TA Birr	LIR	TAGRW	LLEXPR	NBB
Mean	11.67	26%	8.70%	3.67 Billion	141%	5.1 billion	8.60%	26.30%	1%	44
Median	9.02	22%	10.30%	2.44 Billion	134%	3.45 billion	8.90%	25.80%	1%	43
Maximum	19.07	256%	12.64%	17.77 Billion	218%	22 billion	13%	112.70%	5%	152
Minimum	8.33	-13%	-2.10%	76 Million	66%	214 million	4%	-1.91%	0	9
Std. Dev.	4.01	29%	4.20%	3.68 Billion	33%	4.69 billion	2.1	17.47%	1%	29

Source: Author's Eviews descriptive statistics output for explanatory variables, 2015.

4.2. Correlation analysis

Table 4.2.1 and Table 4.2.2 is a correlation matrix table for the variables used in the analysis of the impact of exchange rate variation on the profitability of Ethiopian commercial banks as measured by ROE and the influence of exchange rate variation on the loan growth of commercial banks. The correlation coefficient indicates the strength of a linear relationship between two variables. The purpose of undertaking this correlation analysis is therefore to check whether there is multicollinearityproblem in themodels and to indicate whether or not the variables move together in the same direction. Multicollinarity has been checked for the independent variables used in the model and as it can be seen from table 4.3.1.4 and Table 4.3.1.5 below, there is no explanatory variables which are significantly correlated among themselves. Bryman and Cramer (2001) mentioned that Multicollinearity exists when correlation exceeds 0.80. As there is no correlation coefficients of explanatory variables which exceeds this rule of thumb, there is nomulticollinearity among explanatory variables.

This section will further identify and analyze the existence of correlation between the dependent variables (ROE and loan growth) and explanatory variables using correlation coefficients obtained from the correlation matrix.

The correlationcoefficient will vary from -1 to +1. A -1 indicates perfect negative correlation, and +1 indicatesperfect positive correlation. If the correlation is 0, the movements of the variables are said tohave no correlation or they are completely random.

4.2.1. Correlation analysis for return on equity

This section presents the relationship between the explanatory variables and the dependent variables (ROE). The relationship was explained by the parameter coefficients between the explanatory and explained variables. The coefficients shows the magnitude and direction of the relationships, whether it is strong, weak positiveor negative. As already explained above, the higher the values, the stronger the relationship, and the smaller the coefficient is an indicator of a weak relationship. The sign also shows the direction of the

relationship. The positive sign shows a positive relationship and the negative shows the opposite.

As it can be seen from table 4.2.1.1, loan portfolio growth (LONGRW), GDP, Total saving deposit (logTDPO) and total asset (LogTA) are positively rated to return on equity (ROE).

This indicate that commercial banks that had large volume of saving and total asset had achieved high profit as expressed by ROE during the study period. Likewise,consistent with the theory, the positive relationship of GDP and loan growth to ROE for the study period indicate that Ethiopian commercial banks had achieved better profit during the time GDP had shown growth. On the other hand, a negative correlation of ROE with exchange rate, and loan loss expense ratio signifies that the profitability of Ethiopian commercial banks had been adversely affected by the movement of exchange rate for the study period. The correlation coefficient of GDP, Total asset and Total deposit is more 0.5and indicate that relatively there is strong positive relation between these variables and ROE of the Ethiopian commercial banks for the study period. Conversely, the correlation coefficients of other remaining variables indicated a weak correlation with ROE.

Table 4.2.1.1: Correlation Matrix for Return on Equity

	ROE	USD	LONGRW	LLEXPR	GDP	LOG(TDPO)	LOG(TA)
ROE	1						
USD	-0.2753	1					
LONGRW	0.03194	-0.2267	1				
LLEXPR	-0.4152	-0.4866	0.04644	1			
GDP	0.55728	0.20465	-0.091	-0.2384	1		
LOG(TDPO)	0.57171	0.76797	-0.3724	-0.4445	0.44946	1	
LOG(TA)	0.57018	0.68187	-0.3756	-0.4484	0.45478	0.695136	1

Source: Author's Eviews descriptive statistics output for explanatory variables, 2015.

4.2.2. Correlation analysis for bank Loan Growth

As depicted in table 4.2.2.1, Exchange rate, number of branch network, GDP and total asset arepositivelycorrelated to loan portfolio growth. In contrary, lending interest rate and deposit to loan ratio are negatively correlated to loan portfolio growth. The correlation coefficients of the explanatory variables indicate that neither of the independent variables included in the loan growth model are strongly correlated (positively or negatively) with the loan portfolio growth.

The positive relation between exchange rate and loan portfolio growth indicate that the demand for bank loan is increased during the time exchange rate depreciated and the other way round during exchange rate appreciation. Likewise, the negative correlation of lending interest rate shows that the annual loan growth rate of the banks with higher lending rate is lower than the banks with smaller lending interest rate. The negative correlation between deposit to loan ratio and loan portfolio growth may signifies the seasonality effect. The growth in bank saving portfolio during the season when business is slow might not be loaned up, because of the low demand for loan, which resulted from seasonality effect.

The positive relation of GDP and loan growth is in line with the theory. As GDP growth promotes investment, the demand for bank loan would increase as finance is needed for new investment or expansion. The positive relation between the numbers of branch network, growth in total asset is also consistent with other findings.

Table 4.2.2.1 CorrelationMatrixes For Bank loan Growth

	LONGRW	NBB	USD	GDP	LIR	LOG(TA)	DPOLNR
LONGRW	1						
NBB	0.265956	1					
USD	0.226723	0.766028	1				
GDP	0.090953	0.281292	0.204653	1			
LIR	-0.132929	0.579415	0.656899	0.203301	1		
LOG(TA)	0.375578	0.764767	0.791871	0.454777	0.500603	1	
DPOLNR	-0.330540	0.650447	0.739594	0.234449	0.408205	0.732538	1

Source: Author's Eviews descriptive statistics output for explanatory variables, 2015.

4.3 Regression Result from Return on Equity Model

This section presents the regression result of the model that estimates the impact of exchange rate variation on the profitability of Ethiopian commercial banks as measured by return on equity. Model diagnosis and robustness checks are made to enhance the quality of the econometric estimates followed by presentation of regression results.

4.3.1 Model diagnosis

Test for Heteroskedasticity

It has been assumed that the error terms are homoscedastic. That means the error terms are assumed to have a constant variance; otherwise they are said to be heteroskedastic. Hetroskedaticity occurs when the variance of error term is not constant. The presence of heteroskedasticity makes the standard errors wrong and hence any inferences made could be misleading. This requires validation of the null hypothesis that the error terms are homoscedastic. The study employed White's General heteroscedasticity Test. Gujarati (2004) asserts that the general test of heteroscedasticity proposed by White does not rely on the normality assumption and is easy to implement.

Therefore a white test is made to ensure that this assumption is no longer violated.Brooks (2008) recommended that the null hypothesis of homoscedasticity would not be rejected if the p-value of the F- and $\chi 2$ ('LM') versions of the test statistic and the p-value of the Scaled Explained SS is higher than 0.05. The detail of this test is provided in the appendix at the end of the paper.

Table 4.3.1.1. Heteroskedasticity Test: White.

F-statistic	1.208010	Prob. F(26,48)	0.2796
Obs*R-squared	29.66466	Prob. Chi-Square(26)	0.2817
Scaled explained SS	40.94253	Prob. Chi-Square(26)	0.0314

Source: Author's Eviews Output, 2015

Eviews in Table 4.3.1.1 displayed three different types of tests for heteroskedasticity. As it can be seen from the table, both the F-statistic and Chi-Square versions of the test statistic gave the same conclusion that there is no evidence for the presence of heteroscedasticity, as evidenced by the p-values in excess of 0.05.

Test for Autocorrelation:

It is assumed that the distribution errors are uncorrelated with one another and that the errors are linearly independent of one another. This study used Durbin Watson test to check for the existence of autocorrelation among error terms as recommended by Brook (2008).

To identify the impact of exchange rate variation on Ethiopian commercial banks profitability as measured by ROE, 105 (7*15) observations[5]were used in the regression model.

The error terms are serially correlated as evidenced by the initial DW lower than one. The first order autocorrelation is treated by including AR (1) in the model and the estimation result after the correction for the serial correlation shows a DW test statistic that indicate the removal of the effect of serial correlation from the estimation.

As indicated in table 4.3.1.2, the Durbin-Watson test statistic value is 1.813, With 105 observations and 6 explanatory variables excluding the constant term, the relevant critical lower and upper values for the test are dL=1.42 and dU=1.67respectively. The values of 4 - dU = 4-1.65=2.33. Thus the Durbin- Watson test statistic of 1.813 is between the upper limit (du) which is 1.67 and the critical value of 4- dU i.e.2.33 indicating that there is no evidence of the presence of autocorrelation.

Variables	**DW test statics result**

[5] Adjusted observations is reduced to 91.

Bank specific and macroeconomic factors	**1.813**

Table 4.3.

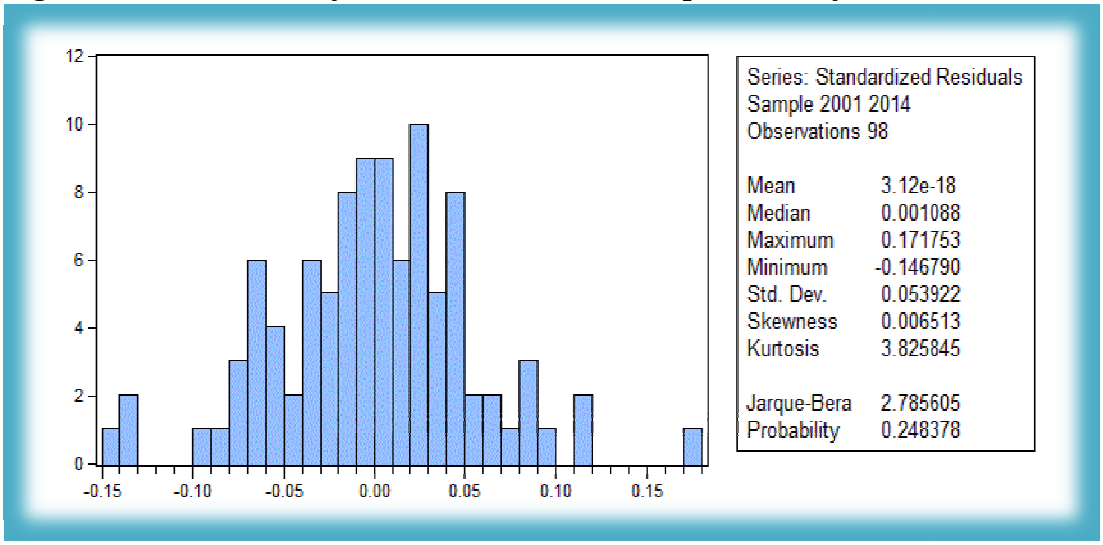
1.2. Autocorrelation Test Durbin Watson

Source: Author's Eviews output, 2015

Normality test

Normality test was carried out to verify if the error terms are normally distributed. The Jacque-Bera (JB) test was employed to ascertain this assumption. Brooks (2008) noted that the Jarque-Bera statistic would not be significant for disturbance to be normally distributed around the mean. Figure 4.3.1.3 indicated that distribution of the panel observation is symmetric about its mean. The Jarque-Bera statistic has a P-value of0.25 implies that the p-value for the Jarque-Bera test for model is greater than 0.05 which is a rule of thumb for normality test. The test was based on the null hypothesis that the residuals are normally distributed. Hence the study failed to reject the null hypothesis of normality at the 5% significance level.

Figure 4.3.1.1. Normality test for residuals- Bank profitability



Source: Author's Eviews output, 2015

Test for Multicollinearity

Test for multicollinearity should be made to ensure that the explanatory variables are not correlated with one another (Brooks, 2008). It is difficult to estimate all the coefficients in the model if the problem of multicollinearity exists among explanatory variables. If two variables are perfectly related to each other, together they contain information that enough to estimate one parameter, not two. If the correlation coefficient is low it indicates that there is no problem of multicollinearity. According to Gujarati (2004), the rule of thumbis that if the pair-wise correlation coefficient between two regressorsis high, in excess of 0.8, then multicollinearity is a serious problem. On the ground of these, the pair-wise correlation coefficient between regressors from covariance matrix estimation table showed that there is no evidence of multicollinearity in the model.As shown in table 4.3.1.3 below, the correlation coefficient between exchange rate and natural logarithm of total deposit (0.77), exchange rate and natural logarithm of total asset(0.68), natural logarithm of total deposit and total asset (0 .69) is relatively higher. However, given the rule of thumb mentioned above, the problem of multicollinearity does not exist in the model.

Table 4.3.1.3. Correlation Matrix of Explanatory variables

	USD	LONGRW	LLEXPR	GDP	LOG(TDPO)	LOG(TA)
USD	1					
LONGRW	-0.2267	1				
LLEXPR	-0.4866	0.04644	1			
GDP	0.20465	-0.091	-0.2384	1		
LOG(TDPO)	0.76797	-0.3724	-0.4445	0.44946	1	
LOG(TA)	0.68187	-0.3756	-0.4484	0.45478	0.695136	1

Source: Author's Eviews output, 2015

Redundant Fixed effect test

The estimation technique follows a panel regression, which provides the advantage of studying a cross section of the banking firms while observing the heterogeneity in the

individual firms. The pooled regression assumes that the intercepts are the same for each firm. This may be an inappropriate assumption, and Brooks (2008) recommended to estimate the model with firm fixed effect or random effect based on the appropriate test result.

The simplest types of fixed effects models allow the intercept in the regression model to differ cross-sectionally. To determine whether the fixed effects are necessary or not, this study run a redundant fixed effects test as recommended by brooks (2008) and others. The results of the test are summarized in the following Table. The detail of this test is provided in the appendix at the end of the paper.

Table 4.3.1.4. Redundant Fixed Effect Test – ROE

Redundant Fixed Effects Tests
Equation: Redundant Fixed Effects Tests
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	4.200821	(6,85)	0.0010
Cross-section Chi-square	25.449653	6	0.0003

Source: Author's E-views Output, 2015

From Table 4.3.1.4 we can conclude that, the *p*-values associated with the test statistics are zero to indicating that it is better to employ the fixed effect model than a simple pooled regression model.

4.3.2 Regression Results: Return on Equity

In the previous sections, different tests were made to check whether the CLRM assumptions are maintained or not. Descriptive statistics and correlation analysis among variables were also presented. As already illustrated in depth, the model satisfied all the CLRM assumptions and the descriptive statistics revealed a quite plausible statistics about the data used in the model. Therefore, this sections presents the result of the regression output.

As indicated in chapter three, the empirical model to identify the impact of exchange rate variation on the profitability of Ethiopian commercial banks was estimated as follows.

$$ROEit=\beta 0+\beta itUSD+\beta it\ LONGRW+\beta itLLEXPR+\beta it\ GDP\ \beta itlog(TDPO)+\beta itLog(TA)+\mu it$$

Accordingly, the estimation result of the panel regression model used in this study is presented in table 4.3.2.1. The regression result shows that the estimated result of the regression analysis is quite satisfactory. The R- squared and adjusted R- squared of the regression output is 72% and 67.5% respectively. The value of the Adjusted R-squared revealed that there is good relationships between dependent and independent variables, where all independent variables can explain about 67.5% of the bank's profitability as measured by ROE. The remaining 32.5% of the changes in the ROE model is explained by other factors that are not included in to the regression model.

Thus, collectively these variables, are good in explaining the changes in the profitability of the Ethiopian commercial banks measured by ROEas the R-square is sufficiently more than 50%. 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 isquite low. F value of 0.000000 indicates strong statistical significance, which enhanced the reliability and validity of the model.

Table 4.3.2.1 Regression Result - ROE

Dependent Variable: ROE
Method: Panel Least Squares
Date: 12/03/15 Time: 11:20
Sample (adjusted): 2002 2014
Periods included: 13
Cross-sections included: 7
Total panel (balanced) observations: 91
Convergence achieved after 16 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.870203	0.436588	-1.993188	0.0498
USD	-0.008298	0.004168	-1.990953	0.0500
LONGRW	0.121553	0.036851	3.298520	0.0015
LLEXPR	-2.647047	0.672348	-3.937019	0.0002
GDP	0.005865	0.001793	3.271872	0.0016
LOG(TDPO)	-0.089440	0.109547	-0.816453	0.4168
LOG(TA)	0.140609	0.109330	1.286098	0.2023
AR(1)	0.350637	0.109936	3.189476	0.0021

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.722072	Mean dependent var	0.237923
Adjusted R-squared	0.675149	S.D. dependent var	0.093657
S.E. of regression	0.053380	Akaike info criterion	-2.882112
Sum squared resid	0.219408	Schwarz criterion	-2.495825
Log likelihood	145.1361	Hannan-Quinn criter.	-2.726269
F-statistic	15.38845	Durbin-Watson stat	1.812856
Prob(F-statistic)	0.000000		

Inverted AR Roots .35

Source: Author's E-views Output, 2015

The dependent variable being explained is bank profitability as measured by return on equity (ROE). As indicated in table 4.3.2.1, from bank specific variables, loan growth and loan loss expense ratio had statistically significant impact on the profitability of commercial banks in Ethiopia for the study period. Conversely, total deposit and total asset as expressed by natural logarithm had statistically insignificant impact on the profitability of commercial banks in Ethiopia. On the other hand, all the external (macroeconomic) variables included in the model are found to have statistically significant impact on the profitability of commercial banks inEthiopian.

All statistically significant bank specific variables are found to be significant at 1% significance level. Likewise, from external factors, GDP is statistically significant at 1% while exchange rate as expressed by official exchange rate of ETB and USD was significant at 5% significance level.

As it can be seen from table 4.3.2.1, the coefficient figures of all the independent variables, except loan loss expense ratio, total deposit and exchange rate are positive. This indicate that from bank specific explanatory variables , Both growth in bank total asset and loan portfolio had positively impacted the Ethiopian bank profitability while loan loss expense and growth in saving deposit had negatively impacted the Ethiopian bank profitability during the study period. Similarly, from the external variables used in the study, GDP had positive impact on bank profitability while exchange rate had negatively impacted the profitability of commercial banks in Ethiopia. The following section presents the detail analysis of the impact of each of the explanatory variables on banks profitability.

4.3.2.1 Bank specific explanatory variables

Loan portfolio Growth rate (LONGRW) -Loan growth is the annual percentage growth of loan portfolio. The loan growth showed a positive coefficient (0.1216) and significant at 1%. This further indicate that during the study period, holding other factor constant, a one percent increase in the bank loan portfolio caused the profit (ROE) of commercial

banks in Ethiopia to grow by 0.12%. The positive significant relation of loan growth rate to ROE is consistent with the study expectation. Therefore, this study fails to reject the hypothesis which says there is significant positive relation between bank loan growth and bank profitability.

Loan loss expense ratio (LLEXPR) - Loan loss expense ratio which is measured as the percentage of loan loss expense to loan portfolio revealed a negative coefficient (-2.647) and statistically significant at 1%. The negative relation of loan loss expense ratio and bank profitability (ROE) is consistent with the study expectation and the findings around the world. For example, Sufian and Chong (2008) had found a negative significant relation between loan loss expense ratio and bank profitability. As the loan loss expense ratio is reflection of credit risk, the result of strongly significant negative relation of the loan loss expense suggests that Ethiopian commercial banks with higher credit risk tend to exhibit lower profitability level. The study is therefore, fails to reject the hypothesis that says there is negative significant relation between loan loss expense ratio and bank profitability.

Total deposit (LogTDPO)-The natural logarithm of saving deposit showed negativecoefficient (-0.089) and statistically insignificant relation with ROE of banks in Ethiopia during the study period. The negative relation of deposit is inconsistent with the expectation. However,it was statistically insignificant even at 10% indicating that there was no relationship between the deposit volume mobilized by the bank and its profitability for the study period. This may signify that, commercial banks in Ethiopia had not effectively loaned up the saving they had mobilized from investors either for lack of demand for loan or other factors. Increase in saving could positively impact bank profitability only when it is loaned up, otherwise it might adversely affect the bank performance as it also bears cost (interest). The study reject the hypothesis of postive significant relation between deposit and bank profitability.

Total asset(LogTA) - Total asset whichdenote the bank sizeis found to have a positive (0.141) insignificant relation with the profitability of Ethiopia commercial banks during the study period.This indicate that, holding other factors constant, a one birr increase in bank total asset had caused 14% increase in the profitability of Ethiopian banks during the

study period. The positive coefficient indicates that larger commercial banks tend to earn higher profits than smaller commercial banks, and vice versa.

The finding is consistent with the study expectation and the findings by some studies around the world and refuted with the findings of negative relation of total asset and bank profitability by some other studies. For example, the finding supports the study result of positive significant relation between bank asset and profitability by (Sufian, F., and Habibullah, 2009; Kosmidou, 2008, and; Kosmidou et al, 2006). However, itopposed with the study result of negative significant relation between this two variables by ***Sufian, F. and Chong R.R.(2008).***

Hauner (2005) offers two potential explanations regarding how size could have a positive impact on bank performance. First, if this link relates to market power, large banks should pay less for their inputs. Second, there may be increasing returns to scale through the prioritization of fixed costs (e.g. research or risk management) over a higher volume of services or through efficiency gains from a specialized workforce.

4.3.2.2. Macroeconomic variables

Exchange rate(USD) -the central objective of this study is to evaluate the impact of exchange rate variation on the commercial banks in Ethiopia for the study period of 2000-2014. As already explained, the study aimed to determine the effect of exchange rate on the profitability of the Ethiopian banks by analyzing its aggregate impact on ROE and factor of bank's profitability(loan growth). Accordingly, the study revealed that exchange rate as measured by nominal exchange rate of USD to ETB showed a negative coefficient (-0.008) and statistically significant at 5% indicating that variation in exchange rate had adversely affected the Ethiopian commercial banks during the study period. It indicated that during the study period an increase of USD to ETB by one birr (depreciation of Ethiopia birr) caused the Ethiopian banks profitability(ROE) to decrease by 0.8% or a decrease of USD to ETB by one birr (appreciation of Ethiopian birr) caused the Ethiopian banks profitability(ROE) to increase by 0.8%, holding other factors constant. The study finding of a negative relation of exchange rate with the ROE of Ethiopian banks for the study period is consistent with the finding of negative significant relation of exchange rate and bank profitability by Kiganda (2014). However it refuted with the

finding of positive significant relation of exchange rate with bank profitability by Babazadeh&Farrokhnejad (2012),Osuagwu (2014, He et al (2014). The study therefore reject the null hypothesis that exchange rate does not affect the profitability of Ethiopian commercial banks.

Gross domestic Production (GDP growth rate)-It is believed that a stable macroeconomic environment is necessary for the bank performance. This study tested the influence of macroeconomic indicator (GDP growth rate) on the profitability of Ethiopia Commercial banks. Expectedly, the result showed a positive impact of GDP growth on the banks profitability with a coefficient level of 0.006 and statistically significant at 1%. This is due to, as theoretically believed, the fact that improving macroeconomic performance raises overall income level and business performance which ultimately improves client's repayment ability and hence leading to enhanced bank profitability. The positive significant relation of GDP is consistent with the expectation and in tandem with the finding of Ongore and Kusa (2013) but refuted with the finding of negative insignificant relation by Kanwal and Nadeem (2013). Therefore, this study fails reject the hypothesis of positive significant relation between GDP and bank profitability.

Having the coefficients of the variables included in the study, we can now generate the operational model. The general model for the profitability (ROE) of Ethiopian commercial banks specified in chapter three is:

$$ROE_{it}=\beta 0+\beta_{it}USD + \beta_{it}LONGRW+\beta_{it}LLEXPR+\beta_{it} GDP +\beta_{it} \log(TDPO)+\beta_{it} Log(TA)+ \mu_{it}$$

Where;

ROEit = the return on equity of bank i at time t.

USD it= exchange rate of USD to Birr assigned to bank i at time t.

LONGRW =Loan Growth rate of bank i at time t.

LLEXPR=loan loss expense ratio of bank i at time t.

GDP=Growth domestic production assigned to bank i at time t.

Log (TDPO) = the natural logarithm of total deposit of bank i at time t.

Log (TA) = the natural logarithm of total asset of bank i at time t.

Now based on the regression results presented in Table 4.3.2.1, the model of this study can be written as follows:

ROE= -0.870203 +0.008298* USD + 0.121553*LONGRW-
2.647047*LLEXPR+0.005865*GDP-0.08944*log (TDPO) +0.14061*log (TA) µit

The impact of explanatory variables on the profitability of Ethiopian commercial banks is summarized as indicated in the following table.

Table 4.3.2.2. Summary of Significant Results from ROE model

Variable	Definition	hypothesis	Regression result	Statistically significant at
USD	Exchange rate of USD to ETB	?	-	5%
LONGRW	Loan growth rate	+	+	1%
LLEXPR	Loan loss expense ratio	-	-	1%
GDP	Dross domestic production – real growth rate	+	+	1%

Source: Summary by authorfrom EviewsROE regression output, 2015.

This summary contains the explanatory variables from the ROE model result indicated in table 4.3.2.1, which are found to have statistically significant impact on the profitability of Ethiopiancommercial banks; as measured by return on equity (ROE) at a maximum significance level of 5%. As shown in table 4.3.2.2, from the bank specific variables, Loan growth and loan loss expense ratio are significant at 1%. From the macroeconomic variables exchange rate is significant at 5% while GDP is significant at 1%. More specifically, exchange rate, which is the main objective of this study is to identify its impact on the profitability of commercial banks in Ethiopia, showed a significant negative relation with the profitability of Ethiopian commercial banks for the study period.

4.4 Regression Result from Loan Growth Model

This section presents the regression result of the model that estimates the impact of exchange rate variation on the loan growth of Ethiopian commercial banks. Model diagnosis and robustness checks are made to enhance the quality of the econometric estimates followed by presentation of regression results.

4.4.1 Model diagnosis

Test for Heteroskedasticity

One of the CLRM assumptions says that the variance of the errors is constant. This isknown as the assumption of homoscedasticity. If the errors do not have a constant variance, they are said to be heteroscedastic (Brooks, 2008, p 132).

The presence of heteroskedasticity makes the standard errors wrong and hence any inferences made could be misleading. This requires validation of the null hypothesis that the error terms are homoscedastic. The study employed White's General heteroscedasticityto ensure that this assumption is no longer violated.Brooks (2008) recommended that the null hypothesis of homoscedasticity would not be rejected if the p-value of the F- and $\chi 2$ ('LM') versions of the test statistic and the p-value of the Scaled Explained SS is higher than 0.05. As it can be seen from table 4.4.1.1, the P value of these tow test statistics is higher than the mentioned threshold (0.05), hence the null hypothesis of homoscedasticity would not be rejected. The detail of this test is provided in the appendix at the end of the paper.

Table: 4.4.1.1. Heteroskedasticity Test – White

F-statistic	0.980555	Prob. F(27,70)	0.5053
Obs*R-squared	26.89348	Prob. Chi-Square(27)	0.4696
Scaled explained SS	368.1894	Prob. Chi-Square(27)	0.0000

Source: Author's Eviews Output, 2015

Test for Autocorrelation:

It is assumed that the distribution errors are uncorrelated with one another and that the errors are linearly independent of one another. This study used Durbin Watson test to check for the existence of autocorrelation among error terms as recommended by Brook (2008).

To identify the impact of exchange rate variation on Ethiopian commercial banks profitability as measured by ROE, 105 (7*15) observations or 91 adjusted observation were used in the regression model. The error terms are serially correlated as evidenced by the initial DW lower than one. The first order autocorrelation is treated by including AR (1) in the model and the estimation result after the correction for the serial correlation shows a DW test statistic that indicate the removal of the effect of serial correlation from the estimation.

As indicated in table 4.4.1.2, the Durbin-Watson test statistic value is 1.788With 105 observations and 6 explanatory variables excluding the constant term, then relevant critical lower and upper values for the test are dL=1.44 and dU=1.67respectively. The values of 4 - dU = 4-1.65=2.33. Thus the Durbin- Watson test statistic of 1.788 is between the upper limit (du) which is 1.67 and the critical value of 4- dU i.e.2.33 indicating that there is no evidence for the presence of autocorrelation.

Table 4.4.1.2. Autocorrelation Test Durbin Watson

Variables	**DW test statics result**
Bank specific and macroeconomic factors	**1.788**

Source: Author's Eviews output, 2015

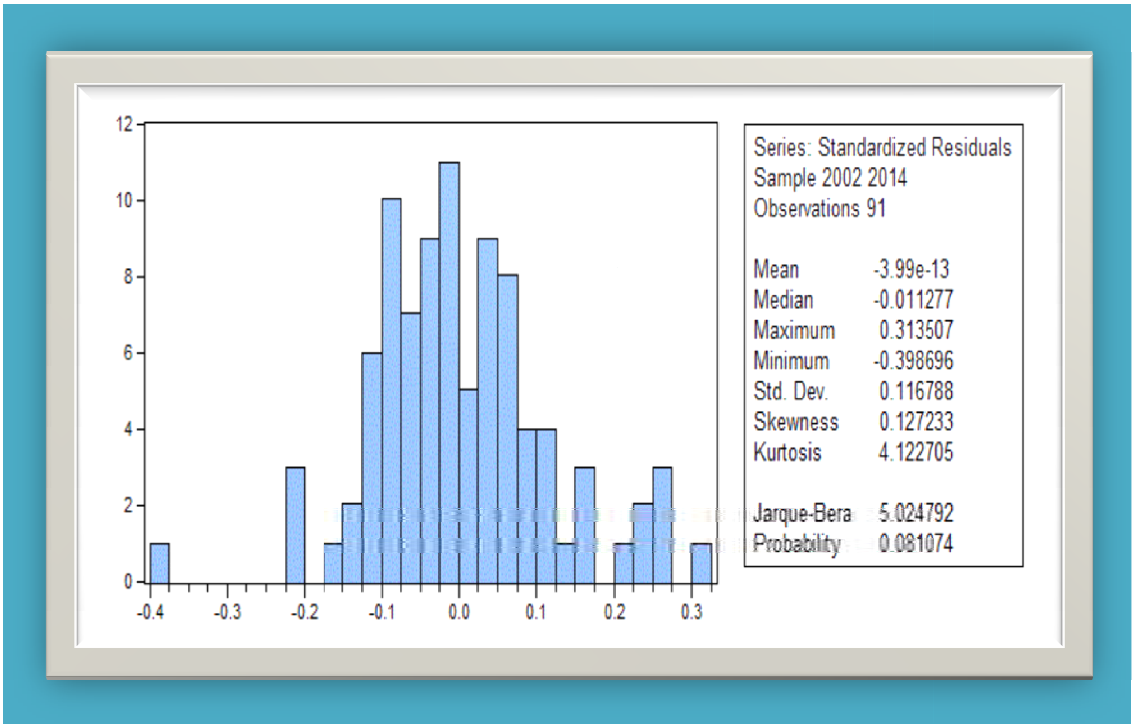
Normality test

Normality test was made to check whether the null hypothesis of Normal distribution holds true. The Jacque-Bera (JB) test was employed to ascertain this assumption. As noted by Brooks (2008), the Jarque-Bera statistic would not be significant for disturbance to be normally distributed around the mean.

Normality test was carried out to verify if the error terms are normally distributed. The Jacque-Bera (JB) test was employed to ascertain this assumption. Brooks (2008) noted

that. The Jarque-Bera statistic has a P-value of 0.081(see figure 4.4.1.1) implies that the p-value for the Jarque-Bera test for model is greater than 0.05 which is a rule of thumb for the disturbances said to be normally distributed. Therefore, this distribution of the panel observation is symmetric about its mean. The test was based on the null hypothesis that the residuals are normally distributed. Hence the study failed to reject the null hypothesis of normality at the 5% significance level.

Figure 4.4.1.1. Normality test for residuals – Loan Growth



Source: Author's Eviews output, 2015

Test for Multicollinearity

Testing the assumption of multicollinearity is made to ensure that the explanatory variables are not correlated with one another (Brook, 2008). The maximum pair-wise correlation coefficient among regressors, which is less than 0.8, from correlation matrix estimation table 4.4.1.3 indicate that there is no evidence of multicollinearity among the explanatory variables.

Table 4.4.1.3 CorrelationMatrix for Explanatory Variables

	NBB	USD	GDP	LIR	LOG(TA)	DPOLNR
NBB	1					
USD	0.766028	1				
GDP	0.281292	0.204653	1			
LIR	0.579415	0.656899	0.203301	1		
LOG(TA)	0.764767	0.791871	0.454777	0.500603	1	
DPOLNR	0.650447	0.739594	0.234449	0.408205	0.732538	1

Source: Author's Eviews output, 2015

Redundant Fixed Effects Tests

To determine whether the fixed effects are necessary or not this study run a redundant fixed effects test as recommended by brooks (2008) and others. The result of the test is presented in Table 4.4.1.4 below. The details of the test are attached in appendix.

Table 4.4.1.4. Redundant Fixed Effects Test for loan Growth

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	4.359922	(6,77)	0.0008
Cross-section Chi-square	26.614883	6	0.0002

From Table 4.4.1.4 we can conclude that, the *p*-values associated with the test statistics are zero indicating that it is better to employ the fixed effect model than a simple pooled regression model.

4.4.2. Regression Results: Loan Growth

Tests for CLRM assumptions, descriptive statistics and correlation analysis for the loan growth model was presented under section 4.4.1 of this paper. Accordingly, it is proved that all the CLRM assumptions are maintained in the model estimated to evaluate the impact of exchange rate on the loan growth of Ethiopian commercial banks. Therefore, this sections presents the result of the regression output.

As indicated in chapter three, the empirical model to identify the impact of exchange rate variation on the loan growth of Ethiopian commercial banks was estimated as follows.

$LONGRWit=\beta 0+\beta itUSD+\beta itNBB+\beta itLIR+\beta it\ GDP+\beta it\ LogTA+\beta it\ DPOLR+\mu it$

Accordingly, the estimation result of the panel regression model used in this study is presented in table 4.4.2.1. The regression result shows that the goodness of the model fitness is satisfactory as indicated by the R- squared and adjusted R- squared of 56.6% and 49.3% respectively

The value of the Adjusted R-squared revealed that all the independent variables together can explain about 49.3% of the loan growth of Commercial banks in Ethiopia. The remaining 51.7% of the growth in loan portfolio is explained by other factors that are not included in to the regression model. For panel data, R-Squared greater than 20% is still

large enough for reliable conclusions (Cameron Trivedi, 2009; Hsiao, 2007, cited in Nyamsogoro, 2010).

The independent variables included in the model are fairly good in explaining the loan portfoliogrowth of Ethiopian commercial banks as evidenced by the adjusted R-square near to 50%. 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 is quite low. F value of 0.000000 indicates strong statistical significance, which enhanced the reliability and validity of the model.

Table 4.4.2.1 Regression Result-Bank loan Growth

Dependent Variable: LONGRW
Method: Panel Least Squares
Date: 12/04/15 Time: 09:45
Sample (adjusted): 2002 2014
Periods included: 13
Cross-sections included: 7
Total panel (balanced) observations: 91
Convergence achieved after 11 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.264563	1.005259	-0.263179	0.7931
USD	0.042223	0.011538	3.659548	0.0005
NBB	-0.003612	0.001583	-2.281113	0.0253
LIR	-0.050215	0.012597	-3.986316	0.0002
GDP	0.002437	0.004224	0.576943	0.5657
LOG(TA)	0.051254	0.051862	0.988289	0.3261
DPOLNR	-0.387733	0.084005	-4.615567	0.0000
AR(1)	0.172973	0.054625	3.166552	0.0022
Effects Specification				
Cross-section fixed (dummy variables)				
R-squared	0.566198	Mean dependent var		0.230656

Adjusted R-squared	0.492958	S.D. dependent var	0.177318
S.E. of regression	0.126263	Akaike info criterion	-1.160264
Sum squared resid	1.227557	Schwarz criterion	-0.773978
Log likelihood	66.79200	Hannan-Quinn criter.	-1.004421
F-statistic	7.730786	Durbin-Watson stat	1.787939
Prob(F-statistic)	0.000000		
Inverted AR Roots	.17		

Source: Author's E-views Output, 2015

The dependent variable being explained is loan portfolio growth. As indicated in table 4.4.2.1, from bank specific variables, Number of branch network, lending interest rate and deposit to loan ratio had statistically significant impact on the loan growth of commercial banks in Ethiopia.Conversely, total bank asset as expressed by natural logarithm had statistically insignificant impact on the loan portfolio growth of commercial banks during the study period. From the external factors, exchange rate is found to have significant impact while GDP had insignificant impact on the loan growth of commercial banks in Ethiopia for the study period

From the statistically significant bank specific variables, lending interest rate and deposit to loan ratio are significant at 1% significance level while number of branch is significant at 5%. On the other hand, the only statistically significant external variable, exchange rate (USD: ETB) is statistically significant at 1% significance level.

As it can be seen from table 4.4.2.1, the coefficient figures of all the independent variables (i.e. number of branches, lending interest rate and deposit to loan ratio) are negative. This indicate as the lending interest rate of banks goes up, the demand for bank would decrease. The inverse relation of number of bank branches and deposit to loan ratio with loan growth may indicate the fact that the loan servicing activity of the banks in Ethiopiaconcentrate at head office or some branches in big city and new opened branches might be limited only to saving mobilization.

Similarly, from the external variables used in the study, exchange rate had positive impact on the loan growth of commercial banks in Ethiopia during the study period. The following section presents the detail analysis of the impact of each of the explanatory variables on the loan portfolio growth.

4.4.2.1. Bank specific explanatory variables

Number of bank branches (NBB) the coefficient of the number of bank branches is negative (-0.0036) and significant at 5%. The finding of negative significant impact of number of bank branch on bank loan growth is inconsistent with the study expectation. It may indicate the effect of competition among banks in the country. Most of the banks in the country had been opening new branches especially in big cities during the past decade. The presence of all banks in one area may result in competing for the same credit worthy clients. The stringent collateral requirement of banks in Ethiopia would not allow them to reach large number of potential clients and scrambling for few clients that can fulfill the collateral requirement is imperative. Therefore, the negative relation of number of bank branches and loan growth might give sense from this perspective. The study result therefore rejects the hypothesis which says there is positive significant relation between number of bank branches and bank loan growth.

Lending Interest rate (LIR)- As expected lending interest rate is negatively associated with the loan growth of commercial banks of Ethiopia. The lending interest rate showed a negative coefficient (-0.0502) and statistically significant at 1%. This implies that as commercial banks increase their lending interest rate, the demand for bank loan is decreased, which is manifested in the reduction of bank loan portfolio growth. The result is also consistent with the finding of negative association of interest rate and lending loan growth by Aysun and Hepp (2011). The study fails to reject the hypothesis of negative significant relation between lending interest rate and bank loan growth.

Deposit to loan ratio (DPOLNR)-Deposit to loan ratio is found to have negative coefficient (-0.3877) and statistically significant at 1%. The finding is against the expectation and other study findings. The inverse relation between deposit to loan ration and loan growth may indicate seasonality effect on demand for loan. The season in which saving increased might not be the time when demand for loan is low. For example, Ethiopia Summer season associated with slow business movement. During such a season demand for finance decrease in line to the business movement. On the other hand, business people may keep their working capital in saving account consequent to the business slow down. This means banks may mobilize large saving during such season and

fail to loan it up since there might be no sufficient demand for loan resulting from seasonality effect.The fact that the data for loan and deposit was taken from bank Balance sheet which is prepared as of June 30, of each year can strengthen the logic of seasonality effect explained above, as the month of June is the first month of summer season in Ethiopia. The study result is refuting with the finding of Laidroo (2012) which indicated a positive association of deposit ratio and lending growth. The study therefore, reject the hypothesis of positive significant relation between deposit to loan ratio and loan growth.

Total Asset (Log(TA)-Total asset which represent the size of the bank showed a positive(.0513) and insignificant association with loan growth of the Ethiopian commercial banks for the study period. The positive relation of total asset of the bank and loan growth is insignificant even at 10%. The study result is consistent with the expectation and it indicate that large banks as expressed by the size of their asset manifested high loan growth for the study period in comparison to small banks. The finding is opposing with the study result of Laidroo (2012) which found a negative association between bank size represented by natural log of total asset and bank loan growth and it is consistent with the other findings (Majnoni et al. 2003; Aydin, 2008; Matousek and Sarantis, 2009) cited in Laidroo (2012). The hypothesis of positive significant relation between total asset and bank loan growth is rejected.

4.4.2.2. Macroeconomic variables

Exchange rate (USD) –As already mentioned,the core objective of this study is to evaluate the influence of exchange rate variation on the profitability of Ethiopian commercial banks. It also aimed to identify the effect of exchange rate on the growth of bank loan with the intension to check whether the effect of exchange rate on bank profitability, if any, had emanate from its influence on loan growth. As indicted in table 4.4.2.1, exchange rate showed a positive (0.0422) association with bank loan growth and significant at 1%. This indicate that an increase in exchange rate (When ETB depreciate against USD) resulted in growth of bank loan. The argument can be justified on the basis of the fact that importers need more birr to buy few dollars during the time birr is depreciate against dollar. Therefore, during the time birr is depreciating, importers tend to

borrow more and during appreciation importers need lees amount of birr to buy a dollar, this may justify the positive relation between loan growth and exchange rate. The study finding of positive significant relation between exchange rate and bank loan growth is consistent with the study result of Hsieh (2015). This study is therefore, rejects the hypothesis that says there is no relation between exchange rate and the loan growth for banks in Ethiopia.

Gross domestic Production (GDP growth rate)- GDP is found to have positive (0.0024) insignificant relation with bank loan growth. As already explained, theoretically, it is believed thatgood macroeconomic performance raises overall income level and business performance which ultimately improves bank financial sector performance. The positive association of GDP with bank loan growth is consistent with the expectation. It is also consistent with the study finding of Laidroo(20120 and Hsieh 92015).

Based on variables included in the study, we can now generate the operational model. The general model for the profitability (ROE) of Ethiopian commercial banks specified in chapter three is:

$$LONGRWit=\beta 0+\beta itUSD +\beta itNBB +\beta itLIR+\beta itLog(TA)+\beta it\ DPOLNR+ \beta it\ GDP +\mu it$$

Where;

LONGRWit = loan growth of banki at time t.

USD it= exchange rate of USD to Birr assigned to bank i at time t.

NBBit = the number branches of bank i at time t.

LIRit= lending interest rate assigned to of bank i at time t.

Log(TA)- natural logarithm of total asset of bank i at time t.

DPOLNR=deposit to loan ratio bank i at time t.

GDP=Growth domestic production assigned to bank i at time t.

Now based on the regression results presented in Table 4.4.2.1, the model of this study can be written as follows:

LONGRW=0.26456+0.04222*USD-0.00361*NBB-0.05022*LIR+0.05125*Log(TA)-0.38773*DPOLNR+ 0.00244* GDP + μit

The impact of explanatory variables on the loan growth of Ethiopian commercial banks is summarized as indicated in the following table.

Table 4.4.2.2. Summary of Significant Results from Loan growth model

Variable	Definition	Expectation	Regression result	Statistically significant at
NBB	Number of bank branch	+	-	5%
USD	Exchange rate of USD to ETB	?	+	1%
LIR	Lending interest rate	-	-	1%
DPOLNR	Deposit to loan ratio	+	-	1%

Source: Summaryby authorfrom EviewsLoan growth regression output, 2015.

This summary contains the explanatory variables from the loan growth model result indicated in table 4.4.2.1, which are found to have statistically significant impact on the bank lending growth. As shown in table 4.4.2.2, from the bank specific variables, number of bank branch network is significant at 5% while lending interest rate and Deposit to loan ratio are significant at 1%. From macroeconomic variables, exchange rate is found to be significant a 1%.

CHAPTER FIVE

5 CONCLUSION AND RECOMMENDATION

5.1 CONCLUSIONS

This section presents conclusions and recommendations based on the different analysis made in previous sections. The conclusion drawn from the descriptive statistics, correlation and regression analysis is presented in this section.

5.1.1 Conclusion from descriptive statistics

During the period covered in this study, commercial banks in Ethiopia had found to be profitable as indicated by the average return on equity of 23% on unadjusted basis. This is quite in excess of the return which is considered to be favorable for the banking sector. According to Fraker (2006) cited in kanwal and nadeem(2013), return on equity between 15%-20% is considered to be favorable for banking sector.

The loan portfolio of Ethiopian commercial banks had shown an average annual growth rate of 26% for the past decade and half. However, the average deposit to loan ratio of

141% for the same period as revealed by the descriptive statistics indicate that most of the commercial banks included in this study had a capacity to provide more loans during those periods. This conclusionis quite sound as the maximum deposit to loan ratio for the study period reached 218%(see table 4.1.2.1).

Descriptive analysis of the Balance sheet figure of the Ethiopian commercial banks included in the study showed that on average, the total saving deposit and total asset held by these banks during the study period was ETB 3.67 billion and 5.1 billion respectively. The total asset had grown on average by 26.3% per annum and this growth rate is parallel with average loan growth rate of 26% mentioned above. This indicates thatloan growth constituted the major portion of the growth in the total asset of the Ethiopiancommercial banks during the study period. As already illustrated above, the average deposit to loan ratio, which is nearly one and half times of the loan portfolio revealed that the Ethiopian commercial banks included in this study had a potential to extend more loans during the period covered by the study.

During the study period, the average and maximum loan loss expense ratio for the Ethiopian commercial banks is found to be 1% and 5% respectively. The magnitude of the loan loss expense can be affected by the provisioning policy pursuedby each bank. The loan loss expense might also have only a temporary effect on the profitability of Ethiopian commercial banks,as the loss can be recovered by confiscating the collateral[6].

The average annual lending interest rate of Ethiopian commercial banks for the study period was 8.6% and the maximum annual interest rate was reached 13%. Considering the minimum deposit interest rate that varies between 3-5%[7] , this rate had yield sufficient spread.

The average number of branches for the commercial banks during the study period were 44 and this reflect the fact that Ethiopian banks were used branch as the only service out late.

[6] Ethiopian banks all usually providing loan against property collateral.

[7] Minimum saving deposit rate as per the NBE policy

The analysis of macroeconomic factors indicated that the exchange rate of Ethiopian birr was depreciated by 129% from the minimum of 8.33 in 2000 to the maximum of 19.07 in 2014 and mean value was being 11.67. The average GDP growth rate of 8.66% for the last 15 years is believed to be positively contributed to the growth of Ethiopian commercial banks.

5.1.2 Conclusion from Correlation and Regression Analysis

As it is mentioned at the very beginning, the main objective of this study is to identify the impact of exchange rate variation on the profitability of Commercial banks in Ethiopia. The annual exchange rate between ETB and USD was used as an exchange rate variable. The correlation and cause and effect relation of the Ethiopian birr exchange rate with the profitability (ROE) of Ethiopian commercial banks has been analyzed using regression model. A number of bank specific and economic factors were included as control variable in the regression model and their correlation and regression analysis has also made as presented in chapter four.

Moreover, in the literature review, it has been identified that exchange rate variation can affect bank performance both directly and indirectly. The direct effect is a balance sheet based exposure (from asset and liability denominated by foreign currency) and the indirect effect can be from different sources and it is very subtle. The indirect effect on the bank profitability is basically emanate from its pressure on the business of bank clients, which manifested by its effect on demand for bank loan and loan performance.

Therefore, in order to further scrutinize the indirect effect of exchange rate variation on the performance of commercial banks in Ethiopia, the effect of exchange rate on the growth of bank loan portfolio was analyzed using separate regression model. The followings are the conclusions drawn from the result of regression and correlation analysis result of these two models.

5.1.2.1 Bank profitability- ROE

From the bank specific factors, loan growth, total saving and total asset was found to be positively correlated with Ethiopian commercial bank profitability while loan loss expense ratio showed a negative correlation. Thus, it is possible to conclude that commercial banks

with large saving and asset base and high loan growth are more profitable. Similarly, from macroeconomic factors, GDP found to have a positive association with the profitability (ROE) of the commercial banks in Ethiopia while exchange rate showed anegative correlation. It is possible to infer that, in the study period, the profitability of Ethiopia commercial banks were better off at the time birr was appreciated and the other way round at the time birr was depreciated against USD. The positive correlation of GDP and ROE is also indicates that GDP growth was contributed to the performance of Ethiopian banks.

The empirical study showed that loan growth, loan loss expense, exchange rate and GDP significantly affect the profitability of Ethiopian commercial banks. From the bank specific significant variables, loan growth is positively impacted the profitability of banks in Ethiopia and significant at 1% while loan loss expense showed negative impact and significant at 1%.

Similarly, from the macroeconomic variables, exchange rate is found to have negative impact and significant at 5% while GDP showed a positive impact and significant at 1%. This signifies that GDP growth and stable exchange rate regime is vital for good bank performance.

5.1.2.2 Bank loan growth

The correlation result shows that Ethiopian commercial banks with large number of branches and asset base tend to attain large loan growth as indicated by positive correlation of loan growth with number of branch and total asset of the bank. Contrary to the negative association with bank profitability, exchange rate showed a positive relation to bank loan growth. The regression result has also shows that exchange rate had positive significant influence on the loan growth of Ethiopian commercial banks in the study period. From this, it is possible to infer that the negative effect of exchange rate on the profitability of banks in Ethiopian was not emanated from its effect on loan growth. Rather it may emanate from its effect on other aspects of the bank performance which shall be subject to further study.

The empirical study also revealed that number of bank branch, lending interest rate and deposit to loan ratio had negative significant impact on the loan growth of banks in Ethiopia during the study period. The negative impact of number of bank branch on bank loan growth might reflect the effect of competition among different banks, while the negative impact of deposit on loan growth may indicate seasonality effect. Summer season is marked with slow business movement in Ethiopia and banks may mobilize large saving during this time, however, this saving might not be effectively load up because of low demand for loan. The fact that a yearend figure[8] has been used in the study can strengthen this conclusion.The negative significant impact of lending interest rate on the loan growth is consistent with the expectation and it indicate that banks charging high interest rate would tend to lose clients to competitor.

5.2 RECOMMENDATION

Based on findings from the descriptive statistics, correlation and regression analysis, the following specific recommendations are forwarded.

Although the depreciating trend of the Ethiopian birr exchange rate against major hard currencies can result in accounting gain on the bank's foreign currency reserve and found to have positive influence on the bank loan growth as revealed by the study, the empirical result of this study shows that on aggregate basis, the variation in exchange rate is negatively impacting the profitability of Ethiopian commercial banks.

Therefore, it is recommended that the bank managers should regularly analyze how exchange rate affects their revenue from different stream, and avail appropriate strategy to reduce the magnitude of the adverse effect of exchange rate variation on their bank's profitability, by sorting out those revenue stream that are highly sensitive to and negatively affected by exchange rate movement.

Regulatory body shall also focus on the composite effect of exchange rate variation and shall ensure the availability of policy that enforces banks to analyze how their revenue

[8] The data used in the study was taken from the banks financial statements which prepared for the period ended 30th June of each year included in the study except for the year from 2000-2008, for this period financial statements of the banks were prepared as of December 31, of each year. The month of June, is the first month of summer season in Ethiopia and as widely known business movement is getting slow during the summer season.

from different sources affected by exchange rate and develop strategy toreduce the adverse effect of exchange rate on bank profitability.

The study also revealed that exchange rate is positively influence the Ethiopian bank loan growth. This can be logical if substantial portion of the bank loan goes to clients engaged in import activities. Becausemore birr is required to purchase few dollar at the time birr is depreciating and vice versa. Importers may demand large loan during the time the birr value is deteriorating. However, the repayment of such loan might be endangered due to the effect of exchange rate on the market price and demand for the goods and services which the bank client is importing. Therefore, while assessing the cash flow of the client to determine the credit capacity of the bank clients engaged on import activities, bank managers shall be highly cautious and should take in to account the likely effect of exchange rate movement on client's sales and profitability and determine the appropriate loan size accordingly.

Lastly, the descriptive statistics showed that on average Ethiopian banks holds deposit to loan ratio of 146% and the maximum amount of this ratio goes up to 218%. This shows a potential to provide more loan. Therefore, it is recommended that bankers should make effective use of the saving deposit for providing loan without compromising the prudent liquidity level.

5.3 Future Research

This empirical study proves that exchange rate variation is negatively impacting the profitability of Ethiopian commercial banks. However, the how of it is not yet answered as exchange rate can affect banks profitability in different ways. This study has also further tried to analyze the exchange rate effect on bank loan growth by anticipating that part of the effect of exchange rate on bank profitability might be emanate from its effect on loan growth. However, it is found that exchange rate positively influenced bank loan growth and has no contribution for the negative impact of exchange rate on bank profitability. Therefore, future studies shall gear to identifying the effect of exchange rate variation on bank loan performance, bank income form facilitation of import and export. Such study

could unfold the how part of the negative influence of exchange rate variation on the profitabilitybanks in Ethiopia.

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LIST OF APPENDICES

Appendix 1: List of commercial Banks operating in Ethiopia and their year of establishment

No.	Name of the Bank	Year of establishment	Number of years since establishment till 2014
1	Commercial bank of Ethiopia	1963 GC	51
2	Construction & Business bank of Ethiopia	1975 GC	31
3	Awash International Bank S.C.	1994 GC.	20
4	Dashen Bank	1995 GC.	19
5	Wegagen Bank	1997 Gc.	17
6	Bank of Abyissinia	1996 GC.	18
7	United Bank	1998 Gc.	16
8	Nib International Bank	1999 Gc.	15
9	Cooperative Bank of Oromia	2004 GC	9
10	Lion International Bank	2006 GC	8
11	Zemen Bank	2008 GC	6
12	Oromia International Bank	2008 Gc	6
13	Buna International Bank	2009 Gc	5
14	Brehan International Bank	2009 Gc	5
15	Abay Bank S.C	2010 Gc	4
16	Addis International Bank	2011 GC	3
17	Debub Global Bank	2012 Gc	2
18	Enat Bank	2012 Gc	2

Source: NBE web site,www.nbe.gov.et, Bank list page.

Appendix 2: List of banks included in sample

No.	Name of the Bank	Year of establishment	Number of years since establishment till 2014
1	Construction & Business bank of Ethiopia	1975 G.c	31
2	Awash International Bank S.C.	1994 GC.	20
3	Dashen Bank	1995 GC.	19
4	Wegagen Bank	1997 Gc.	17
5	Bank of Abyissinia	1996 GC.	18
6	United Bank	1998 Gc.	16
7	Nib International Bank	1999 Gc.	15

Source: Researcher's own selection.

Appendix 3: Data input for bank profit (ROE) and loan growth Models

YR	USD	TLON	LONGRW	TA	TDPO	DPOLNR	TEQ	NBB	LLEX	LLEXPR	NPAT	GDP	LIR	ROE	BANK
2000	8.140	756,000,000	0%	974,000,000	503,000,000	67%	69,000,000	11	6,000,000	1%	3,000,000	3.4	7.74	2%	CBB
2001	8.330	751,000,000	-1%	968,000,000	505,000,000	67%	67,000,000	11	8,000,000	1%	2,000,000	7.4	8.33	3%	CBB
2002	8.540	650,000,000	-13%	958,000,000	603,000,000	93%	77,000,000	13	2,000,000	0%	4,000,000	1.6	4.85	6%	CBB
2003	8.580	627,000,000	-4%	942,000,000	615,000,000	98%	79,000,000	15	8,000,000	1%	11,000,000	(2.1)	5.36	14%	CBB
2004	8.630	637,000,000	2%	1,057,000,000	684,000,000	107%	83,000,000	17	16,000,000	3%	4,000,000	11.7	4.74	5%	CBB
2005	8.652	747,000,000	17%	1,832,000,000	1,056,000,000	141%	106,000,000	19	20,000,000	3%	17,000,000	12.6	3.95	18%	CBB
2006	8.681	1,046,000,000	40%	1,797,000,000	973,000,000	93%	157,000,000	22	25,000,000	2%	56,000,000	11.5	6.14	43%	CBB
2007	8.794	1,156,000,000	11%	1,889,000,000	1,136,000,000	98%	212,000,000	26	55,000,000	5%	56,000,000	11.8	8.45	30%	CBB
2008	9.244	1,205,195,000	4%	2,392,017,000	1,489,262,000	124%	258,988,000	29	8,000,000	1%	84,160,000	11.2	9.53	36%	CBB
2009	10.421	1,391,000,000	15%	2,592,147,000	1,834,000,000	132%	269,143,000	43	10,000,000	1%	73,539,000	10.0	9.03	28%	CBB
2010	12.891	1,557,922,000	12%	3,161,663,000	2,354,385,000	151%	320,216,000	46	-	0%	91,628,600	10.6	9.10	31%	CBB
2011	16.118	1,545,979,000	-1%	3,504,868,000	2,507,157,000	162%	363,073,000	48	-	0%	85,859,064	11.3	9.10	25%	CBB
2012	17.254	1,628,309,000	5%	5,946,604,000	3,517,183,000	216%	478,890,000	55	-	0%	115,000,000	8.8	9.74	27%	CBB
2013	18.195	1,878,705,000	15%	6,699,496,000	4,097,591,000	218%	665,272,000	63	-	0%	139,113,000	9.7	9.05	24%	CBB
2014	19.075	2,370,560,000	26%	7,870,560,000	4,670,560,000	197%	870,560,000	78	-	0%	157,680,000	10.3	9.66	21%	CBB
2000	8.140		23%			132%		24		1%			9.42	11%	AIB

		447,000,000		760,391,264	591,000,000		94,000,000		4,000,000		15,000,000	3.4			
2001	8.330	561,000,000	26%	907,000,000	751,000,000	134%	104,000,000	24	5,000,000	1%	11,000,000	7.4	9.05	11%	AIB
2002	8.540	637,000,000	14%	1,112,000,000	930,000,000	146%	131,000,000	25	5,000,000	1%	12,000,000	1.6	9.44	10%	AIB
2003	8.580	800,000,000	26%	1,401,000,000	1,164,000,000	146%	137,000,000	29	24,000,000	3%	14,000,000	(2.1)	4.93	10%	AIB
2004	8.630	946,000,000	18%	1,770,000,000	1,493,000,000	158%	155,000,000	32	19,000,000	2%	26,000,000	11.7	5.36	18%	AIB
2005	8.652	1,290,000,000	36%	2,226,000,000	1,940,000,000	150%	228,000,000	35	9,000,000	1%	38,000,000	12.6	6.00	20%	AIB
2006	8.681	1,872,000,000	45%	2,954,000,000	2,567,000,000	137%	304,000,000	40	-	0%	78,000,000	11.5	6.21	29%	AIB
2007	8.794	2,512,000,000	34%	3,830,000,000	3,112,000,000	124%	433,500,000	46	-	0%	143,000,000	11.8	8.82	39%	AIB
2008	9.244	2,737,877,000	9%	4,820,224,000	3,869,527,000	141%	597,149,000	53	-	0%	142,800,000	11.2	8.89	28%	AIB
2009	10.421	2,713,000,000	-1%	6,422,547,000	4,962,409,000	183%	749,900,000	61	29,010,000	1%	142,971,000	10.0	8.64	21%	AIB
2010	12.891	3,145,685,000	16%	7,944,780,000	6,105,939,000	194%	940,325,000	64	17,899,000	1%	247,559,000	10.6	8.66	29%	AIB
2011	16.118	3,986,464,000	27%	10,115,780,000	7,743,779,000	194%	1,308,190,000	70	5,213,000	0%	360,631,000	11.3	8.17	32%	AIB
2012	17.254	5,504,610,000	38%	11,936,680,688	9,204,356,000	167%	1,610,325,000	86	11,248,000	0%	394,422,000	8.8	8.95	27%	AIB
2013	18.195	7,709,998,000	40%	14,858,821,000	12,545,207,000	163%	2,011,144,000	114	55,919,000	1%	507,560,000	9.7	9.45	28%	AIB
2014	19.075	9,176,359,000	19%	17,601,184,000	11,773,714,000	128%	2,525,448,000	152	31,327,000	0%	618,269,000	10.3	11.70	27%	AIB
2000	8.140	533,000,000	26%	865,000,000	605,000,000	114%	77,000,000	20	4,000,000	1%	11,000,000	3.4	8.20	14%	DSHN
2001	8.330	714,000,000	34%	1,100,000,000	886,000,000	124%	93,000,000	23	-	0%	21,000,000	7.4	8.68	25%	DSHN
2002	8.540	872,000,000	22%	1,486,000,000	1,191,000,000	137%	122,000,000	26	4,000,000	0%	24,000,000	1.6	7.77	22%	DSHN
2003	8.580		45%			128%		29		2%			5.33	22%	DSHN

		1,267,000,000		1,991,000,000	1,621,000,000		129,000,000		23,000,000		27,000,000	(2.1)			
2004	8.630	1,690,000,000	33%	2,677,000,000	2,178,000,000	129%	172,000,000	31	16,000,000	1%	56,000,000	11.7	5.67	37%	DSHN
2005	8.652	2,232,000,000	32%	3,420,000,000	2,833,000,000	127%	243,000,000	33	12,000,000	1%	71,000,000	12.6	6.44	29%	DSHN
2006	8.681	3,164,000,000	42%	4,546,000,000	3,692,000,000	117%	386,000,000	37	14,000,000	0%	133,000,000	11.5	6.95	42%	DSHN
2007	8.794	3,988,000,000	26%	6,041,000,000	4,861,000,000	122%	544,500,000	42	8,000,000	0%	187,000,000	11.8	8.21	40%	DSHN
2008	9.244	4,382,000,000	10%	7,828,587,000	6,151,520,000	140%	730,608,000	48	18,248,000	0%	239,055,000	11.2	8.44	37%	DSHN
2009	10.421	4,451,508,000	2%	9,732,578,000	7,925,209,000	178%	908,694,000	54	2,174,000	0%	249,881,000	10.0	8.98	30%	DSHN
2010	12.891	5,048,841,000	13%	12,353,381,000	10,144,549,000	201%	1,123,347,000	59	11,361,000	0%	324,040,000	10.6	8.17	32%	DSHN
2011	16.118	6,217,537,000	23%	14,659,792,000	11,841,237,000	190%	1,396,402,000	65	17,060,000	0%	450,655,000	11.3	8.11	36%	DSHN
2012	17.254	8,123,813,000	31%	17,520,038,000	14,065,599,000	173%	1,827,893,000	75	19,452,000	0%	652,015,000	8.8	9.55	40%	DSHN
2013	18.195	8,862,315,000	9%	19,747,171,000	15,851,263,000	179%	2,045,698,000	111	17,767,000	0%	606,788,000	9.7	9.52	31%	DSHN
2014	19.075	9,429,628,000	6%	21,962,198,000	17,681,341,000	188%	2,597,624,000	142	-	0%	963,705,000	10.3	10.81	42%	DSHN
2000	8.140	262,000,000	18%	514,000,000	373,000,000	142%	50,000,000	18	4,000,000	2%	3,000,000	3.4	7.46	7%	WGGN
2001	8.330	344,000,000	31%	583,000,000	449,000,000	131%	58,000,000	20	8,000,000	2%	6,000,000	7.4	9.47	8%	WGGN
2002	8.540	406,000,000	18%	646,000,000	515,000,000	127%	64,000,000	22	5,000,000	1%	6,000,000	1.6	9.11	10%	WGGN
2003	8.580	571,000,000	41%	889,000,000	704,000,000	123%	93,000,000	23	8,000,000	1%	11,000,000	(2.1)	5.15	14%	WGGN
2004	8.630	738,000,000	29%	1,140,000,000	876,000,000	119%	129,000,000	25	14,000,000	2%	32,000,000	11.7	6.56	29%	WGGN
2005	8.652	1,002,000,000	36%	1,616,000,000	1,288,000,000	129%	180,000,000	29	19,000,000	2%	48,000,000	12.6	5.77	27%	WGGN
2006	8.681		59%			112%		33		2%			6.19	33%	WGGN

		1,593,000,000		2,259,000,000	1,778,000,000		255,000,000		29,000,000		71,000,000	11.5			
2007	8.794	2,155,000,000	35%	3,480,000,000	2,723,500,000	126%	403,000,000	39	32,000,000	1%	112,000,000	11.8	6.84	34%	WGGN
2008	9.244	2,346,779,000	9%	4,124,888,000	2,966,326,000	126%	605,444,000	40	52,468,000	2%	138,838,000	11.2	6.97	28%	WGGN
2009	10.421	2,112,381,000	-10%	5,118,308,000	3,728,380,000	177%	836,413,000	49	2,901,000	0%	180,630,000	10.0	8.68	25%	WGGN
2010	12.891	2,473,871,000	17%	5,741,930,000	3,922,795,000	159%	1,051,724,000	50	8,525,000	0%	223,341,000	10.6	9.02	24%	WGGN
2011	16.118	2,910,048,000	18%	8,061,045,000	5,957,480,000	205%	1,337,334,000	53	40,360,000	1%	323,280,000	11.3	9.95	27%	WGGN
2012	17.254	3,565,674,000	23%	8,347,149,000	5,758,178,000	161%	1,604,132,000	60	39,000	0%	336,249,000	8.8	9.96	23%	WGGN
2013	18.195	4,690,141,000	32%	10,393,797,000	7,550,659,000	161%	1,830,424,000	79	3,365,000	0%	343,317,000	9.7	11.43	20%	WGGN
2014	19.075	4,604,415,000	-2%	11,242,577,000	8,384,478,000	182%	2,144,214,000	100	6,770,000	0%	304,899,000	10.3	13.02	15%	WGGN
2000	8.140	522,000,000	1%	718,000,000	482,000,000	92%	123,000,000	11	4,000,000	1%	12,000,000	3.4	8.60	10%	BOA
2001	8.330	687,000,000	32%	896,000,000	651,000,000	95%	147,000,000	13	10,000,000	1%	19,000,000	7.4	10.43	14%	BOA
2002	8.540	669,000,000	-3%	1,142,000,000	909,000,000	136%	141,000,000	15	20,000,000	3%	(2,000,000)	1.6	10.18	-1%	BOA
2003	8.580	809,000,000	21%	1,333,000,000	1,076,000,000	133%	149,000,000	17	24,000,000	3%	6,000,000	(2.1)	6.39	4%	BOA
2004	8.630	962,000,000	19%	1,585,000,000	1,275,000,000	133%	193,000,000	19	11,000,000	1%	38,000,000	11.7	7.92	22%	BOA
2005	8.652	1,234,000,000	28%	2,057,000,000	1,627,000,000	132%	254,000,000	22	-	0%	61,000,000	12.6	7.81	24%	BOA
2006	8.681	1,963,000,000	59%	2,834,000,000	2,177,000,000	111%	402,000,000	26	4,000,000	0%	85,000,000	11.5	8.31	26%	BOA
2007	8.794	2,305,000,000	17%	3,396,000,000	2,721,000,000	118%	403,000,000	29	47,000,000	2%	67,000,000	11.8	8.59	17%	BOA
2008	9.244	2,817,153,000	22%	4,269,942,000	3,477,766,000	123%	419,680,000	43	142,771,000	5%	14,575,000	11.2	8.64	4%	BOA
2009	10.421		-4%			166%		46		1%			9.53	21%	BOA

		2,708,964,000		5,476,617,000	4,494,186,000		519,227,000		22,947,000		100,464,000	10.0			
2010	12.891	3,153,244,000	16%	6,279,536,000	5,138,846,000	163%	585,489,000	48	-	0%	140,582,000	10.6	9.66	25%	BOA
2011	16.118	3,315,687,000	5%	7,277,959,000	6,075,257,000	183%	660,756,000	55	18,996,000	1%	180,928,000	11.3	9.23	29%	BOA
2012	17.254	3,897,406,000	18%	8,239,509,000	6,771,458,000	174%	906,591,000	63	23,629,000	1%	216,316,000	8.8	9.01	28%	BOA
2013	18.195	4,702,074,000	21%	10,129,369,000	8,496,146,000	181%	1,107,631,000	78	23,629,000	1%	216,316,000	9.7	9.37	21%	BOA
2014	19.075	5,061,009,000	8%	11,276,387,000	9,096,476,000	180%	1,528,965,000	100	175,000	0%	447,421,000	10.3	11.34	34%	BOA
2000	8.140	88,000,000	4%	143,000,000	76,000,000	86%	40,000,000	7	1,000,000	1%	3,000,000	3.4	9.84	8%	UNTD
2001	8.330	134,000,000	52%	214,000,000	129,000,000	96%	63,000,000	9	1,000,000	1%	5,000,000	7.4	10.22	10%	UNTD
2002	8.540	163,000,000	22%	314,000,000	189,000,000	116%	88,000,000	10	1,000,000	1%	4,000,000	1.6	9.44	5%	UNTD
2003	8.580	290,000,000	78%	469,000,000	287,000,000	99%	91,000,000	13	5,000,000	2%	5,000,000	(2.1)	5.63	6%	UNTD
2004	8.630	384,000,000	32%	674,000,000	532,000,000	139%	96,000,000	15	9,000,000	2%	7,000,000	11.7	5.01	7%	UNTD
2005	8.652	593,000,000	54%	1,073,000,000	865,000,000	146%	125,000,000	17	7,000,000	1%	31,000,000	12.6	7.69	25%	UNTD
2006	8.681	1,004,000,000	69%	1,599,000,000	1,220,000,000	122%	191,000,000	22	6,000,000	1%	44,000,000	11.5	7.80	28%	UNTD
2007	8.794	1,410,000,000	40%	2,182,500,000	1,541,000,000	109%	360,000,000	30	13,000,000	1%	64,000,000	11.8	8.04	23%	UNTD
2008	9.244	1,859,662,000	32%	3,249,957,000	2,443,345,000	131%	467,792,000	36	13,584,000	1%	91,037,000	11.2	9.00	22%	UNTD
2009	10.421	2,152,234,000	16%	4,651,697,000	3,615,751,000	168%	519,973,000	41	16,700,000	1%	93,586,000	10.0	9.09	19%	UNTD
2010	12.891	2,613,609,000	21%	5,896,229,000	4,724,852,000	181%	637,552,000	42	28,873,000	1%	174,450,000	10.6	9.42	30%	UNTD
2011	16.118	3,276,958,000	25%	7,725,615,000	6,065,824,000	185%	901,364,000	50	6,731,000	0%	231,832,000	11.3	9.63	30%	UNTD
2012	17.254		25%			165%		69		0%			11.77	30%	UNTD

		4,085,376,000		8,786,856,000	6,757,514,000		1,101,714,000		5,670,000		297,860,000	8.8			
2013	18.195	4,710,762,000	15%	9,977,669,000	8,063,473,000	171%	1,201,146,000	75	-	0%	281,959,149	9.7	12.69	24%	UNTD
2014	19.075	4,996,573,000	6%	11,765,831,000	8,909,069,000	178%	1,575,271,739	99	1,446,501	0%	278,170,018	10.3	12.80	20%	UNTD
2000	8.140	59,000,000	0%	158,000,000	78,000,000	132%	40,000,000	9	-	0%	1,000,000	3.4	6.22	3%	NIB
2001	8.330	210,000,000	256%	336,000,000	208,000,000	99%	62,000,000	10	1,000,000	0%	12,000,000	7.4	9.80	24%	NIB
2002	8.540	324,000,000	54%	534,000,000	345,000,000	106%	99,000,000	11	3,000,000	1%	13,000,000	1.6	8.90	16%	NIB
2003	8.580	550,000,000	70%	885,000,000	588,000,000	107%	125,000,000	12	20,000,000	4%	13,000,000	(2.1)	5.93	12%	NIB
2004	8.630	786,000,000	43%	1,247,000,000	832,000,000	106%	173,000,000	13	8,000,000	1%	35,000,000	11.7	7.35	23%	NIB
2005	8.652	1,133,000,000	44%	1,732,000,000	1,223,000,000	108%	224,000,000	17	18,000,000	2%	46,000,000	12.6	7.64	21%	NIB
2006	8.681	1,475,000,000	30%	2,027,000,000	1,452,000,000	98%	285,000,000	20	9,000,000	1%	58,000,000	11.5	8.42	23%	NIB
2007	8.794	1,817,000,000	23%	2,607,000,000	1,879,000,000	103%	425,000,000	28	5,000,000	0%	76,000,000	11.8	9.22	21%	NIB
2008	9.244	2,113,814,000	16%	3,650,107,000	2,469,929,000	117%	598,119,000	40	19,035,000	1%	113,040,000	11.2	9.70	22%	NIB
2009	10.421	2,220,289,000	5%	4,806,504,800	3,296,388,000	148%	728,822,000	45	23,391,000	1%	153,659,000	10.0	11.09	23%	NIB
2010	12.891	2,546,135,000	15%	5,970,507,000	4,127,187,000	162%	916,506,000	48	33,202,000	1%	200,887,000	10.6	12.04	24%	NIB
2011	16.118	2,766,522,000	9%	7,111,522,000	5,157,400,000	186%	1,170,646,400	51	15,339,000	1%	246,434,000	11.3	12.00	24%	NIB
2012	17.254	3,708,899,706	34%	8,275,695,377	5,838,126,809	157%	1,527,946,224	58	1,411,321	0%	286,234,320	8.8	12.12	21%	NIB
2013	18.195	4,542,992,453	22%	9,144,540,286	6,655,213,000	146%	1,665,928,000	72	-	0%	299,369,000	9.7	13.04	19%	NIB
2014	19.075	5,407,739,000	19%	10,747,279,000	7,923,291,000	147%	1,964,355,000	94	-	0%	297,369,000	10.3	13.04	16%	NIB

Appendix 4: Heteroskedasticity Test: White test for Return on Equity Model

F-statistic	1.208010	Prob. F(26,48)	0.2796
Obs*R-squared	29.66466	Prob. Chi-Square(26)	0.2817
Scaled explained SS	40.94253	Prob. Chi-Square(26)	0.0314

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 12/03/15 Time: 11:39
Sample: 5 103
Included observations: 91
Collinear test regressors dropped from specification

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.692964	1.290619	-0.536924	0.5938
USD^2	0.000134	0.000254	0.527961	0.6000
USD* LONGRW	-0.000282	0.000646	-0.436807	0.6642
USD* LLEXPR	-0.000640	0.000454	-1.409485	0.1651
USD*GDP	1.79E-05	0.000368	0.048821	0.9613
USD*LOG(TDPO)	-0.003057	0.007151	-0.427574	0.6709
USD*LOG(TA)	0.002533	0.008030	0.315489	0.7538
USD	0.002639	0.031129	0.084767	0.9328
LONGRW^2	0.000860	0.001058	0.813295	0.4201
LONGRW*LLEXPR	0.001170	0.001230	0.951012	0.3464
LONGRW*GDP	-0.000219	0.000589	-0.371863	0.7116
LONGRW*LOG(TDPO)	-0.012503	0.017410	-0.718136	0.4762
LONGRW*LOG(TA)	0.015129	0.019287	0.784418	0.4366
LONGRW	-0.045992	0.056007	-0.821189	0.4156
LLEXPR^2	0.000120	0.000430	0.279700	0.7809
LLEXPR*GDP	0.000331	0.000418	0.791272	0.4327
LLEXPR*LOG(TDPO)	0.017560	0.011950	1.469452	0.1482
LLEXPR*LOG(TA)	-0.016973	0.013466	-1.260437	0.2136
LLEXPR	0.003364	0.056496	0.059550	0.9528
GDP^2	-0.000110	0.000106	-1.039246	0.3039
GDP*LOG(TDPO)	-0.002594	0.003844	-0.674925	0.5030
GDP*LOG(TA)	0.003034	0.004484	0.676658	0.5019
GDP	-0.007587	0.016106	-0.471047	0.6397
LOG(TDPO)^2	0.026744	0.029078	0.919709	0.3623
LOG(TDPO)*LOG(TA)	-0.027510	0.032089	-0.857289	0.3955
LOG(TDPO)	-0.427750	0.456132	-0.937777	0.3531
LOG(TA)	0.482212	0.572475	0.842329	0.4038

R-squared	0.395529	Mean dependent var	0.003798
Adjusted R-squared	0.068107	S.D. dependent var	0.007006
S.E. of regression	0.006763	Akaike info criterion	-6.880878
Sum squared resid	0.002196	Schwarz criterion	-6.046583
Log likelihood	285.0329	Hannan-Quinn criter.	-6.547753
F-statistic	1.208010	Durbin-Watson stat	1.652193
Prob(F-statistic)	0.279634		

Appendix 5. Redundant Fixed Effect Test –for ROE Model

Redundant Fixed Effects Tests
Equation: Redundant Fixed Effects Tests
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	4.200821	(6,85)	0.0010
Cross-section Chi-square	25.449653	6	0.0003

Cross-section fixed effects test equation:
Dependent Variable: ROE
Method: Panel Least Squares
Date: 12/03/15 Time: 11:30
Sample (adjusted): 2001 2014
Periods included: 14
Cross-sections included: 7
Total panel (balanced) observations: 91

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.527467	0.278471	-5.485193	0.0000
USD	-0.013080	0.003086	-4.237886	0.0001
LONGRW	0.091052	0.024300	3.747032	0.0003
LLEXPR	-2.210223	0.734047	-3.011010	0.0034
GDP	0.005373	0.001901	2.826958	0.0058
LOG(TDPO)	-0.053673	0.064821	-0.828022	0.4098
LOG(TA)	0.137860	0.072014	1.914335	0.0587

R-squared	0.592626	Mean dependent var	0.230539
Adjusted R-squared	0.565766	S.D. dependent var	0.096197
S.E. of regression	0.063390	Akaike info criterion	-2.610270
Sum squared resid	0.365665	Schwarz criterion	-2.425629
Log likelihood	134.9032	Hannan-Quinn criter.	-2.535586
F-statistic	22.06366	Durbin-Watson stat	0.976494
Prob(F-statistic)	0.000000		

Appendix 6. Heteroskedasticity Test: White test for Loan Growth model

Heteroskedasticity Test: White

F-statistic	0.980555	Prob. F(27,70)	0.5053
Obs*R-squared	26.89348	Prob. Chi-Square(27)	0.4696
Scaled explained SS	368.1894	Prob. Chi-Square(27)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 12/04/15 Time: 09:49
Sample: 2 105
Included observations: 98

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-73.91281	103.4045	-0.714793	0.4771
USD^2	0.005313	0.018638	0.285068	0.7764
USD*NBB	-0.000588	0.003765	-0.156159	0.8764
USD*LIR	0.014110	0.026254	0.537441	0.5927
USD*GDP	0.000433	0.016352	0.026495	0.9789
USD*LOG(TA)	-0.088808	0.081962	-1.083526	0.2823
USD*DPOLNR	0.124281	0.194792	0.638016	0.5255
USD	1.549718	1.615625	0.959207	0.3408
NBB^2	-0.000203	0.000287	-0.709383	0.4804
NBB*LIR	-0.000234	0.003955	-0.059077	0.9531
NBB*GDP	0.001019	0.002854	0.357095	0.7221
NBB*LOG(TA)	0.024755	0.022690	1.091023	0.2790
NBB*DPOLNR	-0.032289	0.023621	-1.366989	0.1760
NBB	-0.481553	0.453065	-1.062878	0.2915
LIR^2	0.004933	0.019810	0.249000	0.8041
LIR*GDP	0.013315	0.011488	1.159110	0.2504
LIR*LOG(TA)	-0.060407	0.087152	-0.693127	0.4905
LIR*DPOLNR	-0.053759	0.186792	-0.287799	0.7744
LIR	1.031797	1.675169	0.615936	0.5399
GDP^2	-0.005400	0.006675	-0.808982	0.4213
GDP*LOG(TA)	-0.020941	0.041372	-0.506161	0.6143
GDP*DPOLNR	-0.064620	0.111900	-0.577479	0.5655
GDP	0.477787	0.809818	0.589993	0.5571
LOG(TA)^2	-0.212365	0.263480	-0.806000	0.4230
LOG(TA)*DPOLNR	1.317938	0.825948	1.595667	0.1151
LOG(TA)	7.982588	10.37643	0.769300	0.4443
DPOLNR^2	-1.241658	1.107936	-1.120695	0.2662
DPOLNR	-24.31277	15.38453	-1.580339	0.1185

R-squared	0.274423	Mean dependent var	0.068967
Adjusted R-squared	-0.005442	S.D. dependent var	0.390643
S.E. of regression	0.391704	Akaike info criterion	1.198338
Sum squared resid	10.74027	Schwarz criterion	1.936900
Log likelihood	-30.71857	Hannan-Quinn criter.	1.497071
F-statistic	0.980555	Durbin-Watson stat	1.286858
Prob(F-statistic)	0.505325		

Appendix 7: Redundent Fixed Effects Test – Loan Growth

Redundant Fixed Effects Tests
Equation: LONGRW
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	4.359922	(6,77)	0.0008
Cross-section Chi-square	26.614883	6	0.0002

Cross-section fixed effects test equation:
Dependent Variable: LONGRW
Method: Panel Least Squares
Date: 12/04/15 Time: 09:43
Sample (adjusted): 2002 2014
Periods included: 13
Cross-sections included: 7
Total panel (balanced) observations: 91
Convergence achieved after 9 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.346876	1.079549	-1.247629	0.2157
USD	0.028326	0.011073	2.558072	0.0123
NBB	-0.002915	0.001554	-1.875500	0.0642
LIR	-0.045303	0.012565	-3.605512	0.0005
GDP	4.20E-05	0.004423	0.009493	0.9924
LOG(TA)	0.105160	0.054756	1.920514	0.0582
DPOLNR	-0.388376	0.089151	-4.356365	0.0000
AR(1)	0.299070	0.051889	5.763662	0.0000

R-squared	0.418820	Mean dependent var	0.230656
Adjusted R-squared	0.369805	S.D. dependent var	0.177318
S.E. of regression	0.140764	Akaike info criterion	-0.999661
Sum squared resid	1.644601	Schwarz criterion	-0.778926
Log likelihood	53.48456	Hannan-Quinn criter.	-0.910608
F-statistic	8.544708	Durbin-Watson stat	1.562556
Prob(F-statistic)	0.000000		

Inverted AR Roots .30