

# Factors Affecting the Net Interest Margin of Commercial Bank of Ethiopia

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**Abstract-** This paper analyzes the factors affecting the commercial bank of Ethiopia's (CBE's) net interest margins during 2005 to 2014, a period characterized by increasing the bank's net interest margin. The pooled ordinary multiple regression models are used to estimate the results without compromising the classical linear regression assumptions. In line with findings in the previous literature, this paper finds that capital adequacy (risk aversion), credit risk, operating costs, degree of competition (Lerner index) and deposit growth rate are the most important drivers of CBE's net interest margins. Almost all variables in the model indicates a positive and highly significant association ship with net interest margins, and are found to be the most important bank specific factors that determine the net interest margin of the bank, CBE. The results of the study also suggests that high concentration led to lower competition, and thereby increase the net interest margins of banks, especially the dominant bank like CBE in case of Ethiopia. All in all, the results suggests that there has to be a measure to be taken by the sector to reduce the banks concentration ratio, operating costs, risk premium on credits, and increase the level of capital to offer competitive interest margins and fairly shared growth rates in deposits among others. In doing so, this paper conclude that further structural reforms and merger or consolidation enter alia may lower CBE's net interest margins and share the market potentially fairly to other private banks operating in the industry.

**Index Terms-** Net interest margin, performance, commercial bank of Ethiopia, competition, concentration.

## I. INTRODUCTION

One of the main objectives for the establishment of financial institutions is mobilizing resources (in particular domestic saving) and channelling these to user. This intermediation role of financial institutions takes different forms in different economic systems (Geda 2006). In most countries, banks provide essential financial services that facilitate economic growth. They lend money to start businesses, purchase homes, secure credit for the purchase of durable consumer goods, and furnish a safe place in which societies can store their wealth. In particular, for developing countries, improvements in the banking sector could have significant impact on the allocation of financial resources since the sector remains, still, the most important source of financing private investment of firms, given the underdevelopment of the financial markets (Sufian & Habibullah, 2010). Banks play a key role in improving economic efficiency by channelling funds from resource surplus unit to

those with better productive investment opportunities. Banks also play key role in trade and payment system by significantly reducing transaction costs and increasing convenience. In less monetized countries, like Ethiopia, whilst financial sector is dominated by banking industry, effective and efficient functioning of the Banks has significant role in accelerating economic growth. In Ethiopian context, the financial system is dominated by banking industry, and yet, it is amongst the major under-banked economy in the world (Eshete, Tesome & Abebe 2013).

Identifying the determinants of bank performance is an important predictor of unstable economic conditions and may help bank management and shareholders to present professional plans and achieve their long-term aims more quickly. A profitable banking system is likely to absorb the negative shocks, and so the stability of financial system. Identifying key factors influencing bank performance, profitability enter alia, is of importance to improve bank internal management and perform banking policies (Chen & Liao, 2009). A sound, profitable, competent and well managed banks enables both the economy and the country to stay competitive and able to withstand any negative shocks (Hamidi, Karim & Jamal (2012). In Ethiopia, banks are regarded as dominant financial institution, thus, their health condition is crucial as it will give effect to the general health of the economy. According to these authors, therefore, having the knowledge on factors influencing commercial banks' performance is not only important but also is essential in stabilizing the economy as well as for the benefits of other parties involved such as the government, financial authorities and other stakeholders.

Thus, the study of performance is important in assessing the health of organisations. However, profitability, (in terms of return on average assets, return on average equities and net interest margins among others), of the banking sector is particularly crucial as the soundness of the sector is closely related to the soundness of the entire economy (Lipunga 2014), especially for those countries which relies on bank based finance in the absence of well structured stock market like Ethiopia.

Despite extensive reforms in the financial sector in Sub Saharan Africa during 1980s and 1990s, with a view of improving access to financial services to private agencies, financial depth in the sub-region has remained very low and not improving over the years. Commercial bank performance has been poor characterized by low levels of private credit, high interest rate spreads, high levels of non-performing loans, poor asset quality, operational inefficiencies, among others (Panayiotis, et al., 2005). On the other hand, Commercial banks appear very profitable in Sub-Saharan Africa (SSA) compared to other regions with average returns on assets of about two (2)

percent over the last 10 years, significantly higher than bank returns in other parts of the world. The major reasons behind high return in the region as outlined by Ongore (2013) were investment in risky ventures and the existence of huge gap between the demand for bank service and the supply thereof. That means, in SSA the number of banks are few compared to the demand for the services; as a result there is less competition and banks charge high interest rates. This is especially true in East Africa where the few government owned banks take the lion's share of the market (Ongore, 2013).

Following the banks liberalization reform since 1994, the number of private banks in Ethiopia showing an increasing trend in the market share of the banking industry, however, the involvement of private banks in the industry is still lagging behind as compared to neighbouring countries. The major financial institutions operating in Ethiopia are banks, insurance companies and micro-finance institutions. The number of banks operating in the country reached 19 of which 16 were private, and the remaining 3 state-owned (NBE annual report, 2013/14). In Ethiopia bank concentration defined as the asset share of the three largest banks was 100 percent in 1994 and down to 93.6 percent in 1998. It progressed further downward to 69.6 percent in 2006. This implies that the share of government owned banks also declined. According to Kiyatta et al., cited in Bezabeh & Desta, (2014) in seven out of nine years private banks had a higher ROA than state- owned banks. This is due to several factors: the spread has increased for both public and private banks and private banks have higher spreads than publicly owned banks. These authors suggested that, since privately owned banks are superior in terms of efficiency and profitability, publicly owned banks need to be privatized.

The dominant bank, commercial bank of Ethiopia (CBE) is leading the sector in terms of assets, loans and advances, deposits, capital, employees, technologies enter alia. CBE is still leading the market share of the sector in terms of total assets (72.54%), total loans and advances (68.90%), and total deposits (72.16%) (NBE, 2014). In addition the Ethiopian banking sector is unique by abandoning foreign banks to come and invest in the sector with the reasons from the Ethiopian government side that if we open the sector for foreign investors; on one side our banks will become incompetent with different aspects since they are found at infant stage. On the other hand if the government made open the sector for these investors, they may not be willing to borrow more than 50% of their assets/ capital to the small and medium sized firms which are the priorities of the government in the country. Furthermore, a foreign citizen even not allowed having more than 50% shares in domestic banks .Hence, the strategy of the government is gradualism, yet not decided when to make open the sector to foreigners. Concerning its performance the CBE is showing an increasing trend in its profitability measured by return on asset( from 1.87% in the year 2005 to 3.43% in 2014) and net interest margins ( from 1.07% in 2005 to 3.63% in 2014). The focus of this study is to see factors affecting the net interest margins of the state bank, CBE.

### 1.1 PROBLEM STATEMENT

Apparently, the financial sector in Ethiopia is dominated by banks, insurances and financial institutions. The country has no any formal secondary market except treasury bills, interbank

transactions and informal initial public offers, where the scarce resources are to be mobilized from surplus to deficit areas in the economy. It is also known that banks are playing the pivotal role in making a county's economy smooth by resisting negative shocks in the economy. In country where the financial sector is dominated by the banking sector in the absence of formal secondary financial markets, the role of banks is crucial to the advancement of the country's economy.

As to the case of Ethiopia, since 1992 the country has been engaged in liberalizing its financial sector. According to Geda (2006), the hallmark of the strategy is gradualism, and this approach is not without problems especially from Bretton<sup>1</sup> Woods Institutions that saw the reform as a sluggish process. The concern of (Geda 2006) was liberalization program by analyzing the performance of the sector before and after the reform and noted that the presence promising development of the financial sector in the country, the relatively good shape in which the existing financial institutions find themselves, the government's strategy of gradualism and encouraging direction of its overall reform, though the supervision and regulation capacity of the regulating agency is weak. And he argue for charting out clearly defined time frame for liberalization and exploring the possibility of engaging with foreign banks to acquire new technology that enhance the efficiency of the financial sector in general and the banking sector in particular. In addition, Monetary and Banking proclamation No.83/1994 and the Licensing and Supervision of Banking Business No.84/1994 laid down the legal basis for participation of the private sector in banking business, which had been completely prohibited before. As per the Progress Report of awash international bank as of Sept. 30, 2013, the number of private banks has reached around fourteen in the country, now they are sixteen. The government's strategy for financial development was characterized by gradualism and maintaining macroeconomic stability (Addison and Geda, 2001).

Besides, Ethiopia appears unique compared to its East African neighbours (namely Kenya, Tanzania, and Uganda) and many other developing countries in that it has not yet opened its banking sector to foreign participation. The Ethiopian banking sector remains isolated from the impact of globalization. Although Ethiopian policy makers understand the potential importance of financial liberalization, it is widely believed that liberalization may result in loss of control over the economy and may not be economically beneficial (Kozo, Barbara & Stern 2007). Furthermore, the "Banking Business Proclamation No. 592/2008" of Ethiopia declared that foreign nationals or organizations fully or partially owned by foreign nationals may not be allowed to open banks or branch offices or subsidiaries of foreign banks in Ethiopia or acquire the shares of Ethiopian banks.

Ethiopia's financial sector remains closed and is much less developed than its neighbours, and it has no capital market and very limited informal investing in shares of private companies. A series of financial sector reforms has been introduced since 1994, when private banks were allowed to be re-established. But the

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<sup>1</sup> The Bretton Woods system of monetary management established the rules for commercial and financial relations among the world's major industrial states in the mid-20th century.

three large state-owned banks continue to dominate the market in terms of capital, deposits and assets. Ethiopian financial system is highly bank dominated. From 2001 to 2008, the banking sector constitutes 95 percent of assets, 96.53 percent of deposits, 94 percent of loans and deposits and 76.78 percent of equity of the financial sector on average (Kapur & Gualu 2011).

In most cases, the dominant bank (Commercial Bank of Ethiopia) still seizes quasi-monopoly power (Eshete, Tesome & Abebe 2013). They argue that the Ethiopian banking industry can be characterized as incontestable as entry in the industry is difficult, due to legal, technological and economic factors, and Competition in terms of price is relatively weak in the Ethiopian banking industry which confirms that there is monopolistic competition among banks in terms of prices. In a nut shell, banks in the Ethiopian case are competing in terms of service quality and efficiency (including use of technological advances), branch network expansions, advertising and prices, put in the order of their significance.

According to the Standard microeconomic theory, in a perfect competition setting a bank will be a price taker that maximizes profits by minimizing costs, and can increase output up to the point where marginal costs equal marginal revenue and average costs are minimized. However, Bikker and Bos (2008) argue that there are a number of reasons why banks may not be price takers and may not operate in a perfectly competitive market. They mentioned the following among others. 1) In the presence of increasing returns to scale a single bank should theoretically serve the market. 2) Price discrimination can give rise to monopoly powers, for instance through switching costs, search costs and product differentiation. 3) cross-subsidization may cause spill-over effects from one concentrated banking market to another. 4) Existence of regulatory barriers. All in all, the CBE is leading the industry with great government interference and earning abnormal profits through interest margins and return on assets in such a market where there is no stiff competition with the private banks in the sector, though little completion in terms of branch expansion, technology adoption and advertising in addition to individual fixed-effects of their management abilities.

Empirical findings by Desta & Bezabeh (2014) on banking sector reforms in Ethiopia, suggests that eliminating government interference in the banking business is critical for the efficient mobilization of savings and allocation of deposits to profitable enterprises. They point out some Examples of government interferences that have disrupted the banking sector in Ethiopia as; first, the minimum loan and deposit rate on savings is set by the National Bank of Ethiopia. Second, private banks are now required to offer 27 % of their loans to the government and do so at an interest rate of 3 %. In regard to determining the value of the Ethiopian Birr (ETB), the gradual devaluation policy followed by the government did not prove to be useful. All in all, to the best knowledge of the researcher, the factors affecting the net interest margin (NIM) of the typical state bank, CBE, not yet investigated.

Furthermore, the state bank of Ethiopia, CBE, is recognizing a significant amount of interest margins by setting high lending rates and low deposit rate. The former discourages investment and the latter savings, hindering economic growth. To avoid high NIMs, banks need to be both efficient and

competitive. In the year 2012/13 and 2013/14, the shares of the three state owned banks in terms of branch networking and capital reached 45.4% and 44.7% respectively. Out of which, the shares of CBE is found to be 38.8% and 34.2% respectively. In the same year the rest of 16 private banks take the balance figure 54.6% & 55.3% respectively.

As one measure of competition in the banking sector, concentration ratio is the percentage of combined total assets, total deposits, total net interest margin, total loans and advances, total income among others, of the leading four or eight firms in the industry. Hence, by considering all banks, the first four leading banks in terms of total outstanding credits in the year 2013/14 are commercial bank of Ethiopia (89,665.2), Development bank of Ethiopia (22,666.8), Dashen bank (9567.7) and awash international bank (9176.40), these all in millions of birr.

In the year 2013/14, the concentration ratio is amounted to be 77.86% taking in to account the four big banks in terms of total assets. Alternatively, solely by considering commercial banks operating in the industry (excluding development and cooperate banks, the ratio has been computed here bellow. In this case, the four leading commercial banks, in terms of total credits outstanding during the year 2013/14, are commercial bank of Ethiopia, Dashen bank, Awash international bank and Nib international bank. Concentration ratio=  $(0.6316) + (0.0674) + (0.0650) + (0.0390) = 80.3\%$ .

Furthermore, commercial bank of Ethiopia alone does have the concentration ratio of  $(0.6316) = 63.16\%$ . International findings, For example Maudos, & Nagore, (2004) found that HHI ranges from a low value in the USA (1.03) and Germany (1.88) to a high value in some African banking sectors (68.41 in Zambia; 65.04 in Botswana). Literature suggested the benchmark ranges so as to interpret the meanings of concentration ratios computed in this manner. The concentration ratio of 0% implies absence of concentration, rather perfect competition in the market. The concentration ratios ranges in between 1% to 50% enlighten the presence of low concentration and monopolistic competition. The concentration ratios ranges in between 51% to 80% enlighten the presence of medium concentration and monopolistic competition/ oligopoly. The concentration ratios ranges in between 81% to 100% enlighten the presence of high concentration and oligopoly or monopoly. Hence, the Ethiopian banking industry is characterized by medium concentration, monopolistic completion or oligopoly since the concentration ratio falls in the range of 51 to 80% as computed above. Moreover, the Herfindahl - Hirschman Index (HHI) is considered as more formal and commonly used measure of market concentration. Empirical studies by Beck et al. (2004); cited in Kiyota et al, (2007), concluded that increases in bank concentration were an obstacle to obtaining finance. They found that the constraining effects of bank concentration were exacerbated by more restrictions on bank activities, more government interference in the banking sector, and a larger share of government-owned banks. It would appear therefore that the highly closed nature of the in Ethiopian financial sector would serve to negate the positive effects that would otherwise come from greater financial intermediation.

All in all, the aforementioned situations inspired the researcher to see one element of measuring banks performance,

net interest margin to answer the question that what factors affect the net interest margin of the state bank (CBE) since 2005 to 2014, the time where the banks performance increases persistently.

### 1.2 OBJECTIVE OF THE STUDY

Customarily, studies under quantitative approach do have one main objective and as many specific objectives as required. The general objective of the study will be to analyse the factors affecting the net interest margins of the CBE. Specifically, the study will attempt to:

1. Examine the effect of capital adequacy/risk aversion on net interest margin (NIM) of the state bank (CBE)
2. Examine the effect of credit risk on net interest margin (NIM) of the state bank (CBE)
3. Examine the effect of management efficiency on net interest margin (NIM) of the state bank (CBE)
4. Examine the effect of the CBE's growth rate on net interest margin (NIM) of the state bank (CBE).

### 1.3 STUDY HYPOTHESES

After stating the research problem and reviewing the literature, the ground is prepared for structuring hypothesis. A hypothesis is an expectation of what the researcher believes that he/she might find in the data. It provides a directly testable relational statement and facilitates extension of knowledge. Hypothesis should always be in declarative sentence form, and should relate either generally or specifically variables to variables. Hypotheses are formulated usually either from a research problem statement, an existing theory or the findings of previous studies. Thus, based on both the research problem statement, an existing theory or the findings of previous studies the researcher has formulated the bellow hypotheses in declarative sentence form to show the relationship between the dependent and independent variables selected for this study based on the prior studies and the best knowledge of the researcher.

1.  $H_0$ : Capital Adequacy does not significantly affect CBE's NIM.
2.  $H_0$ : Credit risk does not significantly affect CBE's NIM.
3.  $H_0$ : Management efficiency does not significantly affect CBE's NIM.
4.  $H_0$ : The degree of competition does not significantly affect CBE's NIM.
5.  $H_0$ : The CBE's deposit growth rate does not significantly affect CBE's NIM.

### 1.4 SIGNIFICANCE OF THE STUDY

This section elaborates on the importance and implications of a study for researchers, practitioners, and policy makers (Creswell, 2003). According to him, in designing this section, one might include three or four ways in which the study adds to the scholarly research and literature in the field, helps improve practice and why the study will improve policy. Thus, the researcher suggests the potential benefits for potential audiences as bellow. On the whole, it will help CBE's Bank managers in particular, and police makers, bank supervisors, and regulators in

general, to frame policies aimed at maintaining the growth momentum of the banking sector in the country. Most typically this study will help managers in different ways; by focusing on the key factors net interest margins in the banking industry, it may be helpful in order to develop new deposit and loan business, for supervision and staff motivation, achieves individual and branch sales goals through new business sales and Participates in community affairs to increase the Bank's visibility and to enhance new and existing business opportunities .....and thereby increase performance of bank in terms of NIM, among others. At last, the study will be help full for researchers in the area, using the limitations of this study as stepping stone, to further investigate the factors affecting the cost of intermediation (NIM) and forward their suggestions to the potential beneficiaries.

### 1.5 DELIMITATION AND LIMITATION OF THE STUDY

In most studies, it is believed that more observation means more information for generalization. The focus of this study is just to see the factors affecting the cost of intermediation (NIM) of CBE, the dominant bank in the Ethiopian banking sector, from the period 2005 till 2014, in this time span the CBE has shown a significant increasing trend in net interest margins. This study is designed to be investigated by applying ordinary least square multiple regressions on time series data by taking care of the classical linear regression assumptions. The study will be better generalized if one could see these factors by in comparison with other private banks using panel data further to see their individual fixed-effects. The study also will get enriched by incorporating all potential factors recommended by previous studies as bank specific, industry specific and macroeconomic factors, and using mixed approaches too.

## II. RELATED LITERATURES

The net interest margin (NIM), measured as the difference between interest income and interest expenses, is widely regarded as an indicator of intermediation efficiency or the cost of intermediation (Raja and Sami, 2015). These authors suggested that efficient intermediation is one of the most important functions of the banking system in supporting economic growth. Prior empirical literature suggests five main factors/determinants of banks' interest margins: bank specific factors, market structure, regulation, institutional environment, and the macro economy.

Concerning bank specific factors, Empirical studies often use bank operating cost, managerial efficiency, credit risk, liquidity risk, interest rate risk, implicit interest payment, bank size, capital adequacy ratio, and non-interest income share as bank-specific variables. Many authors has reached a consensus that net interest margin is positively related to operating costs, and agreed that banks pass these costs on to customers (Maudos and Fernandez 2004; Williams 2007, enter alia). Koffie, Edder, & Martinez (2014) analyzes the determinants of banks' net interest margins in Honduras during 1998 to 2013—a period characterized by increasing banks' net interest margins, foreign bank participation and consolidation. In line with findings in the previous literature, they find that operating costs are the most

important drivers of banks' net interest margins. These authors suggest that more efficient banks have lower costs, serve the best-quality borrowers and garner greater market share.

Most of the papers on the determinants of interest margins show that credit risk—proxied by nonperforming loans (NPLs) to total assets and loan loss provision to total assets—exert a positive effect on interest margins (Maudos and Fernandez de Guevara 2004; Angzabo 1997; and Maudos and Solis 2009, among others), which means that banks charge additional risk premiums to compensate for credit risk. Most studies on the factors affecting the net interest margins have proxied the credit risk by nonperforming loans (NPLs) to total assets and loan loss provision to total assets exerts a positive effect on interest margin, which indicates that banks could charge additional risk premiums to compensate credit risk. Other authors such as Williams (1997) and Hess (2007) found a negative association between credit risk and net interest margins, attributing this result to weak banks that decrease margins to cover expected losses.

Another bank specific factors affecting bank's net interest margin is the capital adequacy ratio, which is used to proxied risk aversion of banks. One straightforward link is that retained profits are a principal source of capital. Accordingly, under a regulatory system requiring banks to meet various capital adequacy requirements, profit is an important prerequisite for the expansion of a bank's portfolio of risky assets. The capital adequacy ratio has a positive and significant impact on banks' spreads, confirming the assumption that banks ask for higher margins to compensate for better tax treatment of debt over equity (Saunders and Schumacher; Brook and Rojas (2000). On the contrary, other authors such as Dabla-Norris and Floerkemeier (2007) found a negative relationship between bank's interest margins and capital adequacy ratio, reflecting that well-capitalized banks charge lower spreads for their lower risk of bankruptcy and greater stability. Recently studies find that banks with well-developed non-interest income sources have lower net interest margins; this suggests that banks may tend to offer loans with small or even negative margins to attract clients and compensate with higher fees (Raja and Sami, 2015).

Concerning the impact of market structure on net interest margins provides divergent results. Some of which found the positive relationship between bank concentration and net interest margins. Indicating that net interest margins tend to increase with bank concentration and market power (Angbazzo 1999, Williams 2007, Saunders and Schumacher 2000, and Maudos and Solis 2009, among others). Demircuc-Kunt and others (2004) found that the positive association between concentration and bank margins disappears when institution quality variables are included; suggesting that contestability and other non price factors are better measures of bank competition. Others such as Claessens and Leaven (2004) attribute the absence of links between market structure and banks' spreads to the fact that concentration variables are not good proxies for the degree of competition in the banking sector.

Basing the theory of the factors affecting bank interest margins (refer to Maudos and Fernandez de Guevara (2004) and given the scope of this study the variables considered are bank specific ones and one market structure variable, competition. All in all, capital adequacy (risk aversion), operating efficiency,

credit risk, competition (learner index) and the bank growth are the variables accounted in this study.

#### 1.6 OPERATING EFFICIENCY

The other important ratio is that proxy management is operational efficiency (OE) is the operating cost to gross income ratio i.e. the operating costs necessary to generate one unit of gross income. The relationships are expected to be negative, since high costs are likely to erode net interest margins. However, to the extent that an institution's ability to pass on costs to their clients is a function of market power, the sign may be positive in highly uncompetitive markets. The sign may be negative or positive (Sharma & Gounder 2011).

#### 1.7 CAPITAL ADEQUACY/RISK AVERSION

Capital refers to the amount of own funds available to support a bank's business and, therefore, bank capital acts as a safety net in the case of adverse development (Athanasoglou *et al.*, 2005). Capital is calculated as the ratio of equity to total assets. The ratio measures how much of the banks' assets are funded with owners' fund and is a proxy for capital adequacy of a bank by estimating the ability to absorb losses (Ommeren, 2011). Risk aversion is proxied by the ratio of equity to total assets. A higher ratio indicates higher risk aversion on the part of bank managers. According to Raja & Sami, (2015), the expected sign on this variable is ambiguous: on the one hand, highly capitalized banks are more solvent, which will reduce their funding costs and, therefore, strengthen their margins; on the other hand, higher risk aversion may encourage banks to invest their resources in less risky assets, producing lower margins.

#### 1.8 CREDIT RISK

Credit risk concerns the probability that a borrower will default on a loan (Koffie, Edder & Anabel Pineda, 2014). These authors suggested two ways in which a risky loan portfolio will raise the spread: (i) intensive use of the bank's productive resources to service risky loans; and (ii) higher probability of default leading to a risk premium on the loan rate. Empirical studies of bank spreads generally use either loan write offs, the delinquent loan portfolio, or provisions for NPLs as indicators of default risk. As noted in the literature problem with these measures is that they are often backward looking (reflecting realized defaults) rather than forward-looking proxies for default risk. On the other hand, Raja & Sami, (2015) defined credit risk as the ratio of loan loss provisions to gross loans. A higher ratio is associated with lower credit quality and high credit risk. Banks are expected to require higher interest margins to compensate for funding riskier projects, and to maintain adequate loan reserves (Poghosyan 2012; cited in Raja & Sami). An alternative interpretation is that a bank may mitigate high credit risk by investing in low-return government securities (Valverde and Fernandez 2007; cited in Raja & Sami).

#### 1.9 GROWTH RATE

From the realistic facts the growth rate of the state bank of Ethiopia, CBE, shows an increasing trend (i.e. 11.51% & 30% in the year 2005 and 2014 respectively). An expansion in deposits provides banks more funds available for lending, thereby, encouraging credit extension and eventually net interest margins.

Berger et al (2003) suggested that a bank operates with superior efficiency might choose to reduce price, leading to growth through the capture of increased market share. Alternatively, it might also decide to convert its efficiency advantage in to higher profit, forgoing the opportunity for growth. According to these authors, moreover, market structure might influence or dictate the choice between these alternatives. A bank operating under highly competitive conditions might be forced in the direction of price reductions and growth. A bank in a market characterised by imperfect competition might enjoy greater discretion to opt for profit. Hence, the Ethiopian banking sector is characterized by imperfect competition in the market that more than 76% of concentration ratio in the year 2014, and more than 38% of the loan distribution is accounted for the state owned commercial bank of Ethiopia. This bank is still persistently recognising a high amount of net interest margin and which inspires the researcher especially to examine the factors contributing or causing such an achievement in this regard.

1.10COMPETITION

Banks mobilize, allocate, and invest much of society's savings, so bank performance has substantive repercussions on capital allocation, firm growth, industrial expansion, and

economic development. as a result, research on the effects of bank concentration and competition on performance has important policy implications (Beger et al, 2003). Eventually, to see the impact of competition on bank's net interest margin is the learner index. Competition is measured by the Lerner index instead of the concentration ratio, because the latter cannot provide a satisfactory measure of the degree of market competition in the banking sector (Beck and Hess 2009). The Lerner index is the difference between the price and the total marginal costs (operating + financial) as a proportion of the price (total revenues). The sign of the relationship is expected to be positive as it was explained in literatures. The literature contains two different positions regarding the impact of bank concentration on pricing decision and bank performance, the structure performance hypothesis and the efficient structure hypothesis. The former claims that a more concentrating banking sector will behave oligopolistic ally, while the latter argues that concentration will be conduct to better efficiency as more efficient banks buy less efficient ones (Sami & Mohammed, 2011). However, as one aspect of banks performance measure, net interest margin, the learner index is weighing over the concentration ratio to proxy bank's competition in the industry.

**Table 1: Definitions, notations and expected effect of independent variables on NIM**

Variables	Description	
Dependent variables: Net interest margin (NIM) (in %), defined as Net interest income divided by total assets. It measures the gap between what the bank pays the providers of funds and what the bank receives from firms and other users of bank credit		
Independent variables		Expected effect
Capital adequacy	Equity over total assets (%)	+/-
credit risk	Loan loss provision/total loans (%)	+/-
Operating/management efficiency	Operating expense / total asset (%)	+/-
Degree of Competition/market power	The difference between total revenue and total cost divided by the total revenue as a proxy for market power.	+
Bank's growth rate	Measured by the percentage growth of loans	+

Source: Researcher Own Computation, 2015

III. RESEARCH METHODOLOGY

As an approach, this study is designed to follow a post positivism philosophy which states that researchers under social science can confirm the existing body of knowledge by gathering data from the relevant sorceress. Meaning, this study follows survey (i.e. explanatory research design) research design through which the collected data are analyzed through econometric model to see the significance of the parameters/ coefficients of each of the variables under investigation.

1.11RESEARCH DATA

The major data has been collected from annual publications of the national bank of Ethiopia (NBE) and the CBE's audited

annual financial reports. The audited financial statements of the bank over the study period has been obtained from National Bank of Ethiopia, (which is responsible for maintaining the audited financial statements of all banks operating in the country and regulate their operating activities), the country's central bank. Basically, the balance sheet and income statements were the main sources of the relevant data to address the stated objectives of this study. The variables have been selected based on prior studies and professional judgment of the researcher. The variables considered are: equity -to- asset ratio as a proxy for capital adequacy/risk aversion of the CBE, loan loss provision-to-total loans to proxy credit risk of CBE, cost-to-income (operating cost + financing/total revenue)-a learning index to proxy competition in the market/industry and operating expenses -to- total asset ratio to proxy for management/operational

efficiency, and total loans growth rate in percent to proxy for the growth of the bank, CBE.

As one element of the research methodology, the purpose of this study does not allow the researcher to detail the appropriateness of the various sampling techniques for the study. Hence, purposefully, the researcher selected the state bank, CBE, as a case study to examine the factors affecting the realization of high net interest margin in the period under consideration.

1.12 DESCRIPTIVE STATISTICS

It is usually advisable to supplement the explanatory research design with descriptive statistics so as to see the characteristics/nature of the data and make it ready for the model adopted to examine the cause and effect relationship of the dependent and explanatory variables under consideration. It is used as complimentary data analysis tool in order to report the descriptive statistics for the variables in the regression analyses, most typically to observe the mean, median and standard deviations of the entire dependent and independent variables for the entire study period. This statistics has used primarily to describe the nature of data.

1.13 ECONOMETRIC MODEL SPECIFICATION

An ordinary least square linear regression model will be applied to examine the significant factors affecting the net interest margins of CBE.

The general specification of the model looks the following:

$$y_t = \alpha + \beta x_t + u_t \dots \dots \dots (1)$$

Where the subscript t (= 1, 2, 3 . . .) denotes the observation number.

The disturbance term can capture a number of features. Y denotes the response variable (NIM). X denotes a vector of explanatory variables. A is the constant term/intercept and β is the slop coefficient/ coefficient of parameters. To make the model more realistic, a random disturbance term, denoted by u, is added to the equation.

Substituting the explanatory variables in the model, the final model to be estimated looks the following:

$$NIM_t = \alpha + \beta CAR_t + \beta LLP\_TL + \beta cost\_inc + \beta opexp\_ta + \beta G\_rate + u_t \dots \dots \dots (2)$$

Where, NIM is the bank’s interest spread, CAR stands for capital adequacy ratio computed as equity-to-total assets, LLP\_TL (loan loss provision-to-total loans to proxy credit risk, learner index (total revenue-total cost/total revenue) to proxy competition and opexp\_ta (operating expense-to-total assets) to proxy for management/operational efficiency, and G\_rate (growth rate in terms of the rate of growth of loans in percent). Since every econometric model is estimated with ceteris Paribus assumptions it is must to incorporate the disturbance term ut in the model. Clearly this model is not realistic without the zero mean disturbance term. Statistically if one leave the error term here, it would correspond to the case where the model fitted the data perfectly- that is, all of the data points lay exactly on a

straight line, in reality it cannot be. To make the model more realistic, a random disturbance term, denoted by u, is added to the model.

1.14 ESTIMATION ISSUES AND TESTS

Obviously, it has been suggested that the ordinary least square could be efficient and consistent estimator of the parameters under time-series and cross-sectional data without compromising the classical linear assumptions of multiple regression of such kind. These assumptions are: normality of the data, linearity, homogeneity of variances, and absence of serial correlation/autocorrelation, among others. All these assumptions have been depicted in the table bellow, and treated using the appropriate tests recommended for such types of research designs. Assumptions concerning disturbance terms and their interpretation

**Table 2: Assumptions concerning disturbance terms and their interpretation**

Technical notation	Interpretation
(1) $E(u_t) = 0$	The errors have zero mean
(2) $var(u_t) = \sigma^2 < \infty$	The variance of the errors is constant and finite over all values of xt
(3) $cov(u_i, u_j) = 0$	The errors are linearly independent of one another
(4) $cov(u_t, x_t) = 0$	There is no relationship between the error and corresponding x variate

Source: Researcher Own Computation, 2015

1.14.1 TEST OF NORMALITY AND SERIAL CORRELATION

The structure of the data has been visualized through different graphical methods such as stator plots, histogram, box plots and line graphs as well. Through these means the s potential outliers in the data have been identified and avoided by the method called winsorizing-replace the maximum and minimum values which are outliers with the nearby/ next minimum or maximum values which are not outliers in the data set .Latter the normality of the data has been statistically tested and checked for the null hypothesis that the data is normal. Autocorrelation/serial correlation may not be a problem in small samples, if nay it will be checked by autocorrelation/partial autocorrelation post estimation tests.

1.14.2 LINEARITY

The use and interpretation of multiple regression models often depend on the estimates of individual regression coefficient. The predictor variables in a regression model are considered orthogonal when they are not linearly related. This issue has also been checked by the two-way scatter plot in stata software.

1.14.3 MULTICOLLINEARITY TEST

When the regressors are nearly perfectly related, the regression coefficients tend to be unstable and the inferences

based on the regression model can be misleading and erroneous, and create a condition known as multicollinearity.

Multicollinearity exists when there is a strong correlation between two or more predictors in a regression model. It poses a problem only for multiple regressions because (without wishing to state the obvious) simple regression requires only one predictor, and as co linearity increases there are three problems that will arise: Untrustworthy beta coefficients (bs)-As co linearity increases so do the standard errors of the b coefficients, then big standard errors for b coefficients means that these bs are more variable across samples, it means that the b coefficient in our sample is less likely to represent the population, it will limit the size of R and makes it difficult to assess the individual importance of a predictor importance of predictors Field (2009). This problem makes a significant variable insignificant by increasing its standard error. If the standard error goes up, the t-values will goes down and will come up with high p-values, so that a particular variable will become insignificant but in reality it is not (Hossian Academy).

There are different ways of identifying this problem. One way of identifying multicollinearity is to scan a correlation matrix of all of the predictor variables and see if any correlate very highly (by very highly to mean correlations of above .80 or .90). According to Field (2009), this is a good ‘ball park’ method but misses more subtle forms of multicollinearity. Luckily, SPSS produces various collinearity diagnostics, one of which is the variance inflation factor (VIF), which indicates whether a predictor has a strong linear relationship with the other predictor(s). Although there are no hard and fast rules about what value of the VIF should cause concern, Myers (1990) suggests that a value of 10 is a good value at which to worry. What’s more, if the average VIF is greater than 1, then multicollinearity may be biasing the regression model. Related to the VIF is the tolerance statistic, which is its reciprocal (1/VIF). As such, values below 0.1 indicate serious problems although Menard (1995) suggests that values below 0.2 are worthy of concern. Finally the researcher will take different ways of correcting the problem. Dropping variables with high multicollinearity problem is the one among the different ways by comparing the p-values of the variables from the already estimated model (i.e. drop the variable(s) with higher p-values, lower level of significant all the time, and run the model again).

#### 1.14.4 TESTING FOR HOMOGENEITY OF VARIANCE (HETEROSKEDASTICITY TEST)

The linear regression model (LRM) assumes that the variance of the equation disturbance term is constant over the whole sample period. At each level of the predictor variable(s), the variance of the residual terms should be constant. This just means that the residuals at each level of the predictor(s) should have the same variance (Homoskedasticity, scatterdly plotted, random, no systematic pattern); when the variances are very unequal there is said to be Heteroskedasticity ( systematic pattern). If the researcher collected continuous data (such as in co relational designs), this assumption means that the variance of one variable should be stable at all levels of the other variable (Field 2009). There are different Test statistics for the presence of Heteroskedasticity. This thesis will use the Breusch Pagan test and Goldfeld Quandt test to test the null hypothesis that there

is no Heteroskedasticity ( to accept or reject the null by comparing the probability chi-square with p-value <5%), and Plotting of regression residuals may also help to detect Heteroskedasticity. Normality of disturbance term will be tested using Jarque-Bera (1981) test to test the null hypothesis that residuals are normally distributed and this will be accepted or rejected by doing the same as above.

### IV. RESULTS AND DISCUSSION

Table 3 report the descriptive statistics for the variables used in the analysis. On average the bank have a NIM of 2.35% over the entire period from 2005 to 2014. On average, the capitalization of bank is 6.5% which is less than the minimum requirement set by the banking regulation of 8%. To see in comparison this figure with international facts, for example, in Switzerland the most capitalized banks have a capital ratio of 87% and the least capitalized institutions total equity only covers 0.5% of total assets (Dietrich & Wanzenried, 2011).

**Table 3: Summary Statistics**

Variable	Mean	Std. Dev.	Min	Max
NIM	.0234723	.0086508	.010703	.036332
CAR	.0647683	.0219974	.04201	.09711
LLP_TL	.0038333	.0020384	.0015	.0072
opexp_TA	.0195121	.0041403	.014761	.026191
G_rate	.259493	.1393495	.115071	.551773
L_index	.3234064	.0474694	.256621	.404071

Source: Survey, 2015

The loan loss provision relative to total loans, which is an indicator of credit portfolio, amounts to 0.4% on average which seems quite low. As pointed out above, the operating expense to total asset and learner index ratio indicates 2% and 32% respectively. Both of which seems minimal, this might be because of by transferring such costs to the potential depositors. Lastly, the deposit growth rate is about 26%, which highlights a persistence increase in deposits. This is because the bank’s markets share; in terms of loans, total assets, customers enter alia, as compared to other private banks in the industry is reached at 38% in the year 2013/14.

**Table 2: Determinants Bank’s Net Interest Margins**

Variables	Model specification
CAR	.173 (4.31)* *
LLP_TL	2.67 (6.39)*
opexp_TA	1.074(5.67)**
L_index	.098 (6.36)*
G_rate	.045 (8.27)*
Constant	- .062 (-.28)*
Prob > F	0.0066
R-squared	0.984
Adj R-squared	0.9581

Source: Survey, 2015

This table presents the results from the regression conducted to examine the sources of net interest margins. The estimations were performed using ordinary OLS multiple regression after the different diagnosis regarding the classical linear regression assumptions to keep the consistency and efficiency of the model.

\*\*t-statistics are in parenthesis and significant at 1%

\*t-statistics are in parenthesis and significant at .01%

<sup>a</sup> The test for the variance of the errors is constant and finite over all values of  $xt$  (i.e.  $\text{var}(ut) = \sigma^2 < \infty$ ), Breusch-Pagan / Cook- Weisberg test for Heteroskedasticity has accepted the null hypothesis that the variance of the error term is constant with mean of zero and variance of  $\sigma^2$  across all variables of the model. This test shows very high p-value of 63.51%, which is very far from 5%.

In addition to these tests, I also checked for the normality of the data prior to developing the fitted model to the data. This has been checked with Skewness/Kurtosis tests for Normality as shown in appendix table 5. The joint probability of this test (p-values) indicates that the acceptance of the null hypothesis that the data is normal. Furthermore, the data has also been checked for potential outliers and linearity. In both cases I could not see any outlier in the data (i.e. the box plot for example is symmetrical with the mean), and I also do not find any orthogonal relationship between the response and all explanatory variables of the model. There is no serial correlation problem in the data set; this is because normally autocorrelation is not a concern in small sample with limited time series. All in all, the data is fitted with the classical linear regression assumption.

Table 4 summarises the empirical results for the net interest margin. It is apparent that the overall explanatory power (in terms of adjusted  $R^2$ ) of the model is to high, more than the conventional recommended rate of 60%. The coefficients of capital adequacy ratio, loan loss provision to total loans ratio, operating cost to total asset ratio, the learner index (revenues-costs)/ revenues and the deposit growth rate are highly significant with very low p-values and very high t-values. All variables exhibit the positive causation in the model.

The capital adequacy ratio, the risk aversion measure, is positive and highly significant effect on net interest margins of the bank under consideration. This confirms the positive and highly significant impact of bank capitalization on net interest margin. Equity is considered as an expensive financial device, so to provide a fair remuneration to stock holders, banks should provide better margins, to compensate additional risk, which results in higher profit (Sami & Mohammed, 2011). Equity as measured by "equity/total assets" is an important indicator of solvency. Well-capitalized banks face lower costs of borrowing and low risk of bankruptcy. As a result of the lower costs and low risk of bankruptcy, well-capitalized banks should charge lower margins (Ahokpossi, 2013). On the contrary the commercial bank of Ethiopia can be categorized as undercapitalized firm with an average equity to asset ratio of 6.5% which is below the minimum requirement of 8%. Most studies suggest that, on the one hand, high interest margins can contribute to strengthening bank capitalization, through transfer of profits earned by banks to their capital base. On the other

hand, high interest margins are usually interpreted as an indicator of inefficiency, which adversely affects domestic real savings and investment (Brock and Rojas-Suarez; 2000). Ethiopia may particularly be at risk because, like all developing countries, its financial system is less developed and bank loans are the main sources of funding. In case of commercial bank of Ethiopia this study finds that the bank is generating higher amount of interest margins as it has been indicated by highly significant effect of the capital adequacy ratio as a proxy to risk aversion. All, in all, the finds of the study shows that CBE is charging higher amount of interest to loans to customers and providing lesser deposit interest rate for depositors. For instance, in the year 2013/14, the minimum and maximum saving rate is found to be 5% and 5.75%, respectively. Similarly, the minimum and maximum lending rate has been reached at 7.5% and 16.25% respectively. The minimum deposit and lending rates are set by national bank of Ethiopia, central bank, while the maximum ceilings are kept open for the market (NBE annual report, 2013/14).

Thus, the null hypothesis that the capital adequacy/risk aversion does not affect the net interest margin of CBE has been rejected at 1% significance level.

The findings also indicated that the ratio of loan loss provisions to total loans (measure of credit risk), which is a measure of credit quality, is positively and significantly correlated with bank's net interest margins. Credit risk concerns the probability that a borrower will default on a loan. Two ways have been suggested by prior studies in which a risky loan portfolio will raise the spread: these ways are intensive use of the bank's productive resources to service risky loans; and the higher probability of default leading to a risk premium on the loan rate. It has been shown by the previous studies that credit risk—proxied by nonperforming loans (NPLs) to total assets and loan loss provision to total assets—exert a positive effect on interest margins (Maudos and Fernandez among others), which means that banks charge additional risk premiums to compensate for credit risk. On the contrary, other researchers (see Williams (1997) and Hess (2007) found a negative association ship between credit risk and net interest margins, and the attribute this result to weak banks that decrease margins to cover expected losses. As capital adequacy ratio increased by 1%, the NIM may get higher by 0.173%.

This result suggests high margins create barrier for the deepening of financial intermediation as lower deposit rates discourage savings flow into bank deposits and high lending rates reduce investment opportunities of banks, in case of Ethiopia, the average lending and saving rate spread indicates 10.5% in the year 2014. Fungáčová & Poghosyan, 2009, suggested that, in emerging economies with poorly developed capital markets, both firms and individuals often have nowhere else to turn besides bank loans to raise money, which, in turn, may even hinder growth. These all attributes to the CBE, where the banking sector is characterized by high concentration, low competition and bank based financing of the economy with no forma stock market. Currently this bank is dominating the banking sector with high percentage of market share by expanding its branch networks throughout the rural areas where the market is too rigid and imperfect, and thereby exert higher risk premium on loan rates, and increase transaction costs among others. Through these mechanisms the bank might improve risk

assessment, reduce nonperforming loans, and the need for higher loan loss provisions. All in all, the null hypothesis that credit risk does not affect the net interest margin of CBE has been rejected at 0.01% significance level. As loan loss-to-total loans increased by 1%, the NIM may get higher by 2.67%.

Operating costs to total assets (as proxy for operational/management efficiency) of the bank under investigation do have a significant and positive relationship with the net interest margin. Various studies have shown that operational inefficiency leads to higher costs of intermediation and therefore to higher margins. The higher the operating costs, the higher the interest margins a bank has to charge Brock and Rojas Suarez (2000) and Gelos (2006); cited in Ahokossi, (2013). According to these authors, operating costs reflect the activities in which different banks specialize; banks that focus more on retail operations usually face larger operational costs than banks that are more oriented toward wholesale markets, this is because of the reason that retail operations involve the establishment of a large number of branches, equipment and personnel to serve the retail customer, which is the case for CBE. These larger costs usually translate into a higher spread (Brock and Suarez; 2000). On the other hand, deficiencies in the legal system contribute to high cost of credit. Outdated bankruptcy procedures increase the cost of asset recovery while lengthy civil procedures related to contract enforcement and adjudication of claims make credit operations riskier and costlier (IMF; 2001). Furthermore, operating costs reflect less efficient management and inferior organizational structures. All in all, such potential reasons contributing for higher interest margins can characterize the commercial bank of Ethiopia (CBE), the state owned. Hence, the bank has realizing higher amount of net interest margins persistently in the year under consideration. The coefficient of the operating expense variable is significant and positive; indicating that a bank with high operating costs will pass them on to consumers in the form of wide margins, especially if the banking environment is not competitive (Raja & Sami, 2015). Thus, the null hypothesis that operational efficiency does not affect the net interest margin of CBE has been rejected at 1% significance level. As operating costs-to-total assets increased by 1%, the NIM may get higher by 1.02%.

With respect to the market structure variables, the Lerner index, a proxy of market power, has the expected positive and highly significant impact on net interest margin. This result reveals that banks with market power charge higher lending rates and offer lower deposit rates as it has been discussed so far in the reviews of related literature. The findings indicates that since the CBE is the dominant bank in the Ethiopian banking industry, in terms of different aspects of competition, it could easily exert higher amount of loan interest rate by expanding its branch net works throughout the rural areas where other private banks in the industry could not address as competent as possible. The value of the Lerner index ranges from 0 (perfect competition) to 1 (monopoly) Raja & Sami, 2015, the Lerner index for CBE in the year 2014 indicates more than 40%, imperfect competition. The result of the regression analysis suggest positive relationship between the Lerner index and the interest as expected, banks with greater market power can fix higher spreads than they could in a more competitive market. The result confirms the previous

studies that as market concentration rises, competition declines, and interest margins increase.

Furthermore, to link this result with the theories concerning market structure (structure conduct hypothesis and the relative market power), Banks with relative market power (RMP), that is, banks with larger market shares, can exercise market power in pricing and therefore earn higher margins. Regarding the concept of structure-conduct-performance (SCP), which asserts that market performance (profits, price, product quality, etc.) depends on market conduct (pricing behaviour, legal tactics, merger, collusion, etc.) that in turn depends on market structure (number of buyers and sellers, barriers to entry, etc), there could be a link between interest margins (performance) and market concentration (structure) (Ahokossi, 2013). This paper confirms the SCP hypothesis, implies that a positive relationship between bank interest margins and market structure reflect non-competitive pricing behaviour in concentrated markets like the case of Ethiopia. All in all, the analysis presented here accounts for both market power (RMP) and market concentration (SCP) to untangle their impacts, this is because the concentration ratio of the banking sector and the market share of CBE in terms of its total assets has been computed from the audited annual reports of the bank as 76.59% and 66% in the year 2013/14, respectively<sup>2</sup>. Thus, the null hypothesis that the degree of competition does not affect the net interest margin of CBE has been rejected at 0.01% significance level. As Lerner index increased by 1%, the NIM may get higher by 0.98%.

The last, not the least, variable investigated in the research is that of deposit growth rate. Like other explanatory variables in the model, the deposit growth rate is positively and significantly affects the net interest margin of CBE in the period under consideration. The result of this study suggests that as the bank's deposit liabilities increases, the bank might get much fund inflows from the savers. This finding is consistent with the exercise of market power under the structural-conduct-hypothesis (SCP) hypothesis. The dominant bank, commercial bank of Ethiopia, is collecting saving deposits at lower interest rate; the floor is being set by the national bank of Ethiopia at 5% and made open the ceiling to the banks themselves in the industry. In the year 2014, on average, the minimum and maximum saving rates has found to be 5% and 7.75%, respectively. Similarly, the floor of lending rate is also being set by the national bank of Ethiopia at 7.5%, and leaves open the ceilings to the banks themselves. As of June 30, 2014, the minimum and maximum of this rate revealed at 7.5% and 16.25%, respectively, and the spread has reach at maximum 10.5% (i.e. 16.25%-7.75%). These shows that by providing lower deposit rates and higher lending rates, the CBE, might transfer its operating costs as a result increase its net interest margins. The result of the regression analysis indicate that deposit growth rate of CBE is positively and highly significantly at (0.1%) affect the net interest margin of the bank, and it rejects the null hypothesis that deposit growth rate does not significantly affect the net interest margin of the

<sup>2</sup> The concentration ratio was calculated by taking the three largest banks assets in proportion to the 18 banks, except development bank of Ethiopia, total assets for the year 2014, and the market share of CBE similarly computed by taking its total assets in proportion to the 18 banks total assets in the same year.

CBE. As deposit growth rate increased by 1%, the NIM may get higher by 0.045%.

V. CONCLUSION AND REFLECTIONS

The result shows that virtually all bank specific variables investigated in the research have a positive and significant impact on net interest margin of CBE. The results suggest that higher capital adequacy (as proxy for risk aversion), higher operating costs (proxy for operational efficiency), loan loss provision-to-total loans (proxy for credit risk), Lerner index (proxy for degree of competition) and deposit growth rate are reflected in higher interest spreads. All in all, that higher of these factors increases interest spreads for the bank studied. These suggests that high operating costs, lack of competition, high concentration, high lending rates, low deposit rate, economies of scale for the dominant bank (CBE) and diseconomies of scale for small private banks remain key hurdle that prevent interest spreads from declining in commercial bank of Ethiopia. All in all, the results suggests that there has to be a measure to be taken by the sector to reduce the banks concentration ratio, operating costs, risk premium on credits, and increase the level of capital to offer competitive interest margins and fairly shared growth rates in deposits among others. In doing so, this paper conclude that further structural reforms and merger or consolidation, privatizing the state owned banks, allowing more private banks to join the industry enter alia may lower CBE’s net interest margins through competition and share the market potentially fairly to other private banks operating in the industry.

Appendix

Table I: Correlation matrix among explanatory variables

	CAR	LLP_TL	opexp_TA
	G_rate	L_index	
CAR	1.0000		
LLP_TL	-0.6206	1.0000	
opexp_TA	-0.3657	-.1252	1.0000
G_rate	-0.0079	-0.1381	-0.3685
L_index	0.1579	-.3516	.1151
	.2866	1.000	

Table II: Partial and semi partial correlations of NIM with explanatory variables Partial Semi-partial Partial Significance

Variable	Corr. Value	Corr.	Corr.^2	Corr.^2
CAR	0.9277	0.3117	0.8607	0.0971
LLP_TL	0.9652	0.4627	0.9316	0.2141
opexp_TA	0.9564	0.4104	0.9146	0.1684
G_rate	0.9788	0.5989	0.9580	0.3587
	0.0037			

L_index	0.9648	0.4603	0.9309	0.2119
	0.0079			

Table III: Skewness/Kurtosis Tests For Normality ----- Joint -----

Variable	Pr(Skewness) Prob>chi2	Pr(Kurtosis)	adj chi2(2)
NIM	0.7027 0.4201	0.2456	1.73
CAR	0.3614 0.1629	0.1296	3.63
LLP_TL	0.8040 0.3452	0.1871	2.13
opexp_TA	0.1982 0.3414	0.6859	2.15
G_rate	0.1076 0.1262	0.2624	4.14
L_index	0.6127 0.8790	0.9667	0.26

Table IV: Variance Inflation Factor For Explanatory Variables

Variable	VIF	1/VIF
CAR	1.99	0.503321
LLP_TL	1.85	0.541523
opexp_TA	1.57	0.637950
G_rate	1.44	0.692117
L_index	1.36	0.733658
Mean VIF	1.64	

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