

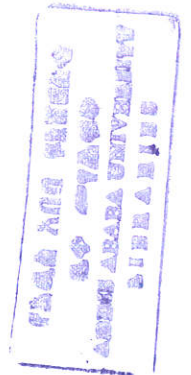
**DETERMINANTS OF PROFITABILITY IN DOMESTIC  
BANKING MARKETS: -  
IMPLICATIONS OF FOREIGN BANK ENTRY.**

**Presented to the School of Graduate Studies of the Addis  
Ababa University.**

**In Partial Fulfillment of the Requirements for the Degree  
of Masters of Arts in Economics (Applied Trade Policy  
Analysis)**

**By;  
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**ADDIS ABABA UNIVERSITY  
SCHOOL OF GRADUATE STUDIES**

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## Dedication

This piece of work is dedicated to my beloved mother, Chaltu Mussa , who raised her children both as father and mother as well.



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## Abstract

A policy of openness of the domestic banking markets to international bank participation is not a universally accepted argument. While arguments in favor of foreign bank entry are argued to be broad based, there exist a set of concerns with regard to the potentially adverse effects of opening to international involvement. But neither side of these arguments is supported by hard evidence.

This paper in the first place attempts to investigate what the determinants of profitability in domestic banking markets are. Afterwards, the implications of foreign bank entry to the profitability of the domestic sector will be analyzed based on the lessons taught from the experiences of the selected East African countries.

In order to attempt its objectives the paper employs a dynamic econometric model, which captures the extent of barriers to entry on the profitability of the local sector through the coefficient of the lagged dependent variable (lagged profit). The problem of inconsistency and bias of OLS estimators is handled by application of the Arellano and Bover(1995) GMM estimation method. This method exploits the orthogonality condition that exists between lagged levels and differences in the difference equation and that of instruments of lagged differences and the levels in the original equation.

Accordingly, it is found that bank specific variables like equity to total assets, customer and short term funding to total assets, and productivity are highly significant determinants of profitability while the credit risk to total loans and overheads to total assets, though not that significant, they do have an inverse relationship with bank profitability. Furthermore, both the industry specific variables and the macro economic variables are found to be significant determinants. The coefficient of the lagged dependent variable also indicates that the Ethiopian Commercial banking market is not characterized by competitive conditions and profits show a tendency to persist from one year to the other. This implies that, entry of foreign banks will reduce the profitability of the local Commercial banks as international banks exploit their competitive advantages and as they internalize the economic benefit of the knowledge they created, possibly subjecting domestic banks to operate at a reduced rate of return where the issue of their survival may be put in to question.

Conclusively, since most of these determinants are highly affected by the quality of management either through its direct or indirect influence, it can be suggested that optimal policies to bank management is the right direction to follow in order to spur progress.

Keywords; Bank *Profitability*, *Foreign Bank entry*, *Bank management*, *Dynamic panel model*, *GMM*.



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# CHAPTER 1

## 1. Introduction

### 1.1 Background of the Study

When the growth and characteristics of financial markets in East Africa with particular relevance to the banking sector is viewed, it is found to have been dominated by foreign and state owned commercial banks. Banks with ownership controls by the indigenous private sector also came to emerge in the mid 1970's (Brownbridge, M. (1998)).

One of the motives for establishment of state banks and "development finance institutions" according to Harvey (1993) is that in places where they established their presence in Africa, foreign banks almost often happened to be highly conservative in their credit financing policies, setting their targets mainly on Trans-national corporations (TNCs) and other corporate clients of sizable nature. Hence, extension of credit access to local businesses, which are controlled by indigenous citizens, was one of the most outstanding motives for the foundation of local banks.

In the mid 1990's ownership controls of local banks occupied 25% of the commercial bank market in Kenya, 20% in Zambia and about 15% in Uganda. A foundation was laid for a finance house in Tanzania in 1995. In Kenya and Zambia, indigenous non-bank financial institutions had controlled a sizable share of the market. An endogenous commercial bank, which marked the first undertaking on the way of giving birth to the local private banking sector, came in to reality in Ethiopia in 1994 (Brownbridge, M. (1998)).

By the same time, the World Trade Organization (WTO) came in to being in 1995 as an international financial institution calling for reduction or removal of barriers to foreign participation worldwide. Afterwards, a sharp increase in the scope of presence of International banks in the form of branches and subsidiaries has been exhibited in a number of Countries. Although de-novo establishments have been important in some



countries, a lion's share of this increased presence has come in to effect as a consequence of mergers and acquisitions (Claessens and Lee (2002)).

To give an illustrative example, Claessens and Lee (2002), show that among East African Countries the number of foreign banks in Kenya rose from 3 in 1995 to 8 in 2000. Whereas in Tanzania they rose from 0 in 1995 to 6 in 2000, in Uganda their number is disclosed to have risen from 1 in 1995 to 8 in 2000. Similarly in Zambia the rise in foreign bank number is from 2 in 1995 to 8 in 2000.

Ethiopia is an exception. Although its financial sector was open for domestic and foreign private investors up until the mid 1970's, all private banks came to be nationalized on January 1, 1975 Birritu (99). From this time onwards up until 1990/91, which is known as the Derg - era, the financial sector passed through mono banking guided by central plan like other sectors. Ethiopia also appears to be unique as compared to its East African neighbors set forth above in that it has not yet opened its banking sector to foreign participation. Hence, the domestic banking sector remains isolated from the impact of globalization.

Currently the government of Ethiopia excludes Commercial presence of foreign banks in its territory. According to a report by Stern, R.M. et al. (2007), in Assessment of the Impact of General Agreement on Trade in Services (GATS) on the Ethiopian financial sector, a discussion is made on the possible scenario or option for Ethiopia to retain the existing regime, which is tantamount to exclusion of International banks, thus maintaining the "status quo", while it keeps on its negotiations for accession to the WTO.

These authors also conclude from thorough investigation of the demerits and risks of the status quo scenario that the limited efficiency of domestic banks cannot be expected to substantially improve without international state-of-the-art methodologies and technology thereby continuing to set some limitations on the availability of credit facilities in the Ethiopian economy. But, no empirical evidence has so far been provided either by the respective authors or other researchers on the issue of how the performance of the

domestic banking markets may potentially be affected with the possible entry of foreign banks. Hence, in the 1<sup>st</sup> place, this study attempts to investigate how various bank specific, Industry specific and macro economic variables determine the performance of domestic banking markets, with particular attention paid to the profitability analysis of commercial banks.

Therefore, in the paper, empirical approaches will be followed to evaluate the profitability of commercial banking markets in Ethiopia, and then a descriptive statistical approach will be employed in making cross country comparisons so as to get lessons from the impact of foreign presence on domestic banking markets in East Africa.

Hence, the study may contribute to Ethiopian financial sector stakeholders, so that they receive early signals on their potential losses from the challenge of tough competition possibly exerted by foreign banks.

## 1.2 Problem Statement

International trade in goods and services has come to be increasingly significant in recent decades. In order to promote such trade a number of banking institutions have also become international. The globalization of the Banking sector has been induced by financial market liberalization attempts made worldwide (Claessens, Demirgüç and Huizinga (2000)).

This process has been promoted and re-enforced by World Trade Organization (WTO) since its establishment in 1995, which through its GATS rules of Financial Services Trade Liberalization (FSTL) aim at reducing or even totally removing all trade barriers in financial services sector by allowing foreign financial firms in sectors such as insurance, banking and securities to enter a host country and enjoy national treatment.

In spite of the fact that this kind of financial liberalization keeps up among other reasons, on the premise that the benefits from foreign entry exceeds any costs; some African countries like Ethiopia still perceive foreign bank entry as threats to the development of a viable domestic banking sector. Since Ethiopian financial sector stakeholders argue that WTO accession entails potential risks, this study attempts to address the problem that the Ethiopian government officials especially expressed in particular concern about the potential impact of foreign bank entry as seen by the Ethiopian financial sector stakeholders with regard to the following issues: -

In the first place, it is argued that the local financial sector is too young and inexperienced to bear the challenge of competition presented to it from International banks with more capital and more experience plus better reputations (The Infant Industry Argument), (Stern, R.M. et al.(2007)).

There is also a common perception that foreign banks will target their lending to highly lucrative businesses in major urban areas towards industrial sectors of sizable scale, real estate and service enterprises (comprising trade) and away from trade in primary

agricultural commodities, “small-scale and cottage/micro enterprise” sectors Stern, R.M. et al. (2001), which are almost often given priority in the development strategy of most African Countries. This has an implication that foreign banks exert only little effort for the growth and development of rural banking but will “cherry pick” the top most companies and sectors.

As reflected by the study group on assessment of the impact of GATS on the Ethiopian financial services sector another concern is that International banks perhaps serve as a medium for the “in ward and out ward flows” of financial capital, via the capital and money market operations; credit activities; and movement of personal capital etc.). This may bring about a shortage of foreign exchange and/or it may create problems of liquidity with potentially adverse effects on the capital account of these countries.

The limited capacity of the National Bank of Ethiopia (NBE) to effectively regulate and supervise foreign banks is also forwarded as one of the reasons for denying foreign entry. The other point worth mentioning is that foreign banks would lend in their home or other foreign currencies and would not be interested in mobilizing domestic savings.

The respective authors also present the view of the Ethiopian financial sector stakeholders that, given the size of foreign financial institutions, their entry in to domestic market could “lead to consolidation” on condition that the new foreign entrant was permitted to purchase numerous domestic institutions so as to merge them. The same is argued to happen if local or indigenous institutions were made to join together in response to the entry and/or appearance of new dominant players in the market.

The other reason for putting limits on the extent of foreign holding is the concern on the part of the government or other stakeholders that the domestic banking sector could entirely be controlled by foreigners with the indigenous people exercising only a little or no ownership and management control. This is perhaps an essential “political economy issue”, more so in consideration of the potential influence and impact of financial

institutions. This comes in to being when foreigners are permitted to hold majority shares in or fully entitled to the control of financial institutions.

Among the several authors addressing the costs to opening financial markets to foreign competition, Stiglitz (1993), as cited in Claessens, Demirguc – Kunt and Huizinga (2000), for instance, discusses the potential costs to local banks, domestic entrepreneurs, and the state resulting from International bank entry. Local banks perhaps incur costs since they should compete with giant foreign banks with better reputation, local businessmen do not also get easy access to financial services for International banks generally focus on multi national enterprises and state may find their control of the economy minimized as foreign banks show a tendency to be less sensitive to their wishes.

In this paper, therefore, attempts will be made to examine how the performance of domestic banking markets is affected by different variables. For convenience in the study, in the first place an attempt will be made to examine how different factors affect domestic bank profitability. This helps to make an informed move for descriptive statistical investigations of the potential impact of foreign bank entry on the performance of the local commercial banking sector.



### **1.3 Objectives of the Study**

In spite of the increasing importance of international trade in goods and financial services, which has been induced by the liberalization of financial markets world wide, and despite the challenge of globalization which has come on its way to force countries decide how to live in a more complex and more competitive world, Ethiopia has not so far opened its banking sector to foreign participation;

Among the problems providing premises for denial of foreign entry, the Infant Industry Argument is outstanding (i.e. on account of the fact that the domestic financial sector at large and the banking sector in particular is too young and immature to compete with the highly experienced large International banks).

Hence, this study attempts to analyze the profitability of domestic banking markets in Ethiopia with a motive to visualize what would the effect of foreign presence on the operations of local commercial banking markets be. Specifically, this study aims to:-

- Investigate how different factors mainly bank specific, industry specific and macro economic variables affect domestic banks' profitability, for a sample of domestic Commercial banks numbered to 8 in total, and for the period covering from 2000-2007.
- Analyze whether or not profits show a tendency to persist overtime in the domestic banking markets in Ethiopia.
- Indicate the potential gains and/or losses to domestic banking markets in Ethiopia, due to the possible entry of foreign banks.

### **1.4 Testable Hypothesis**

The method to be followed and the models to be adopted in this study will help to evaluate the profitability of domestic banking markets in Ethiopia from both scenarios of the with and without cases of foreign bank presence in the context of East Africa.

Thus, in view of the objectives stated above, this study hypothesizes that: -

1. Entry and exit are sufficiently free to eliminate any abnormal profit quickly.  
Hence, profits do not show a tendency to persist overtime.
2. Equity capital is the most significant determinant of domestic banking performance in Ethiopia.
3. Domestic bank profitability increases with concentration.

## **1.5 Significance of the Study**

This paper, in the first place, attempts to investigate what the determinants of profitability in domestic banking markets are. Hence, it is expected to provide some important concepts about the determinants of efficiency pertaining to the functioning of domestic banking markets, with special relevance to the profitability analysis. Hence, it is anticipated that this study may reveal the extent to which different factors affect profits in banking markets.

Accordingly, the proposed paper is anticipated to have relevance in understanding the issue about how foreign entry possibly affects the domestic banking market from the perspective of East African Countries. This provides knowledge on the pre cautionary measures to be taken before opening domestic banking markets to foreign participation, especially for countries like Ethiopia, which is in a “closed “status.

Over and above the stated contributions, it also adds value to the already existing stock of knowledge regarding the issue of how foreign presence potentially affects domestic banking markets in Ethiopia.

This will be done in terms of application of new variables and new analytical approaches that can potentially determine commercial banking performance by presenting averages for each domestic bank and with aggregation of these averages at country level so as to better illustrate the difference between commercial banks operating with out foreign presence in East Africa (for instance Ethiopia) against those functioning with foreign presence in the same region.

## **1.6. Scope and Limitations of the Study**

On account of the difficulty encountered in accessing raw data on different variables determining the profitability of domestic banking markets, in almost all other East African Countries, the study is limited to the empirical analysis of the profitability of domestic banking markets in Ethiopia, with an attempt to make lessons from the 4 East African Countries like Kenya, Uganda, Zambia and Tanzania.

It is assumed that assessing the problem well with the available data on the existing domestic Commercial banks for Ethiopia enables to analyze both the pros and cons of potential foreign entry to the local banking markets in contrast to the effect of foreign presence in the domestic banking markets of the above mentioned East African Countries. This helps to make lessons for countries like Ethiopia, which are in an 'observer status', after applying for membership in the WTO.

Therefore, in this study, an attempt will be made to analyze the overall operation of domestic banks in Ethiopia, with prior attention to be given to the profitability analysis of domestic banking markets, in order to detect the potential gains and/or losses to local banks from foreign entry.

The in availability of complete data for the recently established new banks and at the same time the infancy of the local private banking market has created a set back to the growth of total number of banks (limiting them to only 8). This appears to have restricted the total number of observations in the panel.

## CHAPTER 2

### 2. Literature Review

The issue of foreign bank entry has been investigated extensively in the literature by several authors in the field. Most of these studies have focused on the cost-benefit analysis of foreign entry, with particular emphasis to investigation of its effect on the performance of the domestic banking markets in both developing and developed countries. Moreover, how foreign entry affects the profitability of domestic banking markets in low income countries of Africa, Asia and Eastern Europe have also been dealt with thoroughly.

Since almost all papers attempting to determine the relationship between the performance indicators of domestic banks and foreign entry tend to analyze the possible effects of changes in the foreign bank share on domestic banks' performance, it is deemed important, in the first place, to critically look at the existing literature on the determinants of performance (with particular relevance to profitability) in the domestic banking markets. Subsequently, literatures on the effects of foreign entry to the performance of domestic banking markets are extensively investigated.

As a matter of convenience in the proceedings of the study, the sequence of the literature follows the following arrangement. First and foremost, literatures on the relationship between market structure and bank profitability with its dynamics, followed by the existing empirical evidences will be set forth. In the immediate next, theoretical literatures on foreign banks and impact of their entry, followed by the existing subsequent empirical evidences will be investigated. Finally, the existing literatures on the performance of domestic banking market in Ethiopia will be examined, so as to indicate the gap in the available stock of knowledge, against which this paper gathers momentum in its attempt to narrow it.



## 2.1. Theoretical Literature

### 2.1.1 Market Structure and Bank Profitability

In a similar way as has been extensively dealt with in the literature for bank interest margins, the relationship between overall bank profitability and market structure has also been analyzed within the framework of the Market Power (MP) and Efficient Structure (ES) Hypotheses.

The MP hypothesis, which is some times also referred to as the traditional Structure-Conduct-Performance (SCP) hypothesis states that, as firms gain more and more market power, they are able to earn monopoly profits. In other words, it reveals that the positive relationship between profits and/or margins and market structure speaks for itself that in more concentrated markets, the behavior of pricing is non competitive. A special case of the MP hypothesis is that of the Relative-Market-Power (RMP) hypothesis, which explicitly points out that only those banks with sizable market shares and with products which are well differentiated are capable of exercising market power and consequently earn non competitive profits. It is also cited in Claeys, S. and Vennet, R.V. (2007) that alternatively, the positive relationship between profits and/or interest margins and either market concentration or market share is perhaps captured by two efficiency explanations Berger (1995). When we step ahead towards detailed investigation of these hypotheses, the Efficient-Structure hypothesis (ES) asserts that, variations in the level of profits are attributable to variations in operational efficiency across banks. Following from this general definition, the X- efficiency of the ES (ESX) hypothesis puts forward a suggestion that increased managerial efficiency leads to higher concentration and hence, higher profits.

More explicitly, when the X-efficiency (X-ES) version is viewed, it claims that banks with better-quality management or superior production technologies have lower costs and as a matter of fact are able to offer more competitive rates of interest on loans, advances and/or deposits, thereby leading to an inverse relationship between operational efficiency and interest spreads. Since such firms are commonly assumed to gain sizable market

shares, which perhaps makes the market more concentrated as a consequence of competition. This increased concentration, in turn, leads to entitlements for higher profits.

On the other side of the spectrum, however, the scale efficiency (S-ES) version of the efficient structure (ES) hypothesis explicitly states that there exists considerable difference between firms in the efficiency of their scale of production. Hence, under competitive market conditions these differences in the efficiency of scale of production will be transformed in to smaller margins.

Again, these firms are assumed to capitalize on their market share, which possibly lead to increased market concentration.

### **2.1.2. Dynamics of Bank Profitability**

As cited in a paper on Dynamics of Growth and Profitability in Banking by Goddard, Molyneux & Wilson (2004), and Brozen (1971), suggests that while Structure-Conduct-Performance (SCP) relationship which is static by its very nature is found to be applicable, in the relevant micro theory, when we have markets in equilibrium, there is an un certainty that a profit figure detected at any point in time stands for an equilibrium value. In the persistence of profit (POP) literature, the hypotheses commonly tested are that entry in to and exist from markets are adequately free to dissipate any abnormal profit rapidly, and that rates of profit for all firms show a tendency to converge to the same long-run average value. The alternative hypothesis is that some firms have got particular knowhow or other merits assisting them in blocking entry or preventing imitation. If this is the case, abnormal profit perhaps tends to exhibit persistence from year to year, and variations in average profit rates may be maintained and/or sustained for indefinite period of time.

## **2.2. Empirical Evidences**

### **2.2.1 Market Structure, Bank Profitability and its Dynamics.**

With an attempt to provide tests of the aforementioned two hypotheses, a study such as that by (Berger 1995a), investigated the profit structure relationship in banking. To a certain extent, this author verified the (RMP) hypothesis, since there is evidence that superior management and increased market share (In particular when it comes to small-to-medium-sized banks) raise profits. To the contrary, weak evidence is found for the ESX hypothesis.

On the basis of the findings of (Berger 1995a), managerial efficiency not only brings about an increase in profits, but may lead to gains in market share, and hence, increased concentration, so that the finding of a positive relationship between concentration and profits may be a spurious result due to correlations with other variables. Hence, other factors controlled, the role of concentration should be negligible. But on the other side of a coin, as cited in Athanasoglu, Brissimis and Delis (2005) that among other researchers, Bourke (1989) and Molyneux and Thornton (1992) argue that increased concentration is not the result of managerial efficiency but rather reflects increasing deviations from competitive market structures, which lead to monopolistic profits. As a result, concentration should be positively (and significantly) related to bank profitability.

When empirical research concerning the dynamics of company profitability is viewed, it appears to have based itself on an account of the determinants of profit that is an alternative to the essentially static structure-conduct-performance (SCP) paradigm. Particular to banking, however, empirical tests of the POP hypothesis are few in number. As cited in the same paper by Goddard, Molyneux and Wilson (2004), Berger et al. (2000), however, have recently presented extensive evidence of POP in US banking.

In Goddard et al. (2004), it is also cited that the POP literature owes its origin to Mueller (1977, 1986), who employs “deterministic & stochastic time series models” to show convergence in rates of profit. It is also cited in the same paper that subsequent firm level studies come up with a suggestion that there exists variations between firms in long-run

equilibrium rates of return, and there also exist differences in the rate of adjustment or in the speed of convergence Geroski and Jacquiemia (1988), Goddard and Wilson, (1999), and Mc Gahan and Porter (1999).

Studies previously conducted on the dynamics of profit on one hand and growth on the other hand, have in the course of time developed separately, and followed empirical methodologies that are contrasting to each other. Nonetheless, there are a number of theoretical arguments to point out that these two indicators of performance are closely associated. A clear-cut link in here is that retained earnings are the main source of capital (Goddard et al. (2004)). In similar terms, same authors conclude that, it is well known that under a regulatory system demanding banks to satisfy different requirements of capital adequacy, profit is underscored as an important pre-requisite for expansion of bank's portfolio of risky assets as it will be illustrated in chapter 4 of the paper, in detail. Inclusion of one period lagged dependent variable ( $\Pi_{i,t-1}$ ) as explanatory variable, is based on the above disclosed linkage between retained profits and capital, with indications of a significant effect of lagged profits on current performance.

### **2.2.2 Bank Performance Determinants.**

Among the previous studies that have analyzed bank margins empirically, both for developed and developing countries, one string of literature is that which is based on the dealership model that came to be introduced by Ho and Saunders (1981), who set up a two step estimation method<sup>1</sup> to evaluate or test their model. But Saunders and Schumacher (2000) later capitalized on the works of research previously conducted and found that over the period 1988 – 95 interest margins in Six European Countries and the US are influenced by the extent of bank capitalization, bank market structure, and the interest rate volatility.

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<sup>1</sup> While the first step is concerned with the estimation of a “pure interest spread” by running a regression of observed margins on various bank specific characteristics, the second step involves explaining the “estimated pure spreads” by both the market structure variables as well as macro economic variables.

But when it comes to commercial bank profitability in the literature, it is almost often explained by both internal and external factors as its determinants. The sources of internal determinants are bank accounts (balance sheets and/or income statements) and as a matter of fact could be pronounced as micro or bank- specific determinants of profitability. Where as, the external determinants are factors that do not relate to bank management, but reveal the economic, institutional and legal environment that considerably influence the operation and performance of financial institutions, producing a spill over effect on commercial banking activities.

In taking a look at researches so far undertaken, with particular relevance to the performance of commercial banking markets, they mainly deal with the profitability analysis of either the with-in individual countries' or cross-country banking systems. It is also detected that there exist two groups of researches with respect to studies connected to internal determinants. While the 1<sup>st</sup> group of researches conducted on internal determinants employs factors such as size, capital, risk management and expenses management, on one side, others employ bank specific variables like equity, non interest earning assets, customer and short term funding and overhead costs as internal determinants.

In literatures extensively dealing with internal determinants of bank profitability, *bank size* appears to be one. However, Athanasoglu, Brissimis and Delis (2005), find that all bank specific determinants claimed by the 1<sup>st</sup> group significantly affect bank profitability in the anticipated way, with the exception of size. But on the other side of a coin, as cited by same authors Akhavein et al.(1997) and Smirlock (1985) come up with the findings that size affects bank profitability positively and significantly. The latter finding is even more strengthened by the studies of Demirguc-Kunt and Maksimovic (1998) putting forward that the degree to which commercial bank profitability is affected by various factors like economic, financial, legal, and other factors (for instance; corruption) has close connections with the size of the firm. In similar terms, it is extensively argued in the literature that size and the capital adequacy of a bank are closely related since banks



which are relatively large in size show a tendency to raise capital cheaply, and hence stand to be more profitable.

As cited in Athanasoglu, Brissimis and Delis (2005), making use of similar arguments, Bourke (1989), Molyneux and Thornton (1992), and Bikker and Hu (2002) all disclose that size has something to do with capital ratios, which they claim to be directly associated to bank profitability. Goddard et al. (2004) have also come up with the same finding. When it comes to other researchers, many of them suggest that from increasing the size of a banking firm, only little cost saving can be achieved (Berger et al., 1987), putting forward that by and by scale inefficiencies may be encountered by very large banks.

The other significant internal determinant of profitability extensively discussed in literatures is *equity* and/or *capital*. Demirguc-Kunt and Huizinga (1998), from their empirical studies making use of bank level data for 80 countries for the period 1988 – 1995, indicate that well capitalized banks have got higher net interest margins and appear to be more profitable, coming up with a consistent finding to the previous. To put it more explicitly, they find that banks with considerably high capital ratios show a tendency to encounter a reduced cost of funding due to a likely reduction in “bankruptcy costs”. In addition, they re-enforce their finding with an argument that banks which register a higher equity merely do not need to borrow much in order to back up an asset of a given level.

Farook, M. (2003), in his studies of the structure and performance of commercial banks in Pakistan, states that for a bank, capital is the root source of “strength and consumers’ confidence”. This implies that when banks well equip themselves with a higher capital base, this leads to greater confidence of consumers of the banking services.

According to Claeys, S. and Vennet, R.V. (2007), two positive impacts on interest spreads may come about when capital is held by a bank over the minimum regulatory requirement. The first scenario is that, because the bank has got excess liquid financial

resources, it will have the opportunity to increase its portfolio of loans, advances and/or securities, as risky assets. Hence, on condition that markets permit to make additional loans with a favorable return/risk profile, other factors constant, this will increase the interest margin. Furthermore, as a second scenario, since capital is treated as the “most expensive form of liabilities” in terms of the gains expected, holding excess capital above the minimum legal requirement is a sign of credibility. This creates good will on the part of the bank that helps to attract more funds in the form of deposit. Hence, when depositors exert “depositor market discipline” this perhaps enables the bank to minimize its cost of funds on deposits and as a matter of fact, raise its margin on interest.

On the other side of the spectrum, however, we find contrasting evidence that when a bank holds a relatively high capital – assets ratio this may have an implication that it is functioning over-cautiously neglecting diversification or other opportunities with potential profit (Goddard et al. (2004)). It is also cited in the same paper that a bank maintaining a high composition of liquid assets is not likely to earn high profits but it is also exposed to risk (Bourke (1989)).

When it comes to the other internal determinant, *risk management* appears to be a very important factor. Athanasoglu, Brissimis and Delis (2005), state that the need for risk management in the banking sector is inherent in the banking business and the two main sources of bank failures are poor asset quality and low levels of liquidity. As a valid approach in any business undertaking, financial institutions may resort to diversification of their portfolios and/or increase their liquid holdings in order to reduce the level of their risk, during the times of increased uncertainty. In this regard, risk can be classified in to credit risk and liquidity risk.

As cited in Athanasoglu, Brissimis and Delis (2005), Bourke (1989) among others, find a positive and significant relationship between liquidity position and profitability. It is also cited in Molyneux and Thornton (1992), who report an opposite result to the findings of Bourke (1989), while credit risk appears to have clearly negative effect on profitability Miller and Noulas (1997). To elaborate this result more explicitly, we can take account of



the fact that, the more exposures by financial institutions to risky loans, the higher is the accumulation of un paid loans. To coin a phrase, when banks show a tendency to engage in risky credit financing, the likelihood of accumulation of non performing loans<sup>2</sup> will be high. This subjects banks to significantly allow for loan losses as provision expense, implying that these loan losses have produced lower returns.

It can also be further explained that, when losses on loans begin to swell, there will be a drop in the value of bank loans on the asset side of the balance sheet against its liabilities. The deterioration in the value of their asset drives down the net worth or capital of the bank. As their equity base deteriorates, banks become more and more risky and as a matter of fact there will be less willingness by depositors and other potential creditors to the bank in supplying banks with financial resources. Fewer funds then tell that there are fewer loans and subsequently fewer incomes as well. This is believed to significantly affect its profitability.

Turning to the other internal determinant of bank performance in the literature, *expenses management* stands to occupy considerable part. According to Athanasoglu, Brissimis and Delis (2005), a very significant internal determinant of profitability strongly correlated to the notion of efficient management is, bank expense. Among extensive literature supporting the idea of bank expenses as an important determining factor, it is cited in the above indicated paper that, Molyneux and Thornton (1992) and Bourke (1989) find that there exists a direct relationship between profitability and better quality management.

In an empirical study by Demirguc-Kunt and Huizinga (1998), bank expense is likened to bank's overhead cost, which perhaps provides information on variation in bank operating costs. Accordingly, this variable reveals differences in employment as well as in wage levels. It is also disclosed that differences in overhead expenses are perhaps a reflection of differences in bank activities, mix of products and the quality and range of services

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<sup>2</sup> Non-performing stands for loans or advances whose quality has come to deteriorate so that collection of the entire principal and/or interest balance, in consistence with the terms and conditions of the contractual agreement is in question.

given. When the empirical findings of same authors Demircuc-Kunt and Huizinga (1998) is viewed, it draws a conclusion that in a regression of before tax profit/ta as a dependent variable, it happens that a negative yield enters the regression from the interaction of the overhead/ta variable with per capita GDP enters negatively reflecting that higher overheads eat up bank profits. In other words, these authors came up with a study result that there exists negative relationship between poor quality management and profitability re-enforcing the previously pointed out research results.

In addition to what Athanasoglu, Brissimis and Delis (2005) presented as internal determinants of profitability like size, capital, risk management and expenses management, a more comprehensive empirical research conducted by Demircuc-Kunt and Huizinga (1998) shows that “non interest earning assets” are also significant determining factors of profitability when the respective variables make interactions with per capital GDP, showing an inverse relationship. This have an implication that when assets of non interest earning nature are present, this depresses net interest income and profitability more in countries which are rich rather than poor.

These authors also find that there exists loan/ta variable which negatively relate to the before tax profit/ta variable. Nevertheless, when the variable makes interactions with GDP in the profit equation, it is found to be positive, reflecting that as countries become rich and rich, banks' credit financing operations show a tendency to be more profitable.

On the drawback of the paper, Athanasoglu, Brissimis and Delis (2005), did not take account of the effect of deposits on profitability. These variables, which are on the liability side, comprise deposits of various type identified as demand deposits, savings deposits and time deposits. In spite of the fact that customer funding of this type may entail low interest cost, it appears to be expensive in terms of the requirements for extensive branching networks so as to mobilize deposits. Demircuc-Kunt and Huizinga (1998), also find some evidence that while reliance on deposits reduces bank profitability, it is found to have no significant effect on the net interest variable.



When it comes to the external determinants of bank profitability, literatures for instance, Athanasoglu, Brissimis and Delis (2007), further distinguish between variables that represent market characteristics, comprising market concentration, and ownership status and control variables describing the macro-economic environment, like interest rates, inflation and cyclical output.

As pointed out above, in taking a look at the first group of external determinants of bank profitability, it is pointed and noted that, in their findings, Athanasoglu, Brissimis and Delis (2007), conclude that concentration should be positively (and significantly) related to bank profitability. It is also cited by the same authors that increased concentration may result from market share gains, which perhaps come from managerial efficiency (Berger 1995a). On the other side of a coin, however, it is pointed out by extensive literature that managerial efficiency not only raises profits but may lead to gains in market share.

Hence, on account of the correlation that can potentially be maintained between concentration and other variables, the finding of a positive relationship between concentration and profits is perhaps a spurious result. To coin a phrase, if one makes an attempt to detect the impact of increased concentration on bank profits, without controlling for other variables, since the change in other bank performance determining factors like managerial efficiency could have re-enforced or worked for the increase in concentration, the role of concentration, under *ceteris paribus* condition should be negligible.

When it comes to the works of other researcher, we perhaps come up with a contrasting finding which argues that increased concentration is not a consequence of managerial efficiency, but rather it reflects growing departures from competitive market structures, which signals a move by banks to reap monopolistic profits. According to the view of these researchers, the probability of occurrence of spurious results is highly minimized. Consequently, concentration is claimed to have a significant positive relationship with bank profitability. This view is supported by Bourke (1989) and Molyneux and Thornton (1992), among others.

In the literature, a rather important issue regarding external determinants is whether or not the ownership status of a bank is associated to its profitability. Nevertheless, there does not exist adequate evidence to support the theory that the economic return of privately owned institutions is relatively higher. Among the few studies offering cross-country evidence of a strong negative relationship between bank profitability and government ownership Barth et al. (2004), in their recent work disclose that bank efficiency is indeed negatively correlated with government ownership of banks. But it is cited in Athanasoglu, Brissimis and Delis (2005) that a contrasting result is found, concluding that ownership status has nothing to do with explaining profitability Bourke (1989) and Molyneux and Thornton (1992).

Turning to the macro-economic control variables as the second group of external determinants of profitability in the literature, we first pay heed to the *inflation rate* and then the *real interest rate* will be dealt with subsequently.. Revell (1979) introduces the case of how inflation and bank profitability are related to each other. He comes up with a finding that the effect of inflation on bank profitability depends on whether wages, salaries and other operating expenses of banks increase at a faster rate than inflation. Accordingly, the issue at a spot appears to be a question of how well-established an economy is; so that inflation to persist in the future can be accurately predicted in order for banks to manage their operating costs. In support of this idea Perry (1992) also states that the degree to which inflation affects bank profitability depends on whether or not inflation expectations are fully predicted. This is to say that, expectations of an inflation rate fully predicted by the bank's management has an implication that banks are capable of appropriately adjusting the rate of interest so that their revenues would increase faster than their costs and as a matter of fact earn higher economic profits.

As cited in Athanasoglu, Brissimis and Delis (2005), a number of studies including those by Bourke (1989) and Molyneux and Thornton (1992) have come up with a finding that there exists a positive relationship between either the rate of interest in the long-run or inflation and profitability. When a more comprehensive work by Demirguc-kunt and

Huizinga (1998), is viewed, they find that inflationary environments lead to higher realized interest margins and higher profitability as well. It is also disclosed by Demirguc-kunt et al.(1998) that that the directly proportional relationship between inflation and bank profitability implies that bank income shows increment more with inflation than bank costs. Inflationary situations entail higher costs. For instance, during inflationary times, the man power requirement of banks will increase so as to satisfy the service required by the high frequency of transactions. Needless to mention, this requires additional costs to be incurred on labor. Since there will be greater extent of transactions and more extensive branch networks, this helps to realize an increased income from bank float accordingly.

The other macro economic control variable almost often visited in literatures is *cyclical out put*, as reflected in GDP/capita or its growth rate. In an earlier paper, Demirguc – Kunt and Huizinga (1998) more explicitly state that although per capita GDP does not have any significant impact on realized net interest margins, it appears in the profitability equation with a coefficient of positive figure.

Taking a look at the recent works of Demirguc – Kunt and Huizinga (2000), an attempt is made to make out the likely cyclical movements in bank profitability – the degree to which bank profits and business cycle are correlated with each other. Although the variables employed were not direct measures of the business cycle, their findings confirm that such correlation exists

As an indicator of economic development, *GDP/Capita* is claimed in most literatures, to reveal cross country variations in banking technologies, differences in the mix of banking opportunities and banking regulations.

What can logically proceed from determinants of profitability in domestic banking markets is that, as the foreign bank entry by it self is a significant determining factor, effects of foreign bank entry on the performance of domestic banking markets will be discussed in the subsequent sections.

## **2.3. Issues of Foreign Bank Entry to Domestic Banking Markets**

### **2.3.1 Definition of Foreign Banks and Measurement of Presence**

A bank is defined to be foreign bank on condition that at least 50% of its shares are owned by a foreign entity, i.e. when a bank's operations are under foreign control. But Bayraktar and Wang (2004) define banks as foreign if at least 51% of their shares are foreign owned.

In order to measure foreign bank presence, literatures consider their importance both in terms of numbers and in terms of assets. To coin a phrase, the two most commonly employed measures of foreign bank presence comprise; the share of foreign banks' number in total number of banks and the share in total bank assets of foreign bank assets.

As it is pointed out by Claessens et al. (2000), the "number presence measure" can be considered as valid measure, if competitive conditions are determined by the number of domestic and foreign banks. This might happen, if the pricing of lending and other activities by domestic banking firms are adjusted immediately after foreign entry is detected so as to deprive the new foreign entrant from capturing considerable market share. As a second scenario, the "share presence measure" can be valid on condition that foreign banks come to a point of affecting the pricing and profitability of local banks, only after acquiring sizeable market share (Claessens et al. (2000)). It should also be noted that since both presence measures take account of actual presence of foreign banks and thus do not capture the disciplining effect on domestic banks of potential foreign bank entry.

### **2.3.2. Theoretical Arguments on Foreign Ownership**

#### **2.3.2.1. In Favor of Foreign Bank Participation**

In the first place, in coherence with traditional arguments supporting liberalization of capital account, the presence of foreign bank increases the magnitude financial resources available to local projects by facilitating the in flow of capital. Perhaps it also increases the stability of lending by the domestic economy through diversification of the sources of

capital in support of domestic credit supply Goldberg, Dages & kinney (2000). This is on account of the idea that they may refer to their parents for additional funding and they have easier access to international markets. Thus, domestic financial markets will be less vulnerable to domestic shocks.

On the other side of the spectrum backing up this argument, Cardenas, Graf and O'Dogherty (2003) state that international banks of sizable nature that have laid the foundation for local presence (for instance subsidiaries or branches) are not likely to engage in "cut and run" in times of crisis, may be on account of considerable fixed outlays in laying the foundations of branch networks and acquiring market shares.

As cited in Cardenas et al. (2003), an essential issue for emerging market economies (EME) is linked to the impacts of foreign entry on "Connected lending practices" by local banks. In situations where wealth is excessively concentrated in EME, it commonly holds that board members of banks', shareholders and borrowers of large size, have close relationships. On the other side of the spectrum, however, International banks do not engage themselves in connected lending on account of the issue that they naturally do not happen to have related parties in the economy of the host and their equity structure, which is widely held, does not promote behaviors of this kind (Goldberg et al. (2000)). Hence, this will have considerable impact on the lending practices of domestic banks, creating value to the ethics in credit financing.

According to Levine (1996), foreign banks are perceived to have the potential to improve financial services quality, its pricing and availability. This is based on the premise that foreign banks may serve as direct providers of such qualified services and indirectly through inducing competitiveness with local financial institutions. Backing up the above argument, a study by Cardenas, Graf and O'Dogherty(2003), concludes that foreign bank presence perhaps improves the efficiency and development of local financial markets through increasing the range of financial products and facilities available to customers in the host country through importation of technologies and expertise from their home country.

Cardenas et al. (2003) also state that foreign banks' subsidiaries<sup>3</sup> are perceived to have considerable strength. This market perception might originate from the commonly maintained view that foreign banks confer greater protection to depositors of local origin than a domestically owned bank, as the former is backed up by the capital originating from its parent bank. For instance, as cited in the same paper, it is assumed that if a subsidiary of financial institution of foreign origin fails the parent bank will insure the liquidity of the subsidiary, just to maintain its reputation. When it comes to branches or agencies, it has the obligation to do so as required by law (Makler and Ness (2002), P-840).

Glaessner and Oks (1994), also put forward a premise that the presence of International banks improve "financial system infrastructure" comprising accounting and transparency, financial regulation and through motivating the higher and higher presence of such supplementing agents as rating agencies, auditors and credit bureaus. In the literature, it is almost often argued that foreign presence perhaps builds on the capacity of local financial institutions to effectively measure and manage risk. Furthermore, it may import financial system supervision and supervisory skills from home country regulators.

As indicated in World Bank (2002) summary report, foreign banks may reduce the costs associated with re-capitalizing and re-structuring banks in the period post crisis. It is also worth mentioning that recent research on competition in the banking industry highlights the presence of foreign owned institutions as a shock absorbing factor of the possible side effects of increased market concentration. For example, Beck et al. (2003) found that the financing obstacles in firms increase with concentration; however, the effect is dampened in countries with a sizable share of foreign owned banks.

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<sup>3</sup> In assessment of support from parent it is necessary to make distinction between branches and subsidiaries. Branches are functional entities, which do not have an independent legal status from that of their mother bank (Basle Concordat (1983)). Where as subsidiaries are technically and legally treated as a "stand-alone entities". Because they are incorporated under local laws of the host country.



It is also pointed out by Cardenas et al. (2003), investors of foreign origin not only import with them new capital, superior technologies and managerial know how to the host. But, they also raise the flexibility of domestic markets so that they are enabled to resist shocks. Since, they are considered as a source of strength for endogenous markets, "International rating agencies" take account of these issues in to consideration when they intend to upgrade banks after they have been acquired by foreign investors.

#### **2.3.2.2. Against Foreign Bank Participation**

When arguments against opening the local financial sector to foreign involvement are viewed, they appear to impart mirror the above disclosed arguments, which stand in favor of it. Hence, in this section, the premises so far provided against those arguing in favor of foreign entry are subsequently presented.

As described by Goldberg, Dages and Kenney (2000), one body of concern argues that international banks show a tendency to "cherry pick" the highly profitable local sectors, large business enterprises and/or customers, abandoning young and immature local institutions, which appear to be less competitive. This has two possible implications. In the 1<sup>st</sup> place, the infant domestic institutions will be left to serve the rest, relatively more risky clients, thereby increasing the risk born by endogenous institutions. The other effect is that small and medium size local enterprises perhaps receive less access to credit and other financial services. This effect is even strengthened by what is pointed out by Cardenas, Graft and O'Dogherty (2003), that further concerns come to appear on account of the fact that sophisticated technologies employed by large international banks are highly dependent on "hard data" almost often missing in EMEs. The same also applies for Africa for small and medium enterprises in particular. Therefore, according to these authors, International banks could end up rationing credit to such type of firms. This has an implication that endogenous institutions are subjected to more risk exposures, in their attempt to serve "more opaque" business enterprises as a consequence of the highly competitive conditions created by foreign banks.

The other issue of concern as described by Goldberg, Dages and Kenney (2000) is that the stability of domestic credit by endogenous banks will actually decrease as international financial institutions enter into the host there by creating “additional avenues for capital flight” or by instantaneously withdrawing or re-treating from local markets in adverse situations, like crisis (in either the host or home country).

The same also applies to international banks in cases when their investments fail to perform as expected. This emanates from the fact that foreign banks have got access to more investment opportunities than local banks and as a matter of fact are more susceptible to “cut and run” than banks of local origin (Goldberg et al. (2000)).

In as much as there are arguments claiming that increased foreign ownership imports contemporary approaches to financial supervision, to the contrary, others have articulated concern over the multitude of challenges to supervision posed by financial institutions of complex nature active in many jurisdictions. These opponents to foreign banks participation re-enforce their argument providing a claim that financial regulators in the host country may be “overwhelmed by the Complexities” linked to the supervision of sizable and complex institutions, in getting acquainted with new products or facilities, and operations and by challenges to effectively maintain the required level of coordination with their counterparts situated in home or otherwise (Stern, R.M. et al. (2007)).

Even among those lobbying in favor of foreign participation, many argue that the sequencing of such opening is critical, and that it is the consolidation and strengthening of the local financial system and/or the development of the necessary financial infrastructure, including supervision that should be followed.

Cardenas, Graf and O’Dogherty (2003) also argue that an increase in the involvement of foreign institutions in the host economies might provide exposures to events occurring in

other places (or countries) where their foreign banks function. This effect is known as contagion.

As cited in Stern, R.M et al.(2007), Stiglitz (1993) concludes that there exists considerable “learning by doing” in trade in financial services, demanding that liberalization attempts in this industry be more cautious than in others. .

It is also cited in Stern, R.M. et al. (2007), that, Stiglitz (1993) states that foreign banks are perhaps not that sensitive as local banks to “Window guidance” and other pressures indirectly exerted. This is to say that International banks show a tendency to be less susceptible than local banks, because, it appears to be difficult to subject them to the same “implicit and explicit rules” that encounter local banks. Closure of the bank, which is referred as the maximum punishment possible, in countries like Ethiopia is not likely to seriously affect a sizable foreign bank but for a local bank it appears to be “the economic equivalent of death”.

Although not all of these concerns are generally supported by empirical evidence, recent research in to the sources of financial crisis has fueled an additional concern by establishing a pattern in which financial crisis show a tendency to preceded by liberalization of the financial sector (Kaminsky and Reinhart).

### **2.3.3. Empirical Evidences on Foreign Ownership**

The effect of foreign bank entry on the domestic banking sector has been extensively investigated in the literature. For instance, Claessens, Demirguc-Kunt, and Huizinga (2000) show that in developing countries, foreign banks have greater profits, higher interest margins, and higher tax payments as compared to domestic banks. But in developed countries the reverse is true. Another interesting conclusion drawn from the study is that both profitability and overhead expenses of domestic banks fall with the entry of foreign banks.

### **2.3.3.1 In Favor of Foreign Participation**

Cardenas, Graf and O'Dogherty (2003), states that attempts has been made to examine the stability of international bank lending during periods of crisis, by contrasting their cross-border and local credit financing behaviors. Hence, they indicate that international banks of large size that find their local presence through establishment of either branches or subsidiaries are less likely to engage in "cut and run" activities during periods of crisis. This may be due to their commitments with an outlay of considerable capital expenditures in the establishment of branch networks and acquiring sizable market share. As cited in the same paper Peek et al. (2000) found that lending happens to be more volatile in off-shore than on-shore lending practices for countries like Brazil, Argentina and Mexico.

A study conducted by Bayraktar and Wang (2004), also examines the impact of international bank entry on the operations of local banks and how this correlation is affected by financial liberalization sequence. They show that foreign bank entry has made considerable improvements to the competitiveness of local banks in countries which engaged first in the "liberalization of their stock markets." They conclude that both the profit and cost indicators in these countries are inversely related to the foreign banks share. It is also discussed in their empirical result that if a country takes an undertaking to 1<sup>st</sup> liberalize its financial services, it is anticipated that in its banking sector, banks or investors of foreign origin to have more opportunities to take place in its banking sector. They can engage in investments of long term nature and may supplement institutional development of financial intermediaries.

Goldberg et al. (2000) examined the lending behavior of foreign and domestic banks in Argentina and Mexico in the period 1994 to 1998. They concluded that foreign banks exhibited stronger loan growth with lower proportionate volatility of lending compared to all their locally owned counterparts, there by making considerable contributions to the greater stability of credit. Nevertheless, they pointed out that it is the soundness of banks and not ownership per se, which is an important element in the growth & volatility of

bank credit. As cited in Cardenas, Graf and O'Dogherty (2003), the onshore presence of international banks perhaps promotes the stability of the deposit base through provision of rooms for domestic depositors to do their "flight to quality" at home Clarke et al. (2000). Indeed Demirguc-Kunt et al. (1998), found evidence suggesting that the increased involvement of international banks tends to reduce the likelihood of crisis in banking.

Another empirical evidence provided by Demirguc-Kunt, Levine and Min (1998), in their investigation over the 1988 to 1995 period and for a large sample of countries also discloses that foreign bank entry was generally associated with a lower incidence of local banking crises.

As cited in Cardenas, Graf and O'Dogherty (2003) by making use of a survey data of for firms numbered to more than 4,000 firms functioning in 36 countries, Clarke et al. (2002), came up with a finding that the financing obstacles of all enterprises operating in the economy, as perceived by managers of firms' was minimized by the involvement of foreign banks. It is to be pointed out and noted that that these authors also revealed evidence hinting at the idea that big enterprises benefit from international banks more than enterprises of small size, although, they did not detect signals of any harm inflicted on small medium sized enterprises.

The hypothesis that international banks show a tendency to serve only big enterprises was not supported in empirical findings recently emerged for Mexico. However, it is underscored that there is a need to interpret the results with some caution, since firms of small size still stand to have artificial constraints in getting credit from commercial banks of foreign origin (Cardenas (2003)).

### **2.3.3.2 Against Foreign Participation**

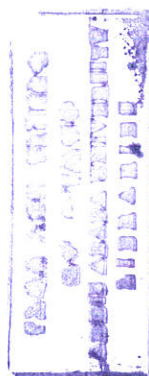
From their empirical findings Classenes, Demirguc-Kunt and Huzinga(2000) also conclude that there may be considerable risks pertaining to reduction of barriers on international bank entry. The risk comes in to effect, when competition gets tougher as a consequence of foreign bank entry, there by reducing local banks profits. Hence, foreign

bank entry may reduce “charter values of domestic banks” increasing their vulnerability. Accordingly this may lead to financial system de-stabilization, particularly when the supervisory and prudential regulations in domestic markets are weak.

The same premise as provided above is forwarded by Claessens and Lee (2002) concluding that more and more competition perhaps brings down franchise value of local banks and as a matter of fact can lead to instability of the financial system. Hence, if not to avoid, minimization of the probable cost of financial system instability demands that adequate regulatory and supervisory frameworks be put in place, as a “natural policy response” under such circumstances. But in a number of low income countries, there appear to be great challenges in laying the foundations of good institutional and legal frameworks.

According to Bayraktar and Wang (2004), despite the merits of foreign presence, local banks may be disadvantaged with their exposures of un-equal access to “international capital markets” relative to banks of foreign origin. It should be noted that this comes in to effect when a country undertakes liberalization of its financial services first. Consequently, local banks may fail to attain the expected level of improvement in efficiency. On the strength of the above stated argument, it is claimed in the same study that, countries that engaged in the liberalization of their capital account seem to have realized less benefits from international bank entry, relative to the other two sets of countries, which involved in the liberalization their domestic services or stock markets. With the assumption that international banks are easily accessed with international funds, the most significant contribution of entry by foreign banks would be that they supply more and more funds to the local banking sector. But, with liberalization of capital accounts in an economy first, both foreign banks and their domestic counterparts will have an easy access to “international capital markets”. Hence, it would be sound to expect that the efficiency of local banks may not be affected by the share of foreign banks.

As cited in Cardenas Graf and O’ Dogherty (2003), empirical evidences with regard to contagion was found by Peek and Rosengren(1997) showing that in the late 80’s and





The issue of how the performance of domestic banks changes with foreign bank entry has been investigated extensively in the literature, but this study is different in that it focuses on selected 4 East African countries which have so far opened their banking sector to foreign participation, so as to share experience from thereof. Since the basic expected role of foreign banks is to increase competitiveness in the banking sector, therefore, the paper has great significance in answering the question of whether domestic banks become more competitive with lower profits, lower costs and lower net interest margin as more foreign banks participate in their industry.

But there exist hardly any literature exclusively dealing with the impact of foreign entry on domestic banking markets in Africa; and that is why considerable literatures quoted in here are those, which were conducted for countries in a different region.

In literatures so far reviewed, discussion has been made on the determinants of performance in domestic banking markets and the impact of foreign entry on domestic banking markets, as well, are dealt with extensively. What remains is review of literature on the Ethiopian banking sector, which follows next.

## **2.4. Overview of Ethiopian Banking Sector**

In this part of the literature review, particular attention is paid to the existing literature on the background structure and performance status of domestic commercial banking markets in Ethiopia. This has significance to this paper in that it helps to clearly identify the gap against which an attempt is made to at least contribute to the narrowing down of the gap in the stock of knowledge.

The development of the banking sector in Ethiopia, like in many other low income countries is shallow & immature. Up until the nationalization of the then emerging financial system by the Derg regime on January 1, 1975, the Ethiopian financial sector had been open for domestic & foreign private investors, under the imperial regime.

The 1<sup>st</sup> nationalization effort by dreg was realized in amalgamation of the then privately owned banks, namely, the Addis Ababa Bank, Banco Di Roma and Banco Di Napoli, there by forming government owned bank known as Addis Bank. But later on Addis Bank was merged with the government owned bank known as Commercial Bank of Ethiopia. Hence, on account of the fact that all private banks were made public, the banking sector passed through mono-banking system guided by the central plan like any other sectors up until 1990/91.

In 1992/93, overall economic reform was made by the country. Following this, in 1994, new monetary and banking proclamation was ratified allowing re-establishment of private banks for Ethiopian nationals. Consequently, numerous amendments in interest rate policy have taken place step by step in order to promote market oriented financial system at macro level.

#### **2.4.1 Historical Background of Banking Sector Policies and Reforms.**

In Ethiopia, formal banking started with establishment of the Bank of Abyssinia on 16<sup>th</sup> of February 1906 in Addis Ababa in partnership with the British controlled National Bank of Egypt as its partner. This bank used to be managed by the respective National Bank. Haile Sellassie's government had firm belief in the idea that the government should be accountable for the economic development of a nation. But development of private sector and market ruled economic systems were promoted through the instruments laid in the state plan. Commercial activities used to be regulated through laws that were meant to lay the foundation for business development and expansion.

Bank of Abyssinia opened branches with in the country far and near. As part of its expansion plan, it opened the first branch at Harar and the other, outside of the country in Djibouti in 1920, but this branch came to liquidation in 1931. In the same year, the bank as a whole was liquidated and replaced by the Bank of Ethiopia, because of the limited range of services it offered, leading to in-efficiency in its operations.

The Bank of Ethiopia took over the commercial operations of the Bank of Abyssinia and maintained its branch network, continuing to operate until the country was invaded by Italians. Afterwards, a number of Italian banks came to establish branches in major towns found in Ethiopia.

After the liberation, the last foreign bank was made to altogether leave the country in 1943. Hence, the State Bank of Ethiopia, which behaved as the Central Bank of Ethiopia, with the sole power to issue national currency as an agent of the Ministry of Finance, started functioning on April 15, 1943. The State Bank of Ethiopia established 21 branches, comprising a branch in the capital of the Sudan, Khartoum and a transit bureau in Djibouti until it came to a stop in 1963. In the mean time, in 1951, the Development Bank of Ethiopia had also been established by the Imperial Charter.

In 1963, a monetary and banking proclamation and a charter on the National Bank of Ethiopia were put in to effect by the Ethiopian government. It is this proclamation that separated the central and commercial banking functions of the State Bank of Ethiopia. Same time, the State Bank of Ethiopia was dissolved by the government and the National Bank of Ethiopia was created as the central bank. Simultaneously, the government structured the Commercial Bank of Ethiopia as a commercial bank. Both banks commenced their operation in January 1964. This time the state gave a permit for establishment of private banks and at the same time International banks were permitted to form joint ventures with indigenous banks, but their power control was limited to 49% of equity. The former foreign banks Banco Di Roma S.C and Banco Di- Napoli S.C were re-licensed and the Addis Ababa Bank came in to being as the first private bank in Ethiopia.

Nevertheless, due to the introduction of socialism and central planning in economic policy making, by the post 1974 military government of Ethiopia, private economic activity was considered to go against the interest of the Ethiopian people. It was decreed that all economic resources would be owned and administered by the state and in exchange, would provide all services to the community. All banks and insurers were also nationalized on January 1975. In the year immediate next(i.e. in 1976), Banco Di- Roma

and Banco Di- Napoli and Addis Ababa Banks were merged to form Addis Bank, but later taken over by the Commercial Bank of Ethiopia in 1980.

When policies and reforms in the post 1991 period are viewed, under a transitional economic policy adopted in 1991, it was opted to reduce the role of government in the economy. In 1994, the government took action in making both the banking and insurance sectors open for domestic private investment via the inaction of two licensing and supervision proclamations for banking and insurance business. In similar terms the NBE was also re-established as the “Central Bank and Financial Regulator” through the respective monetary and banking proclamations.

The government in the post 1995 (Federal government), also accepted the role of intervention and regulation that is not as much extensive as the role of state in a command economy but more extensive and active than its role in a developed market economy. Behaving along these lines, eight private banks could successfully be licensed and regulated in the post 1991 governments, with much more licenses to be issued to the upcoming new private banks on the pipeline.

## **2.4.2 Structure & Performance of Commercial Banks in Ethiopia**

### **2.4.2.1 Market Structure**

In this part, the structure of banks in Ethiopia will be discussed first in terms of number of banks and size of banks (as measured by assets, deposits, loans and advances and profits etc), then in terms of concentration ratio.

Following the banking proclamation of 1994, the total number of banks in the country showed an increase from 3 to 11. All the newly established banks are private commercial banks engaged in the financing of mainly short term loans. Where as the existing public banks have three distinct objectives.

The Development Bank of Ethiopia (DBE) is engaged in the financing of short term, medium term & long term loans for viable development projects comprising industrial, agricultural and service sector projects. Almost often, it provides loans of long term

nature. Construction & Business Bank (CBB) is mainly involved in the financing of real state & building construction or building completion loans. Commercial Bank of Ethiopia (CBE) is engaged in the financing of the common commercial banking businesses.

When we take a look at the total number of bank branches through out the country it appears to have raised to a total of 503 as at the end of the first quarter of 2007/2008. Furthermore, the market share of all the eight private banks viewed against the existing public banks including DBE, as at the same quarter reveals that all the eight private banks have had 248 branches and a total capital of ETB 3.09 billion, as compared to 255 branches and a total capital of ETB 6.71 billion of the three public banks put together. This shows that private banks account for 31.5% of the total banking capital in the country, and 49.3% of the total branches reflecting that more than half the total market share in the domestic banking markets is controlled by public banks.

Comparison of private & public commercial banks on the basis of their asset base also reveals that although the private banks' share in assets has steadily grown over the past seven years, it still remains occupying only 32.89% a slight over one third, in the year 2007. Where as, the public banks' asset share as at the same time still stands to be occupying 67.11% of the total banking assets. It can also be detected that the public banks' share in total assets is exhibiting significant reductions from time to time

In order to show the distribution of assets, deposits, advances & profits and income structure of banks in Ethiopia, descriptive statistical approach has been followed. Hence, the structure of local banks measured on the basis of limited parameters, for the period covering from the year 1999/2000 to 2006/2007, appears to be as described below.

*Table 1 Assets, Deposits, Advances and Net profits of Commercial Banks.*

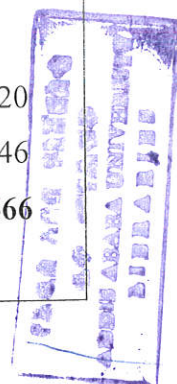
	2000	2001	2002	2003	2004	2005	2006	2007
<b>-Assets</b>								
State owned banks	20,802	22,457	23,104	25,142	29,032	35,001	37,646	45,345
Private banks	3,157	4,036	5,234	6,968	9,093	12,253	16,443	22,227
<b>Total</b>	<b>23,959</b>	<b>26,493</b>	<b>28,338</b>	<b>32,110</b>	<b>38,125</b>	<b>47,254</b>	<b>54,089</b>	<b>67,572</b>
<b>-Deposits</b>								
State owned banks	16,218	17,976	19,133	20,377	23,215	26,423	29,259	34,009
Private banks	2,205	3,074	4,079	5,440	7,186	9,791	12,984	17,115
<b>Total</b>	<b>18,423</b>	<b>21,050</b>	<b>23,212</b>	<b>25,817</b>	<b>30,401</b>	<b>36,214</b>	<b>42,243</b>	<b>51,124</b>
<b>-Loans and advances</b>								
State owned banks	9,665	9,450	8,007	6,702	6,933	8,280	8,699	9,512
Private banks	1,863	2,574	2,956	4,074	5,209	7,153	10,797	13,982
<b>Total</b>	<b>11,528</b>	<b>12,024</b>	<b>10,963</b>	<b>10,776</b>	<b>12,142</b>	<b>15,433</b>	<b>19,496</b>	<b>23,494</b>
<b>-Net profits</b>								
State owned banks	412	21	425	556	338	589	858	920
Private banks	45	74	57	76	194	294	465	646
<b>Total</b>	<b>457</b>	<b>95</b>	<b>482</b>	<b>632</b>	<b>532</b>	<b>883</b>	<b>1323</b>	<b>1566</b>

Source NBE

(The Development Bank of Ethiopia is excluded)

As described above, working on a different dataset covering from the year 2000-2007, it could be observed that total deposits held by Ethiopian banks showed significant increases between the seven consecutive years from Br 18.42 billion to 51.12 billion.

When the development of private banks in deposit mobilization is dealt with exclusively, it appears to be dynamic in that their deposit showed an average increase of 34.17% per



annum compared to an annual average increase of 11.96% in public banks. Nevertheless this may not be a precise indicator of variations in deposit mobilization performance between private banks and public banks, because of the reason that, growth rates, when they emerge from a low base, are high by construction. This is the case with private banks. Hence, comparisons of deposit rates between private banks of only recent history and that of public banks with long years of stay in the business may be misleading (Gebrehiwot, 2008 unpublished).

In spite of the dynamic performance of private banks, public banks still have a dominant position, occupying about 66.52 % of total deposits in the year 2007. When the market share in total deposits of the CBE is viewed over the period covering from year 2000 to 2007, it appears to have decreased from 85.3% to 64.3%.

Turning to loans & advances, the total loan portfolio of the commercial banking sector remained constant until 2003/2004 at between ETB 11-12 billion (Table 1). Ever since, it has showed significant increase as a result of a sharp increase in loan disbursements by private banks (Same table). This is reflected in the growth of total loan portfolio, which reached ETB 23.5 billion in the year 2007.

When the market share of public commercial banks in total outstanding loans is viewed, it still appears to be higher than that of private banks. Although it has dropped continuously from 83.8% in 2000 to 40.5% in 2007, this is perhaps on account of the reciprocal trend in lending between private & public commercial banks. While lending in the former is expanding, it appears to be decreasing in public commercial banks like the CBE, due to the high degree of caution and prudence. That is why the private sector has come to exceed the public commercial banking sector in lending, from the year 2006 onwards.

Finally, when we compare private banks with public commercial banks in terms of net profits they earn annually, we come to deduce that, indeed each individual bank has been profitable each year over the seven years period of observation, except 2001/2002. From

the profit trend, it is also not uneasy to detect that the profits of private banks have shown notable increases only in the past four years. At the present time, they are coming to share more & more profits generated from the banking sector every year.

#### **2.4.2.2 Financial Products Currently Offered By Domestic Banks.**

In spite of the absence and/or late introduction of innovative products & services common to most other countries like credit cards, ATMs or telephone and internet banking, the Ethiopian banking industry mainly provides basic commercial banking products like loans and advances, deposit facilities, both foreign & local transfer facilities & letter of credit and bank guarantee facilities.

With the exception of the DBE & CBB, which are engaged in the financing of development projects of long-term nature, almost all private banks & the CBE, to a certain extent, mainly focus on short-term lending to finance trade & for partial fulfillment of working capital requirement of viable businesses and or projects as well. They tend to finance short term loans, primarily on account of their fear for risks inherent to long term financing and secondly due to their reliance on short term resources available in the form of demand & current account deposits(entailing short term claims from depositors as well). To put it in a nutshell, the motives for profit & liquidity requirements are the main factors, why commercial banks tend to short term financing.

The outstanding key income generating activity for most banks operating in the country is credit. According to Stern, R.M. et al. (2007) over 60% of local banks income is generally derived from credit businesses in spite of the growth of fee based income recently. But, since lending is essentially determined based on the availability & quality of collateral, this, according to Stern, R.M. et al. (2007) constitutes an impediment to development, as good business entities and project ideas may not be financed unless they are well backed up by collateral. In effect, whole sectors of the government's development priority including agriculture, which is dominated by small peasants, have very limited access to credit due to problem of collateral.

On the other side of the spectrum, however, from the commercial banking point of view collateral plays a crucial role in helping domestic financial intermediaries; mainly banks, in minimization of the asymmetric information problems of adverse selection<sup>4</sup> and moral hazard<sup>5</sup>. Collateral reduces the consequences of adverse selection because if the borrower happens to make default on a loan, the lending bank can sell the collateral and use the proceeds to compensate for the losses on the loan. Collateral also minimizes moral hazard by reducing the incentive for borrowers to take on excessive risk. A borrower pledging collateral as a security has more to lose if he/she fails to pay it back and he/she naturally is more reluctant to engage in risky activities. From this, one may sense the disciplining effect of collateral.

With regard to technology-based systems of payment and products, the banking sector has not yet developed them to a visible extent. Only three private banks namely Wegagen Dashen & NIB banks have so far succeeded in networking their branches. While Automatic teller machine (ATM) is 1<sup>st</sup> introduced by the CBE, Card businesses are being introduced by Dashen bank & United bank in some cities and Addis Ababa.

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<sup>4</sup> Adverse selection occurs when some applicants are excluded from the credit market in spite of the fact that they are credit worthy and illegible to credit, had creditors known their characters. Hence, promoters of good character with dependable repayment capacity are rationed out of the credit market.

<sup>5</sup> Moral hazard stands to reflect the tendency of borrowers to show less motivation in taking care of borrowed money than they care for their own money (Fry (1995)).

## CHAPTER 3

### 3. Empirical Model Specification and Econometric Methodology

#### 3.1 Model Specification

As discussed in the preceding chapter, several empirical studies on performance of domestic banking markets offer insights in to the determinants of bank net interest margin and profitability as a major component of the overall performance indicators. The methodologies employed in the respective literatures, however, have got considerable drawbacks.

To explicitly discuss the models as such, Demirguc-Kunt and Huizinga (1998) in their attempt to indicate the determinants of Commercial bank performance, employ a simple regression model in which either the net interest margin or profit before tax/ta are used as dependent variables for bank  $i$  in country  $j$  at time  $t$ . The independent variables of the model comprise bank specific and country specific variables. Furthermore, country and time dummy variables are treated by the respective model. The strength of this model is that it takes account of performance determinants at a more comprehensive level, by estimating several specifications of the model in which bank and country specific variables are inculcated. However, as it is a model of static nature, it has drawbacks that the effect of profits realized in the past are not treated. Moreover, the model fails to take in to account the problems of un observed heterogeneity between the banks under investigation.

As a replication of the above described model, Claessens and Lee (2002), in their investigation foreign banks in low income countries, and, Claessens, Demirguc - Kunt and Huizinga (2000), in their investigation of how foreign entry affects domestic banking markets commit the same shortcoming, in overlooking the effect of lagged dependent variables and un observed heterogeneities between banks. In these two models, in addition to the common bank specific and industry specific variables, the share of foreign banks in country  $j$  at time  $t$  is treated so as to investigate the effect of foreign bank presence. As a valid approach, weighted least squares method is employed, with the

weights in both models being the inverse of the number of local banks in country  $j$  at time  $t$  in a given year in order to correct for varying number of banks across countries.

Bayraktar and Wang (2004) also employ an exact replication of a model developed by Demirguc- Kunt and Huizinga (1998) with the same shortcoming detected in other models previously. But, the sequence of financial liberalization is further treated in this model as an important determinant.

Another strand of literature, which came to introduce the dealership model, is that of Ho and Saunders (1981). These authors set up a two-step estimation approach in order to test the model they developed. One shortcoming in (Ho and Saunders) procedure is that, in spite of the fact that bank specific variables are employed so as to determine “pure bank margins”, it fails to take account of the possible heterogeneity between individual banks in the cross-section, both with in a common market and across different countries.

Most studies also mainly deal with profitability determinants at the bank and/or industry level, with the selection of regressors sometimes lacking “internal consistency”. The effect of macro economic variables has not also been thoroughly investigated.

To cup it all, almost all studies, except few, fail to take in to account profit persistence in banking and choose to apply OLS method of estimation which in reality does not give unbiased and/or consistent estimates due to the presence of omitted variables and endogeneity between the specified variables. Moreover, taking a look at studies so far conducted with particular relevance to the performance of domestic banking markets in Ethiopia, we find that they are conducted from a different empirical perspective. Thus, there exists hardly any literature with the same empirical approach.

Hence, in this study an attempt will be made to address the above highlighted shortcomings with an appropriate econometric model. The empirical approach followed in this paper, which is dynamic by its very nature is well suited to deal with the problem



of introducing lagged dependent variable (lagged profit) among the regressors in the model.

Among the main targets of this paper, determining the relationship between the performance indicators of domestic banks and foreign bank entry is one. However, since the country for so long has never had a banking sector open to foreign participation, the study tends to make lessons from the experiences of countries in East Africa like Kenya, Uganda, Tanzania and Zambia, which has so far experienced foreign ownership in their financial sector. But this comes in to effect, only after exhaustive empirical analysis is done on the performance of domestic banking markets in Ethiopia. On account of the absence of foreign banks, the first independent variable, which is commonly taken as the asset share of foreign banks could not be employed as an explanatory variable of the model.

Whatever the cases, since investigation of the possible effects of changes in foreign presence on the performance of domestic banks requires controlling for other determinants of domestic banks' performance, prior emphasis is given to thorough investigation of the local banking sector.

The other important issue providing initiatives to undertake this research is the fact that studies so far conducted on issues of domestic banking market are at their infancy. Consequently, the methodology followed in this study, which is demonstrated subsequently, appears to make considerable contributions to the developments of the empirical approaches so far employed in the investigation of the performance of domestic banking markets.

In this study, bank profitability is to be measured by before tax profit/ta or individual domestic commercial bank's before tax profits over total assets. It is the same approach followed by Demirguc-Kunt and Huizinga (1998), in their empirical analysis of the determinants of commercial bank interest margin and profitability.

As it is understood by a simple accounting, before tax profit/assets can be obtained by summing up net profit/ assets, or after tax profit over total assets and tax/ assets, or taxes over total assets. The following accounting identity can also be further satisfied from the before tax profit/ assets of the bank's income statement.

$$\text{Before tax profit/assets} = \text{Net interest margin/assets} + \text{Non interest income/assets} - \text{Overhead/assets} - \text{loan loss provisioning/assets} \dots\dots\dots (I)$$

To make brief discussions on the variables explicitly stated above, Demirguc-Kunt and Huizinga(1998) indicate that the non-interest income/assets variable discloses that almost all domestic commercial banks, over and above their credit operations, also engage in non-lending activities, like “investment banking” and “brokerage services” which generate income. Whereas, the overhead/assets variable takes account of the bank’s entire overhead expense related to its activities as a whole. In this category of expenses, we find employee salary and benefits and general expenses. What can be said with certainty about loan loss provisioning/assets is that it simply measures actual provisioning for bad debts.

When it comes to the net interest margin, it is revealed that it can be treated as a “rough index” measuring the efficiency or in efficiency of banks. However, as discussed in the paper by Demirguc- Kunt and Huizinga (1998), since a decrease in net interest margin may, for instance, result from a decrease in bank taxation or from a higher rate of loan default alternatively, it does not necessarily mean that its reduction always signals improvement in the efficiency of banks. While, in the 1<sup>st</sup> instance, it reveals an improved function in financial markets, in the 2<sup>nd</sup> case the reverse is perhaps true.

As an approach taken with some modifications in the study by Hanson and Rocha (1986), which is cited in Demirguc-Kunt and Huizinga (1998), the above accounting identity puts forward an important decomposition of net interest margins in to its components identified as non interest income, overhead, taxes, loan loss provisions and after tax bank profits.

This paper, as a first step to analyzing the data provides an accounting breakdown of the net interest variable, net interest margin for individual banks and its aggregate at country level with particular focus on domestic banks in Ethiopia so as to provide a useful descriptive statistical initial assessment of differences across the 5 East African Countries, comprising Ethiopia.

From empirical investigation by Demircuc - Kunt and Huizinga (1998), the before tax profit/assets regressions confer information on the relationship between profitability and corporate income taxes in banks, reflecting the extent to which a bank can pass on its tax bill to any of its customers, depositors, lenders or otherwise.

Therefore, making use of some selected items from the accounting identity (I) of the bank's income statement, domestic bank's performance indicators and the general model to be estimated is modeled in the following linear form;

$$\Pi_{it} = c + \sum_{k=1}^K \beta_k X_{it}^k + \varepsilon_{it} \dots \dots \dots (1)$$

$$\varepsilon_{it} = \mu_i + v_{it}$$

Where  $\Pi_{it}$  is the profitability of bank  $i$  at time  $t$ , with  $i=1, \dots, N$ ,  $t=1, \dots, T$ ,  $c$  is a constant term,  $X_{it}$ s are  $K$  explanatory variables,  $\varepsilon_{it}$  is the disturbance term with,  $\mu_i$  the unobserved individual bank specific effect and  $v_{it}$  is the idiosyncratic error.

This is a regression model with a standard error components structure, where  $\mu_i \sim IIN(0, \sigma_\mu^2)$  and independent of  $v_{it} \sim IIN(0, \sigma_v^2)$ . The explanatory variables  $X_{it}$  are classified in to bank specific, industry specific and macro economic variables.

This model is selected because unlike other empirical models so far used to investigate the performance of domestic commercial banking markets it allows for un-observed time-invariant bank specific effects, through introducing a standard error components structure as presented above.

The general specification of the model (1), with the  $X_{it}$ s separated in to three groups is therefore;

$$\Pi_{it} = c + \sum_{j=1}^J \beta_j X_{it}^j + \sum_{l=1}^L \beta_l X_{it}^l + \sum_{m=1}^M \beta_m X_{it}^m + \varepsilon_{it} \dots\dots\dots(2)$$

Where the  $X_{it}$ s with j, l and m as their superscripts respectively denoting bank specific, industry specific and macro economic variables. To explicitly indicate the regressors to be included in the specified model, bank specific control variables comprise; Capital/ta, as proxied by equity/assets, Credit risk as proxied by loan loss provisions/loans, customer and short term funding as proxied by the demand, savings, and fixed deposits/assets ,productivity as proxied by gross real revenue/level of man power and Overheads as measured by operating expenses/assets. On the other hand, an industry specific variable, concentration as measured by Herfindahl Hirschman index and a macroeconomic variable comprising the expected inflation rate are employed as well.

*More often than not, since bank profits show a tendency to persist overtime, a dynamic model specification approach is adopted with the inclusion of lagged dependent variable among the regressors. Hence, a lagged profitability augmented equation (2) is shown as;*

$$\Pi_{it} = c + \sigma \Pi_{i,t-1} + \sum_{j=1}^J \beta_j X_{it}^j + \sum_{l=1}^L \beta_l X_{it}^l + \sum_{m=1}^M \beta_m X_{it}^m + \varepsilon_{it} \dots\dots\dots(3)$$

Where  $\Pi_{i,t-1}$  is the one period lagged profitability variable and  $\sigma$  is the rate of adjustment to equilibrium. Hence, model (3) as specified above will form the basis of the estimation.

Inclusion of one period lagged profitability variable [ $\Pi_{i,t-1}$ ] is required to test the hypothesis commonly tested in the persistence of profit (POP) literature claiming that entry and exit are adequately free to dissipate any “abnormal profit”, rapidly and that the rate of profit for all local commercial banks show a tendency to converge to the same

average value in the long run. This null hypothesis is tested against an alternative hypothesis that local commercial banks have got particular knowledge or other skills that back them up in avoiding imitation or blocking entry. If so, abnormal profits may manifest a tendency to persist from year to year, and variations in average profit rates are perhaps sustained indefinitely.

The above-specified model is exactly like Athanasoglu, Brissimis & Delis (2005) empirical model. As cited by the respective authors, the tendency of bank profits to show persistence overtime reflects obstructs to competition in the market, “informational opacity” and/or susceptibility to shocks (regional /macro-economic), the extent to which these are serially correlated(Berger et al.(2000)). Based on the stated findings, it is plausible to think of the reverse causality. This is to say that, where there exist impediments to market competition and informational asymmetry, which might be explained by legal or regulatory entry barriers or variations between sectors in the (unobservable) threat of entry, it is plausible to suspect the persistence of profits. As discussed in the literature, an overview of the current status of local commercial banking markets asserts that the Ethiopian government at the present time prohibits model 3 (commercial presence) of foreign banks in its territory. But in relative terms considerable progress has been exhibited in the Ethiopian banking sector by virtue of the more competitive economic environments created in recent times especially after the banking sector was made open to private investors who are Ethiopian nationals. The range of banking services offered by the local banking sector has also increased accordingly.

According to Claessens, Demirguc-Kunt & Huizinga (2000), *ceteris paribus* the prevalence of abnormal profits reveals an absence of market competition whereas the presence of high overhead expenses is perhaps a reflection of less efficient management and poor organizational structures. This provides good reasons in this paper, to include; one period lagged profit as an explanatory variable, with a motive to capture the speed at which abnormal profit above or below the norm tends to dissipate.

Goddard, Molyneux, and Wilson (2004), in consistence with the POP literature, disclose that the impact of barriers to entry on the dynamics of profitability can be captured, implicitly by the profit equation through the lagged dependent variable coefficient. Hence, from the estimated coefficient of this variable it is possible to detect the likely effect of foreign bank participation in the domestic economy.

An empirical methodology used by these authors in modeling growth and profit in European banking is dynamic panel regression model. In both the growth and profit equations, the inclusion of both the individual effects and a lagged dependent variable has precluded the use of ordinary least squares (OLS) or fixed effects estimation. The main short-coming detected in the specified profit model is that it suffers from omitted variable bias, in its failure to account for significant determining factors of commercial bank profitability such as expenses management and the like, which correlate with profits and in turn with capital. To coin a phrase, the omitted variable that would be captured by the error term stands to correlate with the explanatory variables of the model there by invalidating the basic assumption for consistency and un-biasedness of the OLS. That is why the results are highly biased towards macro economic variables appearing as the most outstanding determinant of commercial banking market performance. Another drawback also lies in misspecification of macroeconomic variables, modeled to be explained only by the annual rate of real gross domestic product (GDP); overlooking other variables like inflation and the real interest rate. In their final analysis, they find only little evidence of a link between bank-level X- inefficiency and profitability.

In contrast, however Demirguc- Kunt and Huizinga (1998)) find that bank characteristics significantly affect bank interest spreads & profitability. But when a comparison is made between different models so far employed to analyze the determinants of performance in commercial banking markets like Demirguc-Kunt and Huizinga (1998), Claessens, Demirguc-Kunt and Huizinga (2000), Claessens and Lee (2002), Bayraktar and Wang (2004) all fail to take into account individual bank specific effects (individual heterogeneities) and the effect of lagged dependent variables (lagged profit).

That is why in this paper, a dynamic specification of the model with a one standard error components structure is chosen to account for both the lagged dependent variable and the individual bank specific effects respectively.

### 3.2. Determinants of Profitability in Domestic Banking Markets

Commonly, the profitability variable is represented by two alternative measures; the before tax profits to assets ratio, i.e., the return on assets (ROA) and the before tax profits to equity ratio, i.e., the return on equity (ROE). In spite of its biasedness due to off-balance-sheet activities<sup>6</sup>, in principle, ROA shows the capacity of a bank's management to reap profits from the bank's assets. On the other side of a coin, ROE reflects the share holders return on their equity. To represent this arithmetically,  $ROE = ROA \times \text{total equity} / \text{total assets}$ , where ta stands for total assets, the respective ratio is known as the bank's equity multiplier.

Most often, financial leverage is measured by this equity multiplier. As described by Athanasoglu, Brissimis and Delis (2005), in general terms, banks which are liquid, meaning, with higher net worth (lower leverage), will report higher ROA, but lower ROE and vice versa. It is also cited in Athanasoglu et al. (2005), that, since considerably higher risk associated with high indebtedness is ignored by an analysis of ROE and because it is regulation that determines financial leverage, ROA stands to provide an important clue for the evolution of profitability in banks (IMF(2002)).

There are several theoretical arguments to suggest that bank profit as a performance indicator has a straightforward link with capital in that retained profits are a principal source of capital. This entails that one period lagged profit can be anticipated to have significant impact on the current performance of commercial banks through the capital variable.

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<sup>6</sup> Off-balance-sheet activities, almost often regarded as comparatively high in risk, comprise a range of transactions excluded from a bank's balance sheet. This includes commitments on loans and the creation of marketable securities from bundles of smaller loans (mortgages or credit card receivables).

### *3.2.1. Bank-Specific Determinants of Profitability*

*Capital:* - taking a look at the 1<sup>st</sup> bank specific characteristics which is to be included as a regressor, this paper has attempted to employ the ratio of equity to assets (EA), to proxy the capital variable.

As cited in Athanasoglu, Brissimis and Delis (2005), the assumptions underlying the model of one period perfect capital markets with symmetric information which implies that there exists a negative relationship between capital & profitability, following from Berger (1995b), can be relaxed so as to allow for an increase in capital to raise expected earnings. In similar terms, the relaxation of this assumption as claimed by same authors, permits banks that anticipate to have better performance, to pass this information in a credible manner through higher capital. In view of the above stated premises, capital stands to be modeled as an endogenous variable.

In this paper ,modeling capital as an endogenous variable means that we are allowing for correlation between current capital & current shocks to the profit as well as feedback from past shocks to profit.

Turning to studies previously conducted, as cited in Demirguc - Kunt and Huizinga (1998), Buser, Chen and Kane (1981) in their investigation of theoretical relationship between bank profitability and bank capitalization, find that in the presence of deposit insurance, banks generally have an interior optimal capitalization ratio. In general, banks which have got a high franchise value-reflecting costly bank entry- have incentives to remain well-capitalized and to engage in prudent lending behavior.

It is also cited by these authors that Berger (1995) provides empirical evidence for US banks that there is a positive relationship between bank profitability and capitalization. Well-capitalized firms are also reported to face lower expected bankruptcy costs for themselves and their clients, thereby reducing their cost of funding.

Therefore, it is from these theoretical backgrounds and the success and failures of previous investigations that the capital variable is selected as the 1<sup>st</sup> regressor in the specified dynamic model, next to the lagged dependent variable.

*Risk*; when it comes to the second bank specific variable, credit risk as proxied by loan-loss provisions to loans ratio (PL) is in order. According to Demirguc-Kunt and Huizinga (1998), the loan loss provisioning/ta variable is a direct measure of difference in credit quality across banks and it also reflects differences in provisioning regulations for cross country investigations on banks.

In similar terms Claessens, Demirguc-Kunt and Huizinga, (2000) indicate that the loan loss provisioning/ta variable is a measure of the new provisioning made during the accounting year for any previously contracted credits. Accordingly, differences between domestic and foreign banks, there, may reflect a difference in customer mix (with foreign banks concentrating on large corporations rather than mortgage or consumer loans). In the same manner, differences in provisioning ratios rather reflect differences in the ability to screen bad credit risks and willingness to provision for bad risks between domestic banks or between foreign and domestic banks as well.

With regard to the effect of loan loss provisioning on profitability, economic theory suggests that increased exposure to credit risk is normally associated with decreased firm profitability and, hence, a negative relationship between ROA and LLP is expected.

In their empirical investigation Athanasoglu, Brissimis & Delis (2000) confirm the findings of Claessens et al.(2000) concluding that banks would improve profitability by making improvements to the screening and monitoring of credit risk and such policies involve the forecasting of future levels of risks. Athanasoglu et al. (2005), also indicate that central banks set some specific standards for the magnitude of loan loss provisions to be adopted by the country's banking system. In view of these standards, provisions held for loan losses will be adjusted by bank management, the level of which is decided at the beginning.

*Customer and Short term funding:* is another variable of significance in this study, and as an item on the liability side, comprise demand savings and fixed deposits. Demirguc-Kunt and Huizinga (1998), report in their findings that, though this kind of funding perhaps carries low interest costs, it may appear to be costly in terms of the required branching networks and that is why as they conclude, an evidence of its negative relations with profitability is detected. In this study, the expectation is that the same negative relationship with profitability holds in the Ethiopian commercial banking market.

*Overheads;* According to Athanasoglu, Brissimis and Delis (2005), the total cost of a bank (net of interest payments) can be separated in to operating cost and other expenses (including taxes, depreciation etc). Hence, they conclude that, from the above, only operating expenses can be viewed as the outcome of bank management. Likewise, Demirguc-Kunt and Huizinga (1998), suggest that the overhead/ta variable provides information on variation in bank operating costs across banking systems. Here, the overhead/ta variable refers to operating expenses in the above sense of expression. Accordingly, this variable reflects variation in employment as well as in wage levels. The same authors also suggest that differences in overhead may also capture differences in bank business and product mix, as well as the variation in the range and quality of services. Since improved management of these expenses will increase efficiency and therefore raise profits, overhead/ta variable is expected to be negatively related to profitability.

Therefore, in this paper, the same variable is selected so as to detect whether or not the findings of the previous studies hold true under a different data set and environment. The findings of negative relationship is expected to particularly be realized in the case of Ethiopia where personal expenses are affected by the relatively low productivity and the excess capacity of larger publicly owned banks like the CBE.

*Productivity;* in the literature, productivity as a determinant of profitability is rarely employed, on account of the fact that banks happened to be exposed to fierce competition

in the banking industry only recently. This is owed to the reduction of barriers to entry as a result of recent moves for globalization of the banking sector world wide.

Among the literatures employing productivity as a determinant of profitability Athanasoglu, Brissimis and Delis (2005) conclude that productivity positively and significantly affects profitability. The same relation is also expected to apply in this study. In order to make investigations of whether the improvements observed in productivity growth have contributed for the profits registered by domestic banks, the rate of change in labor productivity is used in this paper.

In the model, the respective determining variable is measured by the ratio of real gross total revenue to the number of employees in each local bank under investigation.

### ***3.2.2. Industry-Specific Determinants of Profitability***

*Concentration:* To test the importance of the Structure-Conduct-Performance (SCP) hypothesis, industrial concentration in this study is measured by the Herfindahl Herschman Index.

The traditional SCP hypothesis, which is commonly, called the market power (MP) hypothesis, states that when market power becomes high, it results in monopoly profits. Therefore, based on the Structure-Conduct-Performance argument, a positive effect of concentration on bank profits would be indicative of collusion.

Before 1994, where the government made both the banking and insurance sectors open for domestic private investment, the Ethiopian banking sector passed through mono banking system guided by the central plan. Although more than half of the sector's share at the inception of 1994, belonged to the leading firm (the CBE), competitive practices increased through the strengthening of the private sector with the establishment of new commercial banks.

According to Athanasoglu, Brissimis and Delis(2005), alternative indicators of the degree of competition in banking is provided by the estimation of the Rosse Panzar indices, which is usually referred as non-structural measure of competition. The argument is that, when market shares were also included in the regressions, the structural measures (i.e. the

H-H index and concentration ratios) were found to have a weak relationship with profitability, due to correlations of these structural measures with other variables such as market share and the like.

Athanasoglu, Brissimis and Delis (2005) however conclude that the use of non-structural measures in the profitability function has some major limitations. For instance, the Rosse-Panzar' test can give misleading results if the banks in the sample have not completely adjusted to market condition and this leads to a bias towards the spurious appearance of market power.

Therefore, in this paper, rather than the non structural measures, the Herfindhal Index is used. It is computed by 1<sup>st</sup> determining the individual market share (in fraction) of each bank in terms of equity, assets, deposits, advances, and employment and then summing up the squared shares. Mathematical representation of the Herfindhal Index is shown as;

$$H = \sum_1^n \alpha_i^2$$

Where  $\alpha_i = \frac{y_i}{y}$ , is share of bank i.

More specifically, out of the above stipulated market structure components of the Herfindahl index, *Deposit Herfindahl* is here by employed in this paper so as to test the traditional SCP hypotheses.

### ***3.2.3. Macro economic determinant of profitability.***

#### *Expected inflation;*

It is discussed in the literature review that variations in interest margins and profitability are also explained by macro-economic variables. When the relationship between expected inflation and profitability is viewed in particular, while some authors like Demirguc- Kunt and Huizinga (1998), find an explicitly positive relationship, others like Revell(1979) and Perry(1992) state that their relationship is ambiguous.

According to Revell(1979), the relationship between expected inflation and profitability depends on whether or not bank operating expenses like wages and salaries increase at a rate faster than inflation, on the other side of a coin Perry(1992), states that their

relationship depends on how mature an economy is so that inflationary expectations are fully formed enabling bank management to adjust the bank's income accordingly.

Therefore, in this study, in order to determine the effect of expected inflation on bank profitability, this variable is proxied by current inflation, which is being registered in the economy. The same approach is followed in specification of this variable in Athanasoglou et al. (2005). When the rate of inflation in the Ethiopian economy is viewed, it is understood that for the period covering from 2000 to 2007, it shows an average rate of increase of 22.6% relative to the base year price of 100 for year 2000.

### **3.3. Econometric Methodology**

In this study a balanced panel of Ethiopian commercial banks, numbered to a total of eight for the period covering from 2000 to 2007, is used. For simplicity and convenience, the summary statistics of the variables used in the study are set forth in table 2 of chapter 4. As indicated previously, model (3) forms the basis for the estimation of the specified model.

When the majority of studies on bank profitability such as Bourke (1989), Molyneux and Thornton (1992), Demirguc-Kunt and Huizinga (1998), Claessens, Demirguc – Kunt and Huizinga (2000) and Claessens and Lee (2002) are all viewed, they use static linear models to estimate the impact of various factors that are perhaps important in explaining profits. Due to the assumed static relationships, these literatures almost often applied OLS estimation methods on Fixed or Random Effects models. Nevertheless, in dynamic relationships these methods fail to produce consistent and un-biased estimates (particularly as the time dimension becomes smaller and smaller).

Therefore, in this paper, which employs a dynamic panel data econometric technique, due to the inclusion of lagged dependent variable among the regressors, the standard OLS results are invalid. Consequently, an alternative estimation approach that produces un-biased and consistent estimates should be sought.

When it comes to the econometric analysis of model (3), the same empirical approach as that of Athanasoglu, Brissimis and Delis (2007), is followed. The respective empirical method stands to confront with the following issues;

In the 1<sup>st</sup> place, a test for stationarity of the panel will be made using a unit root test for balanced panel. In the second place, an investigation will be made to detect of whether or not individual bank specific effects are present. Thirdly, mechanisms for dynamic panel estimation that deal with the problem of biasedness and in-consistency of the parameter estimates will be put in to effect. In the fourth place, an examination of whether the “Capital Variable” is endogenous and the risk variable is pre determined will be made

Finally, the robustness of the estimates will be checked. In the following sections, each of these issues is discussed in turn. But, first a brief discussion is made on important concepts regarding panel data analysis.

### **3.3.1 Estimation Procedure**

#### ***3.3.1.1. Panel Data Analysis***

In order to thoroughly and adequately investigate the performance of domestic banking markets, data on the variables of interest has been collected on eight heterogeneous local commercial banks covering the period 2000/2007. Hence, panel data analysis econometric techniques appear to best suit to the study for, so many good reasons. But first what is Panel data? Panel data refers to the pooling of observations on across section of firms, households or individuals and countries etc. over a number of periods. They are also called longitudinal data. A Panel data set contains repeated observations over the same units. This allows researchers to specify and estimate more realistic models than would be performed with a single cross section or a single time series.

Hsiao (1985), as cited in Baltagi (1995), lists the benefits from using Panel data, as follows.

In the first place, individual heterogeneities can be controlled using panel data. Panel data suggest that firms, individuals, states or countries are heterogeneous. Accordingly, the effect of these un-observable individual qualities needs to be controlled. Time series and cross section data are not able to control for this heterogeneity, and this perhaps leads to



results that are biased. On the other side of a coin, however, pooling of observations on a cross-section over several time periods provides the ability to control for un-observable individual specific effects, which may be correlated with other variables included as regressors in the specified economic relationships.

Hausman and Taylor (1981), also suggest that analysis of cross-section data also can neither identify nor control for such individual effects.

In the second place, panel data are more suitable to offer better informative data, more variability, less collinearity among the variables, more degrees of freedom and more efficiency of the parameter estimates.

When it comes to time series studies, however, they are “plagued” with multicollinearity. But, this appears to be less likely with a panel since the cross-section dimension adds considerable variability, adding more informative data.

Thirdly, Panel data are also more suitable in the study of the dynamics of adjustment. Cross-sectional distributions that look relatively stable however may conceal significant changes.

In the fourth place, Panel data are better able to identify and measure effects that are simply not detectable in pure cross-sections or pure time series data. At last, Panel data models allow us to build and test more complicated behavioral models than purely cross-section or time series data, for instance, in the studies and modeling of technical efficiency.

Therefore, in this study, data is collected on the variables of interest determining the performance of domestic banking markets on (Eight Commercial Banks in total), for the period 2000 to 2007. This gives us a pooled data set comprising a total of 64 observations. Hence, as an appropriate estimation procedure, these data are arranged in Panel data matrix structure.

### **3.3.1.2. Panel data Unit Root tests**

As discussed above, Panel data has got great many advantages over both time series and cross sectional data. The outstanding benefit obtained from Panel data emanates from its ability to capture individual, household, firm or country specific characteristics, which could not be handled by other data types. Estimations ignoring such individual qualities perhaps lead to in-consistency and biased-ness of the parameter estimates.

Therefore, with Panel data, where the cross-section dimension is denoted by the subscript  $i = 1, 2, \dots, N$  stands for individual banks in each time period, the time series dimension with the subscript (t) denotes  $t = 1, 2, \dots, T$  observations for each banks overtime. Hence, such data types have both the important features of the time series and cross-section data.

As pointed out in G.S. Madalla, and Kim, I.M (1998) what drives researchers towards panel data unit root test is that this undertaking is expected to raise the power of unit root tests by increasing the size of the sample. An alternative path or approach of increasing the size of the sample by making use of long time series data is claimed to cause problems emanating from structural changes. But when we shift from long time series to panel data, though we are minimizing problems from structural changes, it should not be over looked that we are also adding cross-sectional heterogeneity, a problem with the use of panel data. Hence, the question of which of these two, is more of a problem, remains un answered.

By construction, Panel data have time series data properties, in particular when N is small and T is very large. Hence, characteristic features like unit roots and the like become important. But, the use of a relatively large T in a model of bank profitability is perhaps criticized on the premises of “non-stationarity of the panel”.

Another important source of non stationarity in the panel is that it may emanate from the presence of unit roots. But before going in to the detailed discussions of unit roots, in the first place, we need to address what stationarity is.

A stochastic process can be identified as strictly stationary if a change of time origin does not affect its properties. To coin a phrase, an arbitrary shift along the time axis does not affect the joint probability distribution at any set of time. This has an implication that any two series say  $y_t$  and  $y_{t-k}$ , for any  $k$  have the same distribution and that the Co-variances between them do not depend upon  $t$ . It is on these assumptions of stationarity that the majority of econometric theories are built. Hence, in this study in order to employ standard estimation or testing procedures it is typically required that the different variables are stationary.

On the other side of the spectrum, where unit roots prevail, the unconditional variance of  $y_t$  does not exist, meaning that it is infinite and the process is non stationary. To illustrate this consider a process:

$$Y_t = \alpha Y_{t-1} + \varepsilon_t \quad , \quad \text{with } \alpha = 1 \text{ [Unit root]}$$

If we take variances on both sides,

$V(Y_t) = V(Y_{t-1}) + \sigma^2$  , we cannot find the variances of the process consistent with the assumptions of stationarity, unless  $\sigma^2 = 0$ , in which condition we may find an infinity of solutions. The above indicated process with a unit root ( $\alpha = 1$ ) is usually referred as a random walk<sup>7</sup> series. In fact, a non stationary process can be described by any value of  $\alpha$  with  $|\alpha| \geq 1$ .

From an economic point of view, in as much as applicable to this study, the property that makes the presence of a unit root an important question is that in models with unit roots disturbances (which may emanate from policy interventions) have persistent effects that last for ever. In contrast, in stationary models shocks can only have a temporary effect. In line with this premise a test for unit roots, which is attempted in this study helps to detect the likely effect of policy interventions, for instance, the question of whether or not

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<sup>7</sup> A non stationary series is said to be in a random walk if finite solutions does not exist for the variance of the process in consistence with stationarity. Hence, the series wanders widely, implying that an innovation will permanently affect the process, as characterized by its infinite long memory.

allowing foreign banks to enter in to the domestic banking market has persistent or temporary effects is addressed

Given the development of testing procedures and their incorporation in to econometric software packages, testing for unit roots in panel data is becoming more common. There exist different panel data unit root tests suggested by different authors including Breitung and Meyer (1994), Levin and Lin (1993a, 1993b), Quah (1994), IM Pesaran and Shin (1996), R.A. Fisher (1932), Maddala and Liu (1996) and Maddala and Wu (1996), to mention a few. Unit root tests will be employed using Eviews-5 software.

For purposes of clarity in unit root testing, it is deemed important to discuss the basic underlying concepts about the different unit roots before going directly in to their test.

### *Levin and Lin (1993a)*

These authors conducted an exhaustive study and came up to develop unit root tests for the model, as presented below.

$$Y_{i,t} = \alpha Y_{i,t-1} + \delta_0 + \delta_1 t + \eta_i + v_t + \varepsilon_{i,t} \quad \varepsilon_{i,t} \sim \text{IID}(0, \delta^2)$$

Where  $Y_{i,t}$  and  $Y_{i,t-1}$  are a given panel data series with the corresponding lag,  $t$  standing for the time trend and  $\eta_i$  and  $v_t$  representing an individual and time specific effects. The  $\varepsilon_{i,t}$  is the disturbance term. This Levin and Lin (1993a) - LLC test initially assumes that the  $\varepsilon_{i,t}$  are IID  $(0, \delta^2)$ . This implies that individual processes for each  $i$  are cross-sectionally independent and there is no serial correlation in the errors. But, later, they showed that under the serial correlation of errors, the test statistics have the same limiting distributions by the inclusion of lagged first differences of  $Y_{i,t}$ .

Levin-Lin tests have major limitation that  $\alpha$  is the same for all observations. Hence, if the value of  $\alpha$  for the  $i^{\text{th}}$  cross-sectional unit is denoted by  $\alpha_i$ , then the Levin-Lin test specifies the null  $H_0$  and alternative  $H_1$  hypotheses as:-

$$H_0: \alpha_1 = \alpha_2 = \dots \alpha_N = \alpha = 1$$

$$H_1: \alpha_1 = \alpha_2 = \dots \alpha_N = \alpha < 1$$

**Breitung and Meyer (1994) – BM test**

A simple panel data unit root test valid for fixed T and  $N \rightarrow \infty$  is suggested by Breitung and Meyer in 1994. They consider the Model

$$Y_{i,t} = \alpha Y_{i,t-1} + (1 - \alpha) \mu_i + \varepsilon_{i,t}$$

Where  $Y_{i,t}$  and  $Y_{i,t-1}$  are panel data series in levels and lags respectively.  $\mu_i$  stands for individual specific effects and  $\varepsilon_{i,t}$  is an error term with the following distribution.

$$\varepsilon_{i,t} \sim \text{IIN}(0, \delta^2), i = 1, 2, \dots, N, t = 1, 2, \dots, T$$

These authors indicate that, if we regress  $Y_{i,t}$  on  $Y_{i,t-1}$  ignoring  $\mu_i$ , it gives an estimate  $\alpha$  with asymptotic bias.

$$\text{Plim}_{N \rightarrow \infty}(\hat{\alpha} - \alpha) = \frac{(1 - \alpha) S^2}{S^2 + \delta^2 / (1 - \alpha^2)}$$

Where  $S^2 = N^{-1} \sum \mu_i^2$

From the above described expression, it is easily understood that estimates of parameters, which do not take account of the individually specific effects ( $\mu_i$ ) lead to an asymptotic bias, with the  $\mu_i$ s as functions of the bias. It is also shown that the bias vanishes, when  $\alpha = 1$ . Hence, it is possible to test the unit root hypothesis by employing the t - statistic for  $H_0: \alpha = 1$ . This is on account of the fact that under such circumstances the standard test statistics are normal. Nevertheless, since under the alternative hypothesis  $|\alpha| < 1$  the OLS estimate  $\alpha$  will be biased, there by leading to a loss of power.

One of the weaknesses of BM test as cited in G.s. Maddala and In-Moo kim (1998) is that the approach cannot be used to analyze the effect of individual specific effects or serial correlation on the appropriate critical values at which to evaluate the t-tests. It cannot also be extended to allow for heterogonous error distributions. Owing to the above stated limitations, most studies do not choose to resort to empirical application of BM tests.

*IM, Pesaran, and Shin (1996) – (IPS test)*

IPS (1996) - test relaxes the assumption of homogeneity, which states that  $\alpha_1 = \alpha_2 = \dots = \alpha_N$  under the alternative hypothesis ( $H_1$ ). This is to say that IPS-test attempts to resolve the limitation in Levin and Lin (that  $\alpha$  is the same for all observations). The relaxation of this assumption allows estimation of the parameter estimates with  $\alpha$  free to vary across the  $i$  individual series in the panel. Different tags are also allowed for the  $i$  cross-section in the model. The basic idea of the test can easily be illustrated by considering model (IV) in Levin and Lin, as follows.

The model;

$$Y_{i,t} = \alpha Y_{i,t-1} + v_t + \varepsilon_{i,t}, \quad H_0 : \alpha = 1$$

Substituting  $\alpha_i$  for  $\alpha$ , we find that

$$Y_{i,t} = \alpha_i Y_{i,t-1} + v_t + \varepsilon_{i,t},$$

Here, we come up with a model with a linear trend addressing each of the  $N$  cross-sectional units. As a matter of facts, separate unit root tests with respect to the  $N$  cross-sectional units will be employed instead of pooling the data on across section over several time periods. Using the second equation a null hypothesis of ( $H_0 = \alpha_i = 1$ ) is tested against the alternative hypothesis of ( $H_1 = \alpha_i < 1$ ).

Given that there are  $T$  observations, if we consider the  $t$ -test for each cross-sectional unit, we may find that the  $t$ -statistics for testing unit roots denoted by  $t_i$ ,  $i = 1, 2, \dots, N$ , letting  $E(t_i) = \mu$  and  $\text{Var}(t_i) = \sigma^2$ , can be represented as,

$$\frac{\sqrt{N} (t_i - \mu)}{\sigma} \Rightarrow N(0,1)$$

Nevertheless, this approach has got significant shortcoming because of the problem encountered in computation of  $\mu$  and  $\sigma^2$ , which is commonly resolved by Monte Carlo methods, whereby they are tabulated for ready references.

As thoroughly discussed in G.S. Madalla and Kim, I.M. (1998), the important point worth noting in IPS test is that it is a means of combining evidences on the unit root

hypothesis, which are obtained from the respective  $N -$  unit root test executed on the  $N -$  cross-sectional units. These authors also disclose that the test implicitly assumes that  $E(t_i)$  is the same for all  $i$ , meaning that  $T$  is the same for all cross-sectional units. Therefore, the test appears to be dealing with balanced panel data only.

***Maddala and Wu (1999) test (MU tests)***

Making use of the model developed by Levin and Lin (1993) as a testing procedure that takes care of the problem of heteroskedasticity and autocorrelation that are apparent in their 1992 tests, Maddala and Wu (1999) base their test, on the null of non stationarity against an alternative hypothesis of stationarity.

The model shown explicitly looks like;

$$\Delta y_{it} = \alpha y_{i, t-1} + \sum_{l=1}^{\alpha_i} Q_{il} \Delta y_{i, t-l} + Z_{it}r + e_{it}$$

Where  $\Delta y_{it} = y_{it} - y_{i, t-1}$ ,

The null  $H_0: \alpha = 1$  against

The alternative  $H_1: \alpha < 1$

In order to accomplish their task, they use a fisher type test that combines the significance level (P-value) for rejecting the null in the  $i^{th}$  test; which is conducted for each cross-section  $i$  separately. Algebraically,

$$P = -2 \sum_{i=1}^N \ln P_i$$

Where  $-2 \sum_{i=1}^N \ln P_i$  has a  $X^2$  distribution with degrees of freedom  $2N$

This fisher type test by MW (1999) is found to have far better power than the IPS test. Its versatility in being applied to any unit root test, its application without requiring a balanced panel, its easiness in computations and its non requirement for imposition of the same lag length for each individual cross-section  $i$ , makes it more advantageous.

On account its compatibility to the assumptions of individual effects made in this study, Levin and Lin (1993a) will be employed with regard to a unit root in each bank.

### 3.3.1.3. Are Bank- Specific Effects Present?

In this section, in the first place, an attempt will be made to investigate whether or not individual bank specific effects are really present. It is to be noted that this can be detected from the estimation results. The particular methodology employed in this study is that, to the specified model (1) of the paper, a dummy variable ( $d_i$ ) for each bank  $i$  will be included in the model where  $d_{ij}=1$ , if  $i=j$  and 0 elsewhere. Hence, we will have a set of  $N$  dummy variables where  $\mu_1, \dots, \mu_N$  can be estimated by OLS method and where the implied estimator for  $\beta$  is called Least Square Dummy Variable (LSDV) Estimator.

After wards, it is possible to test the joint significance of these dummy variables indicated by null hypothesis as  $H_0: \mu_1 = \mu_2 = \dots = \mu_{N-1} = 0$ , by conducting an F test. This refers to a simple chow test with OLS applied to the pooled model for the restricted residual sum of squares (RRSS) and the LSDV regression applied to the un restricted residual sum of squares (URSS). For the details of the test please see table A3. Hence, if the null hypothesis is rejected, it is wise to conclude that bank specific effects are present.

It is to be noted that, before a test is conducted for the presence of individual bank specific effects, an assumption has already been made that individual commercial banks operating in the domestic banking markets are treated as having peculiar qualities inherent to their structural organization, to the mix of financial products offered and/or to the management atmosphere, which determine their performance. In this study, it is also underscored that out of the existing commercial banks, which are numbered to 10 in total, about 8 are considered. The other two are missing, on account of incompleteness or unavailability of data.



### 3.3.2. Model Estimation

Before directly entering in to detailed discussions about attempts so far made to deal with the problems of biasness and in-consistency in dynamic models, it is deemed important to discuss about the sources from which these problems emerge.

As explicitly stated in the model specification, this study employs a dynamic specification of the model, through the inclusion of lagged dependent variable (lagged profit) among the regressors. This helps to account for certain features of banks profit such as profit persistence, through the coefficient of this lagged variable. But, problems emerge in dynamic models with the inclusion of lagged dependent variables. Some of the basic problems introduced by this effect can be illustrated by considering model (3), which forms the basis for the estimation.

$$\Pi_{it} = \mathbf{c} + \sigma \Pi_{i, t-1} + \sum_{K=1}^K \beta_K \mathbf{X}_{it}^k + \varepsilon_{it}$$

$$\varepsilon_{it} = \mu_i + \mathbf{v}_{it}$$

Since  $\Pi_{it}$  is a function of  $\mu_i$  (the un-observed bank specific effect such as bank management skills).

$\Pi_{i, t-1}$  is also a function of  $\mu_i$ .

Therefore,  $\Pi_{i, t-1}$  a right hand regressor in (3) is correlated with the error term.

This renders the OLS estimator biased and in-consistent even if the  $\mathbf{v}_{it}$  are not serially correlated.

Among the attempts so far made to deal with the problem of in-consistency and biasness of OLS estimates in dynamic models, the first, which was made by Anderson and Hsiao (1981), suggests that an instrumental variables estimation approach which is based on first differenced transformation of the original equation is considered as a breakthrough.

To put it more explicitly, Anderson and Hsiao (1981) certainly suggest first differencing of the model to eliminate individual effects ( $\mu_i$ ) and then making use of  $\Delta\pi_{i, t-2} = (\pi_{i, t-2} - \pi_{i, t-3})$  or simply  $\pi_{i, t-2}$  as a valid instrument for  $\Delta\pi_{i, t-1} = (\pi_{i, t-1} - \pi_{i, t-2})$ . Consequently,

this instruments will be un-correlated with  $\Delta V_{it} = V_{it} - V_{i, t-1}$ , so long as serial correlations between the  $V_{it}$ s does not exist.

Arellano and Bond (1991) point out that the Instrumental Variable (IV) estimation proposed method by Anderson and Hsiao (1981), because of its failure to exploit all the available moment conditions, leads to consistent but in-efficient estimates. The IV estimation method by Anderson and Hsiao (1981) is also claimed to have failed to take account of the differenced structure on the disturbance terms ( $\Delta V_{it}$ ). What is suggested by Arellano and Bond (1991) as a solution to the problem stated above is that gains in the efficiency of the parameter estimates can be achieved by exploiting all the available lagged values of the dependent variable and lagged values of the exogenous regressors (explained) as instruments.

Because Arellano and Bond estimators are criticized for being in efficient when the instruments used are weak, particularly when applied to panels with very small T, for the present study with T=8, which might not be large enough to eliminate such problems, the estimation of the specified model will be undertaken by employing the system GMM estimation approach in the Arellano and Bover(1995) paradigm.

### **3.3.2.1. General Method of Moments (GMM) Estimation**

In order to deal with the problem of bias and inconsistency of OLS estimates in dynamic panel models where the included lagged dependent variable correlates with un observed individual-specific effects, violating one of the conditions of OLS, Arellano and Bond (1991) argue that one can get additional instruments from exploiting the orthogonality conditions that prevail between lagged values of the dependent variable ( $\prod_{it}$ ) and the disturbances  $V_{it}$ . Two variables are said to be orthogonal to each other when they do not correlate.

Before presenting the details of the system GMM estimation method, it is deemed important to explicitly indicate the model hereby specified, for purposes of estimation. Hence, the following refers to the expanded form of model (3) in section 3.1.

$$\begin{aligned} \Pi_{it} &= c + \sum_{k=1}^k \beta_k X_{it}^k + \varepsilon_{it} && \text{Where } \varepsilon_{it} = \mu_i + v_{it} \\ \Pi_{it} &= c + \sigma \Pi_{i,t-1} + \sum_{j=1}^J \beta_j X_{it}^j + \sum_{l=1}^L \beta_l X_{it}^l + \sum_{m=1}^M \beta_m X_{it}^m + \varepsilon_{it} \\ \Pi_{it} &= c + \sigma \Pi_{i,t-1} + \beta_1 EA + \beta_2 LLP + \beta_3 CUST + \beta_4 OH + \beta_5 PVT + \\ & \quad + \beta_6 HH + \beta_7 CPI \end{aligned}$$

As indicated in the table for notations (Table A-1)

- $\Pi_{i,t-1}$  = Profits lagged one period
- EA = Equity/ta
- LLP = Loan loss provisioning/TL
- CUST = Customer and short term funding/ta
- OH = Overheads/ta
- PVT = Productivity
- HH = Herfindahl Hirschman Index
- CPI = Expected inflation (Consumer Price Index)

Where ta stands for total assets, TL stands for total loan.

Making use of a simplified model (3), this is illustrated as;

$$\Pi_{it} = \sigma \Pi_{i,t-1} + \mu_i + v_{it} \quad / \sigma / < 1 \text{ ----- (1)}$$

For  $i = 1, \dots, N$  and  $t = 2, \dots, T$ , where  $\mu_i + v_{it} = \varepsilon_{it}$  has the standard error components structure;

$$E(\mu_i) = 0, \quad E(v_{it}) = 0, \quad E(v_{it} \mu_i) = 0 \text{ for } i = 1, \dots, N \text{ and } t = 2, \dots, T \dots (2)$$

The idiosyncratic errors ( $v_{it}$ s) are also assumed to be serially un-correlated

$$E(v_{it} v_{is}) = 0 \text{ for } i = 1, \dots, N \text{ and } S \neq t \text{ ----- (3)}$$

and that the initial condition  $\Pi_{i,1}$  are pre-determined.

$$E(\Pi_{i1} v_{it}) = 0 \text{ for } i = 1, \dots, N \text{ and } t = 2, \dots, T \text{ ----- (4)}$$

The above assumptions imply that, altogether there are  $m = 0.5 (T-1) (T-2)$  moment restrictions. Accordingly,

$$E(\Pi_{i,t-s} \Delta v_{it}) = 0 \text{ for } t = 3, \dots, T \text{ and } S \geq 2 \text{ ----- (5)}$$



To explicitly indicate how a consistent estimate of  $\sigma$  is obtained from instrumenting the 1<sup>st</sup> differenced profit with lagged levels of profit dated  $t - 2$  and earlier, the procedure takes the following steps. In Arellano and Bond (1991), 1<sup>st</sup> differencing (1) above, eliminates the individual effects.

(i)  $\Pi_{it} - \Pi_{i,t-1} = \sigma (\Pi_{i,t-1} - \Pi_{i,t-2}) + (V_{it} - V_{i,t-1})$  and note that  $(V_{it} - V_{i,t-1})$  is MA(1) with unit root.

For the 1<sup>st</sup> period, i.e.  $t = 3$ , we have:

(ii)  $\Pi_{i3} - \Pi_{i2} = \sigma (\Pi_{i2} - \Pi_{i1}) + (V_{i3} - V_{i2})$ , in this case,  $\Pi_{i1}$  is a valid instrument. Since it is highly correlated with  $(\Pi_{i2} - \Pi_{i1})$  and not correlated with  $(V_{i3} - V_{i2})$ .

In the second period  $t = 4$ , we have,

(iii)  $\Pi_{i4} - \Pi_{i3} = \sigma (\Pi_{i3} - \Pi_{i2}) + (V_{i4} - V_{i3})$

In this case,  $\Pi_{i2}$  as well as  $\Pi_{i1}$  are valid instruments for  $(\Pi_{i3} - \Pi_{i2})$ , since both  $\Pi_{i2}$  and  $\Pi_{i1}$  are not correlated with  $(V_{i4} - V_{i3})$ . If one continues in this manner, adding more and more valid instruments with each forward period, in order that for the  $T^{\text{th}}$  period, the set of valid instruments becomes  $(\Pi_{i1}, \Pi_{i2}, \dots, \Pi_{i,T-2})$ .

Therefore, equation (5) written more compactly gives us

$$E(Z_i' \Delta V_i) = 0 \text{ ----- (6)}$$

Where  $Z_i$  is the  $(T - 2) \times m$  matrix given by

$$Z_i = \begin{pmatrix} [\Pi_{i1}] & & & 0 \\ & [\Pi_{i1}, \Pi_{i2}] & & \\ & & & \\ 0 & & & [\Pi_{i1}, \dots, \Pi_{i,T-2}] \end{pmatrix} \text{ and } \Delta V_i \text{ is the } T - 2 \text{ vector } (\Delta V_{i3}, \Delta V_{i4}, \dots, \Delta V_{iT})'$$

Then the matrix of instruments is  $Z = [Z_i^1, \dots, Z_i^N]^1$  and the moment equations described above can also be given by the moment conditions in step (6) above that  $E(Z_i^1 \Delta V_i) = 0$

Pre multiplying the differenced equation (i) in vector form by  $Z^1$ , one gets

$$Z^1 \Delta \Pi = Z^1 (\Delta \Pi - 1) \sigma + Z^1 \Delta V \text{----- (7)}$$

Note that, this instrumental variable procedure still does not take account of the differenced error term  $(V_{it} - V_{it-1})$ .

At last, we get the Arellano and Bond (1991) one step consistent estimator of  $\sigma^2$  after performing GLS on (7).

Nevertheless, as shown by Blundell and Bond (1998), in situations where the dependent variable is close to a random walk, instruments relying on past levels as instrument for future differences are likely to perform weakly because past levels convey only little information about future changes. Under such circumstances, as discussed in Hoeffler (2000), the available instruments are only weakly correlated with the endogenous variables and the likelihood of the GMM estimator to suffer from severe finite sample bias and in-accuracy will be high.



Instead, they come up with a second strategy which suggests to estimate a system linking two sets of equations. While one is the differenced equation of type (ii)

$$\Pi_{it} - \Pi_{i,t-1} = \sigma (\Pi_{i,t-1} - \Pi_{i,t-2}) + (V_{it} - V_{i,t-1})$$

For which we apply appropriate lagged levels of  $\Pi_{it}$  and  $X_{it}$ s (other regressors) as instruments, there exist other set of equations in the system which stand as the levels (original) equations (1).

$$\Pi_{i,t} = \sigma \Pi_{i,t-1} + \mu_i + v_{it}$$

Provided that the additional assumption augmented by Blundell – Bond (1998)

$$E(\mu_i \Delta \Pi_{i2}) = 0 \text{ for } i = 1, \dots, N \text{----- (8) is satisfied.}$$

For this assumption to hold, a stationarity restriction on the initial condition  $\Pi_{i1}$  is required. I.e. to say that shocks to profit in one time period are not, correlated with initial profit of this time period.

In combination with the AR (1) model set out in equations (1) to (4), this assumption results in  $T - 2$  further moment conditions.

$$E(\varepsilon_{it} \Delta \Pi_{i,t-1}) = 0 \text{ for } i = 1, \dots, N \text{ and } t = 3, 4, \dots, T. \text{ --- (9)}$$

This permits the application of lagged 1<sup>st</sup> differences of the sequence as valid instruments for levels equations, as indicated by Arellano and Bover(1995). A GMM estimator which utilizes moment restrictions of both sets (5) and (9) can, therefore, be constructed. This employs a system of  $(T - 2)$  equations in 1<sup>st</sup> differences and  $(T - 2)$  equations in levels, consistent with periods 3, - - -,  $T$ .

The matrix of instruments for this system can therefore be written as.

$$Z_i^+ = \begin{pmatrix} Z_i & 0 & 0 & \text{----} & 0 \\ 0 & \Delta \Pi_{i2} & 0 & \text{----} & 0 \\ 0 & 0 & \Delta \Pi_{i3} & \text{----} & 0 \\ - & - & - & \text{----} & 0 \\ - & - & - & \text{----} & - \\ 0 & 0 & 0 & \text{---} & \Delta \Pi_{i,T-2} \end{pmatrix}$$

## CHAPTER 4

### 4. Result and Discussion

#### 4.1. The Data and Source

In this study, model (3) specified in section (3.1) will be estimated by using data on different bank specific variables like equity, credit risk, customer and short term funding, overheads and productivity, and industry specific variables like market concentration as well as macro economic variables like the expected inflation rate . Data on the respective variables is obtained from various sources. In its attempt to evaluate the determinants of profitability in domestic banking markets, the study in the 1<sup>st</sup> place takes a look at the performance of the eight commercial banks out of the existing ten which are used to giving commercial banking services in Ethiopia. The data covers the period extending from 2000 – 2007.

The reason why the study deals with only eight commercial banks is that for the other two, data in certain circumstances has been found to be missing and incomplete. This may have come in to effect, for one thing, on account of late entry to the market as reflected in their period of establishment as recent as the year 2004 for the Cooperative Bank of Oromia S.C. and year 2006 for Lion International Bank. The other reason is that an annual report for Lion International Bank is missing from the National Bank of Ethiopia. The third reason for exclusion of these two banks is to avoid the convenience created in introduction of un-balanced data in to the panel.

As indicated by Asoglu, Brissimis and Delis (2005), the profitability variable can be measured by different measures identified as the profits to assets ratio, commonly referred as Return on Assets i.e. (ROA) and the profits to equity ratio, which is referred as Return on Equity (ROE). Since the investigation of ROE as a measure of profitability is associated with considerable risks inherent to high leverage as reflected in a report of the National Bank of Ethiopia, banks with higher equity (lower leverage), In this study, ROA (Return on Assets i.e. tax profit to total assets variable) is employed as a key indicator

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What should also be noted and pointed is that since profits are flow variables generated in the course of the year, for the computation of the ROA ratio, the average value of assets of two consecutive years, and not the end year values that are used.

Most of the data on bank specific and industry specific variables is obtained from the income statement and balance sheet of each commercial bank, as compiled by the National Bank of Ethiopia (NBE). An important bank specific factor, the equity/ta variable, in the context of these banks comprises authorized and paid capital, legal reserves, general and special reserves, retained earnings as well as profit and loss figures for the subsequent years summed up and each taken as a ratio of total assets. Where as, the credit risk variable is determined by the ratio of the loan loss provisions to total loans and advances. Both variables use the data from the balance sheet.

Taking into account deposits as a determinant of bank profitability, Demirguc-kunt and Huizinga (1998), in their extensive analysis of the determinants of Commercial bank interest margin and profitability, consider the effect of customer and short-term funding (Cust.) which comprise demand deposits, saving deposits and time deposits. Accordingly, though they find that this liability category does not show significance in the net interest variable there are some indications for the existence of negative relationships with bank profitability.

In this study, the required data on deposits is obtained from each bank's balance sheet. These data covers the period extending from 2000 – 2007, with no observation missing from the panel. Note that the variable included as a regressor is Cust./assets.

Turning to the overhead/assets variables, data on salary and benefits of employees is consolidated with the general expenses of these banks, so as to come up with the operating (overhead) expenses as a ratio of total assets.



Another relevant data on productivity variable is compiled from real gross total revenue to the number of employees. Hence, the gross total revenue of each bank has been deflated by the CPI (consumer price index) so as to detect the effect of real improvement in labor productivity on bank profits. In spite of the fact that data on the level of manpower is obtained for the required period covering from 2000 to 2007, particularly for the CBE and CBB, for all the private banks considered in the study, data were available only for the period 2003 to 2007. Hence, the missing observations on the left wing are filled by using simple averages keeping consistency among the data. The limitation detected in making use of the data on the total number of employees held at each bank is that since it has not been stratified as skilled or unskilled, the study assumes that every employee contributes to bank profits in exactly the same way. This is a constraint imposed by the nature of the data. But, in reality, as the contribution of bank employees to its profitability depends on the level of their skill, the result of the regression should be interpreted with some cautions and not as conclusive.

When it comes to data on inflation as a macro-economic variable, it is obtained from the data set of the Ethiopian Economic Association (EEA).

Turning to concentration as an industry specific variable, various authors such as Demircuk-kunt and Huizinga (1998) employ the ratio of the three largest banks' assets to total banking sector assets so as to represent this variable. Where as, Beck and Hesse (2006) apply the Herfindahl Hirschman (HH) index for both the deposit and loans market, as an indicator of market structure. Athanasoglu, Brissimis and Delis (2005) also employ the Herfindahl index as an indicator of market concentration, in their attempt to test the SCP hypothesis. On the other side of a coin, however, Farooq, M. (2003) states that the distribution of assets, deposits and advances for commercial banks can be shown by Lorenz Curve, over and above the Herfindahl Index and concentration ratio. In this context, Lorenz curve is a construct employed in the computation of measures of inequality by plotting the proportion of the magnitude of the variable held by the bank against the proportion of the number of banks. With an attempt to detect the dynamics of in-equality, a computed summary measure, which is called Gini Coefficient, is also



derived from Lorenz curve (Lc). As a ratio of the area between Lc and the  $45^{\circ}$  line to the total area below  $45^{\circ}$  line, the Gini coefficient attains its maximum value of 1 in complete in-equality conditions and attains its minimum value of zero in absolute equality conditions.

As an alternative measure of industrial concentration, Farook, M.(2003) employs the Herfindahl index, which is computed as the sum of squared individual market shares (in fraction) of each bank in terms of deposits, assets, equity, advances, employment and the like.

In this paper, since the required data on these variables is consolidated from the balance sheet of each bank and because of its advantage over the Gini coefficient in taking account of both the number of banks and their size differences, Herfindahl index is used as an indicator of market concentration. In situations where there exists a single firm in the industry, the value of H is 1. In other words, when the number of firms in the industry decreases, in-equality in shares increases, implying that H tends to 1, under such circumstances. In Farook, M (2003), the concentration ratio is used in the same context as Demirguc Kunt and Huizinga (1998).

When it comes to expected inflation as significant macro-economic determinant of profitability, it is proxied by the current average rate of inflation and the data as mentioned previously is from EEC.

Finally, data on indicators of the level of financial intermediation namely bank deposits /GDP, loan-deposit ratio, net interest margin and overhead costs have been acquired from World Bank Publication(2006) for selected African countries like Uganda, Kenya, Tanzania, Sub-Saharan Africa and Low income countries. Hence, this helps to make a descriptive statistical comparison of the performance of domestic commercial banks in Ethiopia against the average performance in terms of financial intermediation in the respective countries.

In similar terms, aggregate data on bank spreads and profitability domestic vs. foreign banks have also been acquired from World Bank Publication of the Global Development Finance (2000) on French-speaking, English-speaking, Portuguese-speaking and other African countries, with averages shown for SSA (Sub Saharan Africa). This helps to compare the average performance of local banks with the presence of foreign banks as in many other East African Countries and with out foreign presence just as Ethiopia.

#### 4.2. Data Descriptives

In the study, a sample of eight banks are selected not on the basis of the standard sample selection techniques but depending on the availability and adequacy of data with regard to the key bank-specific and industry-specific determinants of profitability as provided from the compilations of the NBE (National Bank of Ethiopia). It is also to be recalled that in this study a sample period of 2000 – 2007 is considered. The duration of the panel is determined on the rationale that data for East African Countries, which is to be used as a bench mark against which comparison of the efficiency of domestic commercial banking markets is made, is availed only as of 2000.

In the table below, a descriptive statistics for the key variables of interest are provided. The mean and standard deviations for the selected variables are also incorporated in the summary statistics described below.

**Table 2: - Summary Statistics of selected key variables**

Variables	Mean	Std. Dev.	Min	Max
Return on Asset (ROA)	0.031	0.015	0.003	0.070
Log ROA	-3.586	0.552	-4.605	-2.659
Equity/assets	0.115	0.055	0.040	0.290
Loan Loss Provisioning/loans	0.067	0.062	0.000	0.290
Deposits/assets	0.738	0.099	0.490	0.870
Overhead Expenses/assets	0.023	0.008	0.010	0.040
Productivity	0.162	0.162	0.070	1.360
Herfindahl Index	0.580	0.098	0.440	0.730
Expected Inflation	0.228	0.228	-0.04	0.700

As described previously, return on assets (ROA), which is determined by the rate of profit before tax to total assets is used as a measure of domestic bank profitability. From the statistical summary depicted above, it is learnt that in the domestic commercial banking markets there appears to be considerable variation in profitability. The mean return on assets in the local banking market is 3.1%, whereas the standard deviation of log (ROA) is 0.552. The minimum ROA as indicated above is 0.003, as registered by the CBB in the year 2000, while the maximum ROA attained is 7%, as exhibited by NIB bank in 2001. In the table here under, the summary statistics updated to year 2007 is presented.

*Table 3: Summary statistics of profitability determinants of local banks for year 2007*

<b>Banks</b>	<b>Return on assets(ROA)</b>	<b>Equity/ta (EA)</b>	<b>Credit risk(LLP)</b>	<b>Overhead (OH)</b>	<b>Productivity (Pvt)</b>	<b>Cust. &amp; short term funding</b>
CBE	0.03	0.10	0.14	0.02	0.17	0.76
CBB	0.04	0.0004	0.11	0.14	0.02	0.60
Awash	0.06	0.11	0.04	0.02	0.13	0.81
Dashen	0.05	0.09	0.02	0.02	0.18	0.80
WB	0.05	0.12	0.04	0.02	0.16	0.78
United	0.05	0.16	0.03	0.02	0.13	0.71
NIB	0.05	0.16	0.03	0.02	0.13	0.72
Abyssinia	0.03	0.12	0.05	0.02	0.15	0.80

Where ta stands for total assets, notations for other variables can be referred from table A-1 in the annex.

Accordingly, the records maintained for the most recent year 2007, reveals that the highest ROA ratio of 6% is registered by Awash International Bank, where as, Dashen Bank, NIB Bank, United Bank and Wegagen Bank reported to have realized an approximately similar rate of return on assets of 5% each. A relatively lower rate of return on assets of 3%, however, is exhibited by bank of Abyssinia and the CBE as at the year 2007.

In the upcoming section a simple descriptive statistical analysis will be made on selected variables comprising bank specific, industry specific and macro economic ones.

As a determinant of profitability, capital, which is proxied by equity/ta is registered highest (29%) by United Bank in 2001 and the lowest figure of 4% is that which was recorded by the CBE for two consecutive years 2005 and 2006. Since this does not reveal the current liquidity status of domestic commercial banks, recent records maintained as at the year 2007, testify that two private banks namely United Bank and NIB Bank, holding an equivalent rate of equity of 16% as a ratio of their assets, find themselves in a relatively better liquidity position, while the Construction and Business Bank (CBB) as per its record as at end of same year is the least liquid (illiquid) bank keeping only 0.4% as a ratio of its assets. However, since there are alternative measures of liquidity, which may come up with evidences contrary to this finding, the descriptive result in here must not be considered as conclusive and a room for some kind of doubts should be allowed. If Banks are rated according to the NBE parameters of liquidity, as an alternative to this, the result may hold the other way round. Therefore interpretations should be made with some caution. It is the constraint imposed by the data with regard to some other alternative measures that made the study to resort to the respective ratio analysis, the method, which, by it self has considerable drawbacks.

In terms of the risk inherent to credit financing as proxied by the ratio of loan loss provisions to total loans and advances commercial banks operating in the domestic economy can be compared against each other. From the summary statistics depicted a while ago, the highest provision rate maintained so far is 29% by the CBE as at the year 2003.

Nevertheless, records for the year 2007 reveal that the CBE still stands to have maintained the highest loan loss provisions as a ratio of its total loan portfolio, which is approximated to 14%, followed by the CBB, allowing an expense of 11% against its total assets. This high rate of expense on non performing loans happened to be high at the existing state commercial banks on account of their long years of stay in the local banking market being subjected to different policy directions promoted by governments in the past, falling prey to the consequences of miss directions and default as well. The other reason is that, as policies change in response to change of state or the politics of

state, they almost often found themselves only to learn from their own experiences. The local public commercial banks did not also possess well developed skills of bank management, which promoted high risk taking in lending. When it comes to private banks, records of the end year 2007 reveal that Abyssinia Bank appears to have maintained the highest rate of 5% as an expense on provisions to total loan. What should not be overlooked in here is that this figures may not reflect the actual risk pertaining to credit financing in domestic commercial banking markets owing to the fact that these banks commonly send a some how manipulated data to the NBE.

Generally, the extent of prudence and caution in lending can be measured by the rate of NPLs(non performing loans), where banks commonly determine their provision expenses applying standard rates of provision on loans which fall 90 days past their due date. It should also be noted that provision rates are considerate of the level of risk pertaining to the installment of the loan. According to Mishkin, F.A (2006), excessive risk-taking in credit financing may affect the capital position of banks because it leads to deterioration in the value of their assets relative to their liabilities. This in turn leads to erosion of customer confidence as banks become riskier due to problem of liquidity. To coin a phrase, when the liquidity position of a banks start to deteriorate as a consequence of rising non-performing loans, depositors and other potential lenders to the bank show less willingness to supply banks with funds, creating financial constraints in lending which may have the potential to turn the lending boom from the start to a lending bust (crash).

To take a glance at deposits, in the summary table it is indicated that the lowest share of deposits to total assets so far maintained in the commercial banking markets is 49% as exhibited by NIB bank in 2000, where as, the maximum share of deposits to total assets so far maintained in the industry appears to have attained 87%, as registered by Awash Bank for two subsequent years 2005 and 2006. When we look for up to date records in this case, we find that in the year 2007, the highest share of deposits to total assets approximated to 80% has been maintained by two private banks namely Dashen Bank and Bank of Abyssinia, while the lowest share of deposits to total assets of 60% has been exhibited by the CBB. These figures, however, may not be of much relevance, as banks



commonly measure their statutory position checking their loans to deposit ratio and not the deposits to total assets ratio. This ratio of loans to deposit, however, is important as the NBE evaluates each bank whether it has adhered to the maximum statutory limit or has trespassed that. The maximum statutory limit set by the NBE recently is 75%.

In terms of the absolute magnitude of deposit, however, the CBE stands to occupy the Lion's share of deposit to the Industry's total deposits. The absolute magnitude of deposit as at the year 2007 has reached Br. 32.87 billion.

Turning to industry specific variables as a determinant of profitability, we pay heed to concentration. Using the data from the bank statement of each bank and applying simple arithmetics of ratio, the individual market share of each bank is determined in terms of assets, equity, deposits, advances and employment. Summing up the squared shares, the computed Herfindahl Index is set forth in the table below.

Returning to the summary statistics, Herfindahl deposit index which is employed as a measure of industrial concentration registers a mean value of 0.58 with a standard deviation of 0.098. This indicates that in the domestic commercial banking markets there exists considerable variation among banks in terms of their share in deposits. However, as shown in the table below, the value of H-H for different variables relating to the banking firms shows a decreasing trend testifying that the concentration of domestic commercial banking markets in terms of deposits, advances, assets and number of employees has shown significant reductions from time to time. The exception lies with equity, which shows an irregular trend.

**Table 4: - Herfindahl Index**

<b>Bank Variables</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>	<b>2006</b>	<b>2007</b>
Equity	0.54	0.49	0.32	0.40	0.38	0.30	0.24	0.39
Deposits	0.73	0.69	0.64	0.60	0.56	0.51	0.47	0.44
Advances	0.61	0.54	0.47	0.35	0.31	0.28	0.22	0.20
Assets	0.69	0.66	0.62	0.58	0.55	0.51	0.46	0.44
No. of employees	0.61	0.51	0.45	0.40	0.37	0.35	0.30	0.29

### 4.3. Regression Result

As a valid scientific approach, it is always recommended that, before conducting an in-depth investigation on certain issues, the data to be used for analysis should be adequately explored. On the basis of the above specified premise, certain tests of specification have been conducted so as to provide a back up to the consistency of ideas posed in the study. The first test of diagnosis is made with an attempt to detect the normality of each variable making use of a simple skewness-kurtosis test. As depicted in table A-2, although the coefficient of skewness for most of the variables is close to 0, implying normality, the relative measure of kurtosis manifests significant departures from 3, testifying some kind of peakedness or flatness in the frequency distribution. Explicitly stating, except the dependent variable (ROA), its lag and the market structure variable concentration, which appear to be relatively skewed to the right, all the selected bank specific variables, and the other one macro economic variable exhibit a greater extent of normality. In spite of the sufficient evidences provided by the numerical approaches indicating that the majority of the variables are normally distributed, G.A Madalla (1988, p13), in his book, states that even at times the variables are not distributed normally, it is possible to “make do” with transformations of the variables in order that the transformed variables are distributed normally. Hence, the methodology undertaken in this study, which attempted to transform the variables through 1<sup>st</sup> differencing, is believed to push all the variables towards even more normality.

In the general model (1) to be estimated, the disturbance ( $\varepsilon_{it}$ ) is assumed to follow a standard error components structure. Since there is a presumption that individual banks operating in the domestic banking markets have got un-observed bank specific characteristics such as management quality and the like which contributes for the variation in profitability, it is deemed important to control for these traits.

With a different motive to detect the particular magnitude of these un observed bank specific qualities and control for them accordingly, an attempt is made to estimate

individual effects with a model of fixed effects (FE<sup>8</sup>) type, making an assumption that: All explanatory variables ( $X_{it}$ ) are independent of all error terms ( $\epsilon_{it}$ ).

Accordingly, the respective model is estimated with pooled OLS (ordinary least squares) and the least square dummy variable (LSDV) estimators in order to generate the residual sum of squares for the restricted and un restricted models respectively. Here, it should be noted that while the un-restricted model, which includes dummy variables for each bank in the model is estimated by LSDV estimators, the restricted one is estimated by application of OLS on the pooled model. The F-statistic computed from the chow test is 1.891, which is below the critical value of 1.64 substantiating that the null hypothesis that (all un observed bank specific effects are jointly equal to Zero) is not rejected at 5% level. But some of the coefficient estimates of these bank specific effects seem to considerably affect the profitability of domestic banking market and it appears to be plausible to assume that though not highly significant, bank specific effects are present as indicated by the results of the test statistic. Furthermore, since ignoring these bank specific effects, has an implication that any two banks are homogenous with regard to their un-observed individual characteristic (which is not realistic), and since ignoring them inflates the estimated coefficient of the lagged dependent variable by attributing predictive power to this variable, that which actually belonged to the banks fixed effect.

The probable reason why the individual effects are not highly significant is because of the fact that there does not exist considerable variation in managerial skills between the CEOs and/or board of directors presiding the existing commercial banks, as a result of lesser developments registered in the financial sector as reflected in the poor level of financial infrastructures, which does not present a test to management, thereby creating less demand for competitive skills of management. This being the case, the assumption of fixed individual effects is held in the study. Table A-4 presents the details of the yields from the chow test.

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<sup>8</sup> A fixed effect (FE) model refers to a linear regression model in which the intercept terms show variation over individual units. These intercept terms usually capture the un observed individual qualities which are commonly assumed to be time invariant. Hence, such individual effects can be eliminated through transformations in deviations from individual means.

In order to treat bank-specific effects, either the fixed effect or the random effects model can be used. But which ever model the evidences favor (FE or RE<sup>99</sup>), due to the problems introduced by the inclusion of lagged dependent variables in the model, which create a functional relationship between the respective variable or its lag and the un-observed bank specific qualities in the error term. This effect, as discussed in Baltagi (1995) creating some kind of correlations between the lagged dependent variable and the error terms ( $\varepsilon_{it}$ s), invalidates the OLS conditions for consistency. Hence, an attempt to deal with the problem of bias and in-consistency in the specified dynamic model is made using GMM estimation in Arellano-Bover(1995)/Blundell-Bond(1998) paradigm.

Before presenting the results of the GMM estimation, however, it is necessary to confirm that a suitable model is designed. As an undertaking, the hypothesis that the capital variable is better treated as endogenous and the credit risk variable as a pre-determined variable is substantiated and this task is accomplished by running the same model twice. In the 1<sup>st</sup> instance, the two variables are modeled as a strictly exogenous variable, while in the second test as endogenous and pre determined respectively. From the results of the test it is learnt that the hypothesis that capital is better treated as endogenous and credit risk as per determined is supported, in line with what is suggested by economic theory.

On account of its convenience in providing the Sargan test for over-identifying restrictions the proposed specification test is conducted in Arellano and Bond paradigm. Hence, it is from the outcome of this test that the hypothesis in the 1<sup>st</sup> case is rejected while in the 2<sup>nd</sup> case, it is highly accepted. More specifically, when the P-values of the test for both scenarios are compared against each other while it registers a P-value of 0.000 when both the capital and risk variables are assumed to be exogenous, to the contrary, it gives a p-value of 1.000 when the capital variable is assumed to be

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<sup>9</sup> A random effect (RE) model, however, is a linear model which treats the unobserved individual effects as a random factor, independently and identically distributed over individuals. In RE models the time invariant individual effects left out of the regression model are treated as an error term. Hence, they are more appropriate when we are not interested to detect the particular value or effect of one person's or individual quality. There fore these models allow us to make inference with respect to the characteristics of the population.

endogenous and the credit risk variable is assumed to be pre-determined. This implies that the instruments employed in the estimation are valid.

In the dynamic model under consideration, it is suspected that there is some sort of collinearity among the variables specified. Hence, employing Klein's rule, an attempt is made to detect the extent to which explanatory variables are correlated with each other. Accordingly, the result depicted in table reveals that there does not exist high degree of correlation among the variables because the partial correlation coefficient between each of the variables does not manifest higher ratio than that of the overall explanatory power of the model. But, although multicollinearity does not appear to pose considerable problem, it is un-deniable that there exist a certain extent of correlation between explanatory variables, which is un-avoidable.

After a confirmation that a suitable model is designed, the next step should be making discussion on how the methodology of GMM estimation is implemented, then follows presentation of the one step results from the respective estimation approach.

To begin with, Arellano and Bond estimation starts by transforming all variables through 1<sup>st</sup> differencing. The reason for this as described in various econometrics books is that 1<sup>st</sup> differencing eliminates time invariant un-observed bank specific effects in the error term, which create the problem of bias and in-consistency of OLS estimates, on account of their correlation with the included lagged dependent variable ( $ROA_{t-1}$ ).

As discussed by Roodman, D. (2006), in his working paper Introduction to “difference” and “system” GMM in Stata, it is stated that though the fixed effects are gone through 1<sup>st</sup> differencing the lagged dependent variable may still be endogenous, owing to the correlation of the  $Y_{i,t-1}$  term with the  $V_{i,t-1}$ , in the  $\Delta V_{i,t-1}$  and  $\Delta V_{it}$  terms respectively. Similarly, any predetermined variables, which are not strictly exogenous may come to be potentially endogenous on account of their tendency to relate to the  $V_{i,t-1}$ .

Making lessons from the points discussed above, the raw data compiled from the income statement and balance sheet of the selected eight local commercial banks is 1<sup>st</sup> arranged in Microsoft excel format and pasted to Stata 10 software. Here, it should be made clear that the variables of interest are coded as described in table A1, which describes the definition, notation and expected effect of explanatory variables.

In accordance with the methodology explicitly pointed out in Arellano and Bond (1991), in this study an attempt is made to obtain additional instrumental variables by exploiting the orthogonality conditions that exist between lagged values of profits and the disturbances  $v_{it}$ . It is also emphasized in Roodman, D. (2006) that deeper lags of the explanatory variables remain orthogonal to the disturbances and are available as instruments. Although Arellano - Bond(1991) approach is pursued up until estimation, Since a model has been developed by Arellano-Bover (1995)/ Blundell-Bond (1998) who augmented the 1<sup>st</sup> model by making an additional assumption, that 1<sup>st</sup> differences of the instrumenting variables do not show correlation with the fixed effects allowing for the introduction of more instruments with the potential to dramatically improve efficiency, and since their demonstration that the difference GMM performs poorly on account of the fact that past levels convey little information about future changes, especially if the distribution of the dependent variable is close to random walk, so that the transformed variables are weakly instrumented by the un-transformed lags.

To put it in a nutshell, where Arellano-Bond uses levels for instrumenting differences (or orthogonal deviations), Blundell-bond employ differences to instrument levels. For variables close to a random walk, past changes may indeed predict more strongly of current levels than past levels are of current changes. Hence, the new instruments appear to be more relevant.

Following the foot prints in the above discussion, in order to get a consistent estimate of  $\sigma$ , a system GMM estimator which combines the standard set of first-differenced equations with appropriate lagged levels of profits as instruments, and an additional set of

original equations in levels with appropriate lagged first-differenced profits as instruments is applied.

Taking a look at the results of regression obtained from Stata 10, it is learnt that both the parameter estimate and the test statistics reveal that in the Ethiopian commercial banking markets, profits show considerable persistence. The null hypothesis that profits does not persist in the domestic commercial banking markets is rejected at 10% significance level.

As described in literatures on persistence of profits a value of  $\sigma$  between 0 and 1 indicate that profits show persistence, with a tendency to return to their normal (average) level. More explicitly, Goddard et al. (2004) discloses that  $\sigma$  indicates the rate at which abnormal profit tends to converge towards their long run average. Hence  $\sigma = 0$  tells that there exists sufficiently fierce competition that an abnormal profit realized in any one year does not persist at all in to the following year. In similar terms,  $\sigma > 0$  indicates that abnormal profit does persist. In other words, there does not exist fierce competition because of the effectiveness of barriers to entry or other obstructs to competition. Accordingly, the coefficient estimate of 0.28 obtained from the GMM estimation in this study reflects that in the Ethiopian commercial banking markets profit earned in any one year does persist into the following year, because the industry is not fairly competitive and barriers to entry are effective to a certain extent. The interpretation of the parameter of estimate in this study are also backed up by the arguments in the POP literature that the coefficient on lagged dependent variable in the profit equation implicitly captures the impact of barriers on entry on the dynamics of profitability (Goddard et al. (2004)).

In the context of Ethiopia, where the development of financial markets and infrastructures is at their infancy, the main source of capital in the local commercial banking markets appears to be retained profits and that is why profits earned in any one year show a tendency to persist in to the future. Had alternative sources of raising capital such as well developed stock markets and the like existed, the degree of persistence of profits earned in the past into current profits would have been minimal.

As pointed out above, the parameter estimate of the lagged dependent variable or lagged profit ( $\Pi_{i,t-1}$ )  $\sigma = 0.28$  is crucial to detect and/or predict what the possible effects of minimization of barriers to entry on domestic commercial banking markets would be. Hence, it is understood by the results of this study that, with the possible entry of banks particularly of foreign origin, the following signals to the local banking market can be originated from the results of this study,

If barriers to entry to the domestic banking market are relaxed so that entry and exit are made sufficiently free, this would eliminate any abnormal profit quickly and that all banks profit rates would show a tendency to converge to the same long run average value. This is to say that, as restrictions to entry and exit are eliminated, competition will be highly induced in the domestic banking market on account of the prospective new entrants (local or foreign based). Since, the new entrants to the local commercial banking market especially if they are of foreign origin will have firm specific advantages such as superior technology, trade marks, and better management, they may grow up soon to control significant share of the local market in counter balancing and/or excelling the quality standard of indigenously provided special services. Hence, abnormal profits, which used to be realized by local banks due to their special knowledge or other advantages, will narrow down as international banks with better reputation knowledge and capital enter in to the domestic banking market.

As normally reflected in the coefficient estimate of  $\sigma$  showing a tendency to converge to zero as competition is induced, the possible effect of foreign bank entry to the domestic banking market would be that their profitability is reduced.

It is extensively discussed by Claessens, Dermiguc-kunt, and Huizinga (2000) in their findings suggesting that in developing countries, foreign banks have higher profits than domestic banks and their increased presence is linked with a decrease in profitability and margins for banks of domestic origin.

In the same notion as profits are indicators of the efficiency of domestic banking markets it is also true of net interest margins too. Hence, when it is said that the profitability of domestic banking market reduces with the increased presence of foreign banks, *ceteris paribus*, this may have come from the reduction in the net interest margin. Therefore, it is valid to expect a reduction in the domestic margin with a relaxation of barriers to entry.

Although the empirical result in this study indicate the possible effect of reduced barriers to entry in terms of domestic bank profitability only, it is clear from welfare point of view that a reduced cost of service means that consumer in the domestic economy will be well-off in the presence of fairly competitive banking markets.

Another issue of concern as indicated in Claessens and Lee (2002) is that strengthened competition perhaps lowers charter values of indigenous banks there by leading to financial instability. On the other side of a coin however, the same authors Claessens and Lee (2002) suggest that increased competition from international banks have introduced contemporary risk management practices, as these banks 'imported' supervisory skills from home country regulators there by strengthening banking systems. Since, the two issues of concern pointed out above are mere arguments not backed up by empirical evidences and since the details on the theoretical and empirical aspect of international bank entry can be referred from the literature review, what can possibly be suggested from the empirical findings of this study is that reductions to barriers to foreign entry negatively affects the profitability of the domestic banking markets.

Turning to the capital variable which is instrumented by equity/assets  $t-2$  ratio both the parameter estimates and the test statistic testify that the variable equity/assets significantly and positively affects commercial bank profits. Hence, the null hypothesis is rejected at 5% significance level. For the details of the test statistics please see Appendix I. The coefficient estimate of the parameter (0.22) is interpreted as;

A unit increase in the equity/assets position of a local commercial bank yields 0.22 additional units of return as a ratio of assets. As hypothesized from the start, if not the most, capital appears to be the outstanding determinant of the profitability of domestic

banking markets. To give illustrations as to why the equity/assets variable lagged two period is used as an instrument, Hoeffler, A.E. (2000) indicates that when we treat a variable as endogenous (equity/assets in this case) this means that we are allowing for correlation between current capital and current shocks to profits, as well as feed back from past shocks to profits. Therefore, valid instruments for the equations in difference are values of the endogenous capital lagged two periods or more.

As discussed in Claeys, S. and Vennet, V.R. (2007), the positive relationship between capital adequacy and profitability springs from its direct effect on interest margin. Accordingly, when excess capital over the minimum regulatory requirement is held by a bank, the two positive effects detected on the interest margin comprise the following points:-

In the presence of free capital, the bank will have the possibility to capitalize on its portfolio of risky assets in the form of loans or securities which perhaps increase the interest margin, in situations allowing banks to finance additional loans with a progressive return/risk profile. Furthermore, when a bank holds capital above the minimum regulatory requirement, this can be treated as an important signal of credit worthiness from the bank's part. Demirguc-Kunt and Huizinga (1998) also express same idea stating that well-capitalized firms entail lower expected bankruptcy costs for themselves and their clients there by reducing their deposit funding costs. Hence, they are able to increase their interest margin. Therefore, it can be concluded that it is through its effect on interest margin that equity/assets affects profitability.

The other important variable given due consideration as a determinant of the profitability of domestic banking markets is credit risk which is instrumented by loan loss provisions (LLP)/Loans lagged one period. The reason for instrumenting this variable with  $(LLP/loans)_{t-1}$  is that according to what is cited in Hoeffler (2000) it is possible that values of the predetermined variable lagged one period or more can be used as appropriate instruments in the first differenced profit equation. The regression result

obtained from GMM estimation, in line with the expected, shows that credit risk has negative relationship with profitability.

The parameter of estimate obtained from the regression which is (-0.07) indicates that for a percentage increase in the magnitude of risk as measured by loan provisioning expenses/Loans, the profitability of domestic banking markets will be negatively affected by 0.07 percentage points. But, in contrast to the expected relationship, which is precisely determined by the econometric model employed in this study, the test statistic do not speak of the significance of the relationship that exists between the credit risk variable and bank profitability. The possible reason is that, provision expenses almost often allowed in the domestic banking market are commonly imposed by the authority (the NBE or the management) and hence the respective regressor might have not captured the variation in the level of risk inherent to credit financing. The other reason may be that the Ethiopian banking system managers, with an attempt to maximize profits, seem to have put in place a risk avoidance strategy, through implementing policies that improve the screening and identification of potential customers, together with proper credit monitoring and risk management practices. Hence, in situations where prudence and caution in lending prevail, the effect of the credit risk variable may appear to be insignificant not because of its real insignificance, but because it is strongly controlled by management against its influence.

In spite of the estimated relationship going consistent with the findings in other studies such as Athanasoglu, Brissimis and Delis (2005), the results of the test statistic does not appear to be consistent to other studies.

When we turn to an exogenous variable of due concern as a determinant of profitability, the customer and short term funding/ta which comprise demand deposits, saving deposits, and fixed deposits is one. We find this balance sheet item on the liability side and they instrument themselves. Taking a look at the results of regression, we find that the customer and short-term funding variable is a highly significant factor, which negatively affects the profitability of domestic banking markets. As reflected in the estimated

coefficient of (-0.090) and a Z-test statistics of -2.61. The null hypothesis of Zero effect of customer and short term funding/ta on bank profitability is rejected at a 1% level of significance.

In the same analogue, the regression result in the overhead expenses/assets variable which comprises general expenses and employee salaries and benefits reveal that overhead expenses negatively affect bank profitability. The overhead/assets ratio has an estimated coefficient of (-0.468) reflecting that a unit increase in the overhead/assets ratio eat in to bank profits with 0.468 units. Although the estimated relationship tallies with the findings in other studies such as Demirguc-Kung and Huizinga (1998) and Athanasoglu, Brissimis and Delis (2005), the result of the test statistic shows inconsistency to other studies, by providing an inference that the overhead/assets does not significantly affect bank profits; leading to a rejection of the null hypothesis at 5% level of significance. The negative effect of overheads/assets, which is indicated by the result of the regression reveals that, in the Ethiopia Commercial banking markets, there is a lack of competence in expenses management, since banks appear to be transferring part of their additional cost to their customers and the remaining part to profits on account of the fact that competition restricts them to charge over the market rate. Had there been efficient cost management strategies, increased spending should have linked quality effects from there-of to improved domestic bank profitability. According to Athanasoglu, Brissimis and Delis (2005), for this linkage to come in to effect, a certain level of maturity is required.

Inflationary environments also seem to contribute to the inverse relationship between customer and short term funding/assets and bank profitability. In situations where tight monetary policy instruments are put in place, banks are restricted against lending and/or income but exposed to costs in terms of opportunity cost of holding money.

When it comes to productivity growth, this exogenous variable which is measured by real gross total revenue/assets is found to positively and significantly affect bank profitability. Note that in determination of this variable, gross total revenue is deflated by the consumer price index (CPI). From the regression result, both the estimated coefficient

(0.25) and the test statistic reveal that the null hypothesis that labor productivity does not significantly affect bank profitability is rejected at 1% level of significance. This suggests that as productivity grows, it makes it possible to generate income which is partially channeled to bank profits. The same empirical finding is also suggested by Athanasoglu, Brissimis, and Delis (2005), concluding that improved labor productivity increases bank profits, which is perhaps the outcome of employing new high quality labor and reducing the total number of employees. Business process re-engineering can also significantly improve productivity. Note that as productivity is an exogenous variable it has instrumented itself, in this study.

With regards to the market concentration as an industry specific variable, in this study, the 'Herfindahl-Hirschman (H-H) index' is used to examine the SCP hypothesis. The regression results from the GMM estimation as reflected in the coefficient estimate (-0.178) and the test statistic reveal that market concentration negatively and significantly affects profitability. Hence, the null hypothesis is rejected at a 5% level of significance. Therefore, the SCP hypothesis could not be justified. As reflected in the H-H index, although the market concentration shows a decreasing trend for the full coverage of years under investigation, suggesting that the domestic commercial banking industry is used to moving to a more competitive structure and accordingly there should have been a decline in profitability, the improvement of managerial practices, as revealed by bank specific variables, must have contributed to the growth of profitability. This is one shortcoming detected in analyzing the effect of market concentration on profitability from the SCP hypothesis point of view.

Pondering at the other drawback, although the negative relationship as indicated by the regression result shows that declining market concentration should go hand in hand with higher profitability, the coefficient of the lagged dependent variable on the other side of the spectrum reveals that there is relatively low market power in the domestic commercial banking market. Therefore, due to such conflicting premises, the effect of market concentration still remains controversial.

The findings in this paper, however, seems to be compatible with the findings of Berger (1995a), as cited in Athanasoglu, Brissimis and Delis (2005), suggesting that concentration is almost often negatively associated to profitability once the effects of other variables are controlled for in the profit equation.

Taking a look at the last variable, the expected rate of inflation emerges as a significant determinant of profitability proxied by the change in consumer price index (CPI). When the results of the regression are viewed, both the coefficient estimate of (-0.044) and the test statistic testify that the rate of inflation negatively and significantly affects bank profitability. The null hypothesis is rejected at 10% level of significance. The observed negative relationship is possibly due to the weakness of Ethiopian Commercial Banks' management to satisfactorily predict inflation to hold in the future, which is attributed to the problem with their managerial skills. This implies that interest rates are not fully anticipated and adjusted so that bank expenses are allowed to increase faster than bank incomes. On the other side of the spectrum, a possible scenario is that bank customers may have succeeded (relative to bank management) to fully or adequately predict inflation, signaling that abnormal profits could be realized from asymmetric information.



#### **4.4. Comparative Descriptive Analysis of Foreign Bank Entry.**

As described in the methodology, after the determinants of profitability in the domestic banking markets is carefully analyzed, the next step is to make cross country comparisons of performance in terms of the efficiency indicators like net interest-margins and net profit before taxes. Particularly, the country average indicators of performance for Ethiopia are compared against that of the averages for the Rest of Africa (ROA).

The reason why the ROA is taken as a benchmark is that data could not be independently availed for the selected East African Countries like Kenya, Uganda, Zambia and Tanzania and it is found only in aggregates.

Hence, the following table depicts the regional average of bank spreads and profitability for Domestic Vs Foreign Banks, for the period 2000-2005. The average aggregate figures

in the next table stand for the average efficiency indicator of low income countries of Africa.

**Table 5 Bank Spreads and Profitability: For Domestic vs. Foreign Banks in Africa.**

Region	Ownership	Net-Interest Margin/ta	Non-Interest Income/ta	Overhead/ta	Loan Loss Provisioning/ta	Net Profit Before Tax/ta
Rest of Africa	Domestic	5.53	3.28	6.54	3.46	-1.19
	Foreign	5.27	2.99	5.84	1.00	1.42
Ethiopia	Domestic	2.89	2.73	2.26	0.80	2.56

NB that ta stands for total assets.

From the table depicted above, it is understood that where they established their presence, foreign banks tend to have higher profits than domestic banks. Although the net interest margin as a ratio of total assets and the non interest income as a ratio of total assets in the region appear to be higher for domestic banks than foreign banks, since domestic banks register a relatively higher overhead to total assets and higher loan loss provisioning to assets than international banks, the net profit before tax to total assets is registered higher for foreign banks than their domestic counterparts. When it comes to the domestic banking markets in Ethiopia, it is revealed that although both the average net interest margin to total assets and the average non interest income are relatively lower as compared to their African counterparts (domestic or foreign), the overhead expenses to total assets and loan loss provisioning to total assets variables to total assets which are far lower than that of the regional average, the level of net profit before tax to total assets appears to be higher in the domestic banking sector than in their foreign counterparts.

## CHAPTER 5

### 5.1. Conclusion and Recommendation

World trade in goods and services has come to be increasingly essential in recent decades. An international institution like the WTO has also come in to being in 1995 with a motive to promote such trade through its GATs rules of FSTL, which spurs the internationalization of the banking sector. But the issue of foreign participation in domestic banking markets is still debatable and arguments in support of a policy of openness are not universally accepted. That is why some countries like Ethiopia are in a state of denial, as a caution against the potential risks of foreign bank entry.

This paper attempts to provide evidence on what the determinants of profitability in domestic banking markets are. Among these determinants, though the foreign bank entry variable is one, since data could not be availed on account of their non-presence in the domestic banking market, the most likely effect of foreign participation is inferred from the coefficient of estimate of the lagged dependent variable ( $\Pi_{i,t-1}$ ).

As a tool to address this effect, a formal dynamic econometric model is employed. This helps to detect whether or not competition in the local commercial banking markets is sufficiently free so that an excessive profit generated in any one year does not tend to persist at all in to the following year. From the foregoing analysis the coefficient estimate of lagged profit ( $\sigma > 0$ ) discloses that in the Ethiopian commercial banking markets abnormal profits do persist: The degree of competition is low, because protection and/or barriers to entry or other restrictions are effective to a certain extent.

To coin a phrase in the above argument, if foreign banks are allowed to operate in the domestic economy, the likely 1<sup>st</sup> effect is that the profitability of domestic commercial banks decreases, as competition is induced by foreign banks in their attempt to reap the economic benefit of the superior technology or knowledge they created. This helps them to provide the service more efficiently as compared to their counter parts of local origin. But, for the locals to significantly gain from foreign banks, an adequate infrastructure

including good information and an appropriate framework for secured lending should be put in place. At the present time, however, since the country lacks well developed infrastructure, and has not established good legal and institutional frameworks, the likely benefit from foreign bank entry may be in a questionable stand. Although the narrowing down of net interest margin, due to foreign entry, may contribute for improvement in the welfare of consumers, whether or not local banks can survive at the reduced return is also another sort of question. Similarly, because of the fact that improved competition perhaps lowers charter value of indigenous banks, the likely cost of this effect should also be noticed beforehand.

The other important lesson learnt is that equity capital significantly and positively affects bank profitability and that high exposure to credit risk reduces profits. Furthermore, an increase in customer and short term funding negatively and significantly affects bank profitability, perhaps due to the required branching networks, where as the overhead variable, though not strongly, it negatively, affects bank profitability, indicating that bank management cost decisions are significant determinants of performance. When it comes to productivity, the findings in this paper suggest that the growth of labor productivity has a very strong positive impact on bank profitability. The estimated effect of industrial concentration on bank profitability is found to be negative and significant testifying the theoretical consideration which claims that industrial concentration is almost often negatively associated to profitability once other factors in the profitability equation are controlled for. This shows that concentration is in some way related to other explanatory variables of the model. Hence, the SCP hypothesis is not justified.

At last, expected inflation as a macro-economic control variable is found to negatively and significantly relate to bank profitability. This implies that domestic commercial bank managers do not fully anticipate inflation and that interest rates are not adjusted timely. Hence, bank expenses tend to rise faster than bank income.

In general, the empirical results come up to provide an evidence that profitability in domestic banking markets is determined in the 1<sup>st</sup> place by the extent of barriers to entry

in to these markets; hence, in order to reap all the benefits of lifting barriers to entry, institutional development efforts should keep up on a few selected highly relevant aspects rather than making an attempt to build a broad regulatory and supervisory frameworks which is not attainable, in the short run, with the existing limited resource and capacity of the country. No matter what the cost of foreign entry may be, since it impossible to be kept isolated from the rest of the world, in a highly competitive and complex global environment, certain valid sequences should also be followed in the process of opening the market for foreign participation. A more comprehensive cost-benefit analysis conducted at country level is also expected to produce good premises for decision. Hence, further research should be conducted in this regard.

When it comes to other determinants, empirical evidences testify that the profitability of commercial banking markets in Ethiopia are highly shaped by bank specific variables which are almost often influenced by bank level management, macro-economic control variables which can not directly be controlled by the managerial decisions of banks and industry specific determinants, though the empirical result in this case has not confirmed the SCP hypothesis.

Conclusively, it is extensively discussed in the literature that all the three important determinants of profitability namely bank-specific, industry specific and even macro economic variables are highly affected by the quality of management either through its direct or indirect influence, suggesting that optimal policies to bank management is the right direction to follow in order to spur progress.

**Table A-1 Interpretations, notations and the expected effect of the explanatory variables of model (2) on bank profitability.**

		Variable	Measure	Notation	Expected effect	
Determinants	Dependent Variable	Profitability	Net profits before taxes/assets	ROA		
		Bank-specific	Capital	Equity/assets	EA	+ve
			Credit risk	Loan loss provisions/Loans	LLP	-ve
			Customer & short term funding	(Demand, Savings and time deposits)/ta	Cust	-ve
			Overheads	(Wages and Salaries plus general expenses)/ta	O-H	-ve
			Productivity	Adjusted gross total revenue/manpower level	PVT	+ve
		Industry - specific	Concentration	Herfindahl-Hirshman index	H-H	?
		Macro economic	Expected Inflation	Consumer Price Index	CPI	?



**Table A-2 Skewness and Kurtosis test for normality**

\_\_\_\_\_ joint \_\_\_\_\_

Variable	Pr (Skewness)	Pr (Kurtosis)	Adj chi 2 (2)	Prob > chi2
ROA	0.604	0.242	1.70	0.4268
ROALag	0.643	0.297	1.35	0.5094
EA	0.000	0.005	19.24	0.0001
LLP	0.000	0.003	23.47	0.0000
CUST	0.004	0.880	7.50	0.0235
O-H	0.012	0.324	6.62	0.0365
H-H	0.952	0.000	20.05	0.0000
CPI	0.004	0.955	7.53	0.0232

As indicated above, the coefficient of skewness for most variables such as EA (for equity), LLP (for loan loss provisions), CUST ( for deposits), O-H (for overhead expenses) and CPI( for expected inflation) is close to 0 substantiating that the distribution of these variables is close to normal, with exceptions to the distribution of the dependent variable and its lag. The coefficient of Kurtosis for all variables, however, exhibits considerable departures from 3 testifying some kind of peakedness or flatness in the distribution, when viewed as aggregate.

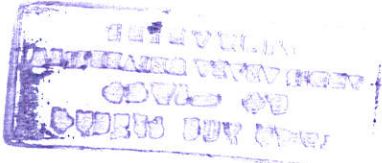


**Table A-3 Panel Unit Root Test Results**

Bank Variables	In Levels					In 1 <sup>st</sup> difference				
	LLC	BM	IPS	MU	HADRI	LLC	BM	IPS	MU	HADRI
Return on Assets(ROA)	I(0)	I(1)	I(1)	I(1)	I(1)	I(0)	I(0)	I(0)	I(0)	I(1)
Equity/assets(EA)	I(0)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)	I(1)
Credit risk/Loans(LLP)	I(0)	I(1)	I(0)	I(1)	I(1)	I(0)	I(1)	I(1)	I(1)	I(1)
Cust. & short term funding/assets	I(0)	I(1)	I(0)	I(0)	I(1)	I(0)	I(1)	I(1)	I(0)	I(1)
Overheads(OH)	I(0)	I(1)	I(0)	I(1)	I(1)	I(0)	I(1)	I(0)	I(0)	I(1)
Productivity(PVT)	I(1)	I(1)	I(1)	I(0)	I(1)	I(1)	I(1)	I(1)	I(0)	I(1)

**I (0) stand for integrated of order 0 meaning that the series is stationary in levels.**

**I(1) stands for integrated of order 1 meaning that the series becomes stationary after first differencing, though could not be justified in some of the tests indicated above.**



**Table A-4 Testing for Individual Specific Effects.**

**For the Restricted model**

Source	SS	df	MS		Number of obs	= 63
-----+-----					F( 8, 54)	= 6.69
Model	.007119208	8	.000889901		Prob > F	= 0.0000
Residual	.007179205	54	.000132948		R-squared	= 0.4979
-----+-----					Adj R-squared	= 0.4235
Total	.014298413	62	.00023062	Root MSE	= .01153	

roa	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
roalag	.051133	.1213802	0.42	0.675	-.1922196	.2944857
ea	.0949852	.0403506	2.35	0.022	.0140871	.1758833
llp	-.0329383	.0326315	-1.01	0.317	-.0983606	.032484
dep	.0292634	.018059	1.62	0.111	-.0069427	.0654696
oh	-.1297199	.2386103	-0.54	0.589	-.6081048	.348665
hh	-.7133193	.2743843	-2.60	0.012	-1.263427	-.1632118
om	-.8853352	.36802	-2.41	0.020	-1.623171	-.1474995
cpi	.0177246	.015117	1.17	0.246	-.0125832	.0480323
_cons	.5994592	.2370958	2.53	0.014	.1241107	1.074808

**For the Full model**

Source	SS	df	MS			
Model	.008341531	15	.000556102	Number of obs = 63		
Residual	.005956882	47	.000126742	F (15, 47) = 4.39		
				Prob > F = 0.0000		
				R-squared = 0.5834		
				Adj R-squared = 0.4504		
Total	.014298413	62	.00023062	Root MSE = .01126		
roa	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
roalag	-.0241929	.1238143	-0.20	0.846	-.2732752	.2248895
ea	.0920909	.0780844	1.18	0.244	-.0649947	.2491766
llp	.0595498	.0848731	0.70	0.486	-.1111929	.2302924
dep	.0108006	.0470922	0.23	0.820	-.0839367	.105538
oh	-.1723876	.3407609	-0.51	0.615	-.8579101	.5131348
hh	-.8532747	.2844982	-3.00	0.004	-1.425611	-.2809381
om	-1.11229	.3935089	-2.83	0.007	-1.903928	-.3206522
cpi	.0294507	.0175341	1.68	0.100	-.0058234	.0647247
dum_bank1	.01048	.0070868	1.48	0.146	-.0037769	.0247369
dum_bank2	.0018317	.0060971	0.30	0.765	-.0104341	.0140974

dum_bank3	.0114409	.0085592	1.34	0.188	-.005778	.0286598
dum_bank4	-.0098697	.0155168	-0.64	0.528	-.0410854	.021346
dum_bank5	.0020362	.0079674	0.26	0.799	-.0139922	.0180646
dum_bank6	-.009708	.0156621	-0.62	0.538	-.041216	.021800
dum_bank7	.0075575	.0072806	1.04	0.305	-.0070891	.0222041
_cons	.7362001	.2542053	2.90	0.006	.2248049	1.247595

The Residual sum of squares from the restricted model is 50.21 while the residual sum of squares from the full model is 41.66. From a simple chow test,

$$F = \frac{(RRSS - URSS)/(N-1)}{(URSS/(NT-N-K))} \sim F_{N-1, N(T-1) - K}$$

$$F = 1.45$$

The critical value at 5% level of significance is 1.64. Hence, the null hypothesis could not be rejected indicating that although bank specific effects are present their effect on bank profitability is not that significant.

Table A-5 Correlations between the determinants of profitability in the domestic banking markets.

R<sup>2</sup>: 44.99

<b>Variables</b>	<b>Return on asset</b>	<b>Lagged return on asset</b>	<b>Equity to total asset</b>	<b>Loan loss provisions/ta</b>	<b>Customer and short term funding</b>	<b>Overheads/ta</b>	<b>productivity</b>	<b>Herfindahl-Herischman Index</b>	<b>Consumer price Index</b>
<b>Return on asset</b>	1.00								
<b>Lagged return on asset</b>	0.1314	1.00							
<b>Equity to total asset</b>	0.0634	0.0962	1.00						
<b>Loan loss provisions/ta</b>	0.0853	0.1440	0.3594	1.00					
<b>Customer and short term funding</b>	0.0139	0.0003	0.0227	0.0254	1.00				
<b>Overheads/ta</b>	0.0007	0.0019	0.1722	0.2402	0.3840	1.00			
<b>productivity</b>	0.0004	0.0376	0.0183	0.0063	0.0014	0.1759	1.00		
<b>Herfindahl-Herischman Index</b>	0.2492	0.0217	0.0440	0.0127	0.0769	0.1021	0.0623	1.00	
<b>Consumer price Index</b>	0.0267	0.0952	0.0085	0.001	0.0146	0.0537	0.0066	0.7459	1.00



**Table A-6 System Dynamic Panel-Data (System GMM) Estimation Results**

Number of instruments = 47

Wald chi2 (13) = 118.66

Prob > chi2 = 0.0000

**One-step results**

roa	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
roa						
L1.	<b>.2797729</b>	.1639236	1.71	0.088	-.0415115	.6010572
L2.	-.1739537	.1332174	-1.31	0.192	-.4350551	.0871477
L3.	.1121898	.108079	1.04	0.299	-.0996412	.3240208
llp						
L1.	-.0688769	.0851962	-0.81	0.419	-.2358584	.0981046
ea						
L1.	-.2046475	.1144848	-1.79	0.074	-.4290336	.0197387
L2.	.0600694	.0850719	0.71	0.480	-.1066683	.2268072
--.	.2181667	.1064409	2.05	0.040	.0095464	.426787
llp	-.0050863	.091831	-0.06	0.956	-.1850718	.1748992
dep	-.0901874	.0343786	-2.62	0.009	-.1575682	-.0228065

oh	-.4684369	.5149303	-0.91	0.363	-1.477682	.5408079
pvt	.2531668	.0924915	2.74	0.006	.0718868	.4344468
hh	-.1783211	.0900205	-1.98	0.048	-.354758	-.0018843
cpi	-.0444397	.0232085	-1.91	0.056	-.0899275	.0010481
_cons	.178419	.0642833	2.78	0.006	.052426	.3044119

---

Instruments for differenced equation

GMM-type: L(2/6).roa L(1/2).L.llp L(2/2).L2.ea

Standard: D.ea D.llp D.dep D.oh D.pvt D.hh D.cpi

Instruments for level equation

GMM-type: LD.roa LD.llp L3D.ea

Standard: \_cons

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**Result**

$$\Pi_{it} = 0.178 + 0.28\Pi_{i,t-1} + 0.22EA - 0.07LLP - 0.09CUST - 0.47OH + 0.25PVT - 0.178HH - 0.044CPI$$

A simple Z-test for significance of each variable.

I) *Lagged profit***Hypothesis**

Ho:  $\sigma = 0$  (Profits does not persist) (Zero persistence)

H<sub>A</sub>:  $\sigma \neq 0$

$$\text{Test statistic } Z = \frac{\sigma_e - \sigma = 0.2798 - 0}{S_e(\sigma_e) \quad 0.164} = \frac{0.2798}{0.164} = 1.71$$

*The critical value of the test at 10% significance level = 1.645*

*The null hypothesis is rejected at  $\alpha = 10\%$*

II) *Capital(EA)***Hypothesis**

Null hypothesis ( $H_0: \beta_1 = 0$ )  $\rightarrow$  (Capital does not affect profitability)

Alternative hypothesis H<sub>A</sub>:  $\beta_1 = 0$  |

$$\text{Test statistic } Z = \frac{b_1^{\wedge} - \beta_1 = 0.22 - 0}{S.e(b_1^{\wedge}) \quad 0.106} = \frac{0.22}{0.106} = 2.075$$

*The critical value at 5% significance = 1.96*

*The null is rejected at 5% significance level*

III) *Credit Risk (LLP/TL)***Hypothesis**

Null hypothesis ( $H_0 = 0$ ) = Credit risk does not significantly affect bank profits

Alternative hypothesis ( $H_0 \neq 0$ )  $\square$  H<sub>0</sub> not true

$$\text{Test statistic } Z = \frac{b_2^{\wedge} - \beta_2 = -0.07 - 0}{S.e(b_2^{\wedge}) \quad 0.0852} = \frac{-0.07}{0.0852} = -0.82$$

*The critical value at 5% = 1.96*

*The null hypothesis is not rejected at 5%*

IV) Deposit (CUST/ta)

**Hypothesis**

Null hypothesis ( $H_0: 0$ ): (Deposit does not affect bank profit)

$H_A: H_0$  not true

$$\text{Test statistics } Z = \frac{b_3^{\wedge} - \beta_3}{\text{S.e}(b_3^{\wedge})} = \frac{-0.090 - 0}{0.0344} = \frac{-0.090}{0.0344} = -2.61$$

Critical value at 5% significance level = 1.96

The null is rejected at 1% significance level.

V) Overhead expenses (OH/ta)

**Hypothesis**

Null hypothesis ( $H_0: 0$ ): (Bank expenses does not affect bank profits)

Alternative Hypothesis ( $H_A: H_0$  not true)

$$\text{Test statistics } Z = \frac{b_4^{\wedge} - \beta_4}{\text{S.e}(b_4^{\wedge})} = \frac{-0.4684 - 0}{0.515} = \frac{-0.4684 - 0}{0.515} = -0.909$$

The critical value at 5% = 1.96

The null is not rejected at 5%

VI) Productivity

**Hypothesis**

$H_0: \beta_5 = 0$  (Labor productivity does not significantly affect bank profits)

$H_A: \beta_5 \neq 0$

$$\text{Test statistic } Z = \frac{b_5^{\wedge} - \beta_5}{\text{S.e}(b_5^{\wedge})} = \frac{0.2532 - 0}{0.0925} = \frac{0.2532}{0.0925} = 2.737$$

Critical value of the test at  $\alpha = 1\% \approx 2.576$

The null is rejected at 1% significance level

VII) *Market Concentration.*

**Hypothesis**

$H_0: \beta_6 = 0$  (Market concentration does not affect bank profits)

$H_A: \beta_6 \neq 0$

$$\text{Test statistic } Z = \frac{b_6^{\wedge} - \beta_6}{\text{S.e}(b_6^{\wedge})} = \frac{-0.1783 - 0}{0.090} = \frac{-0.1783}{0.090} = -1.98$$

*Critical value of the test at 5%  $\approx$  1.96*

*Hence, the null is rejected at 5% significance level.*

VIII) *Expected inflation (Consumer price index)*

**Hypothesis**

$H_0: \beta_7 = 0$  (The rise in general price level does not affect bank profits)

$H_A: \beta_7 \neq 0$

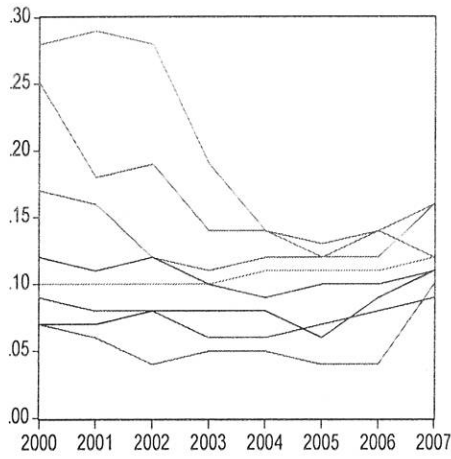
$$\text{Test statistic } Z = \frac{b_7^{\wedge} - \beta_7}{\text{S.e}(b_7^{\wedge})} = \frac{-0.0444 - 0}{0.0232} = \frac{-0.0444}{0.0232} = -1.91$$

*The critical value of the test at 10%  $\approx$  1.645*

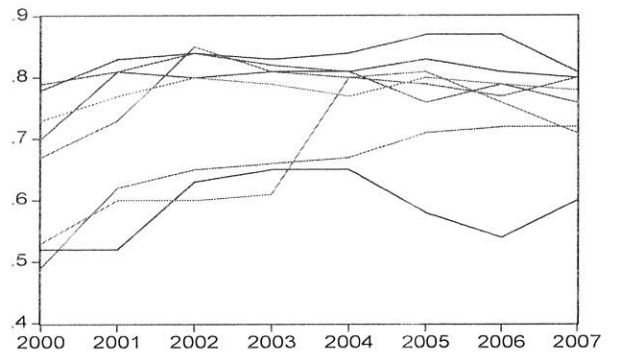
*The null is rejected at 10% significance level*

**Combined cross section graph for each variable and for different banks against trend.**

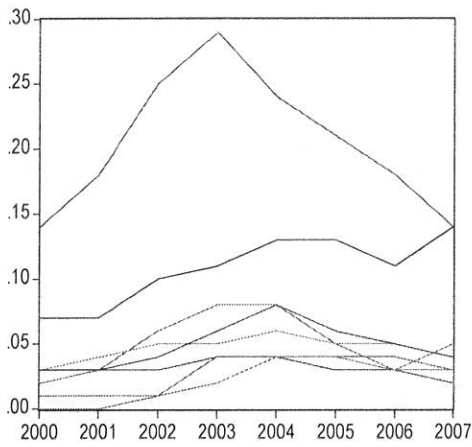
A) Equity to total assets



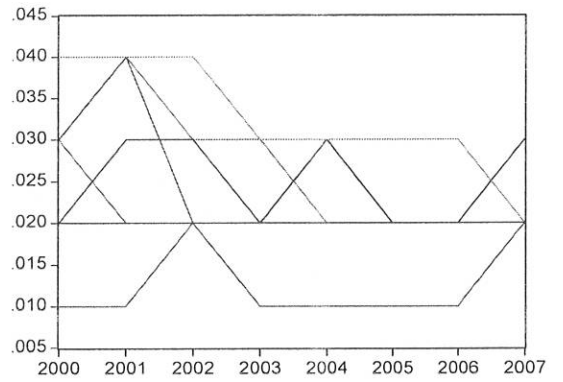
C) Customer and short term funding to total assets



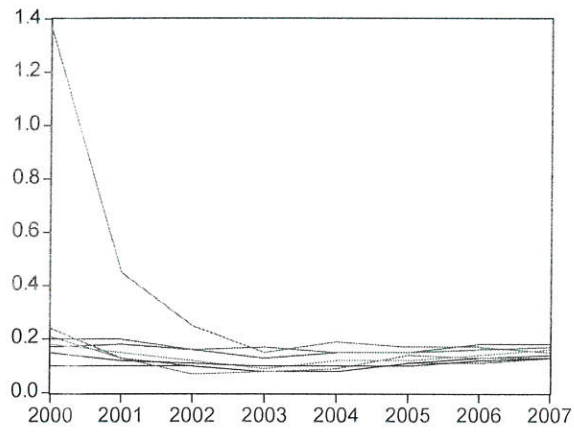
B) Loan loss provisioning to total assets



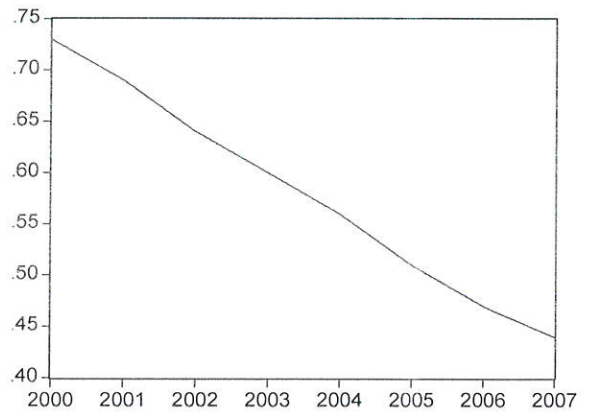
D) Overheads



E) Productivity



F) Herfindahl deposits



G) Expected Inflation

