Addis Ababa University

School of Economics

Tests for Traditional Structure-Conduct-Performance Paradigm and the Efficient Market Hypothesis in the Ethiopian Banking Sector

By
Eshetu Getahun

A Project Paper Submitted to the School of Graduate Studies of Addis Ababa University in Partial Fulfillment of the Requirements for the Degree of Masters of Art in Economics (Competition Policy and Regulatory Economics)

Addis Ababa
June 2010

Addis Ababa University

School of Economics

"Tests for Traditional Structure-Conduct-Performance Paradigm and the Efficient Market Hypothesis in the Ethiopian Banking Sector"

By

Eshetu Getahun

Approved by Advisor:

Tassew Woldehanna

Advisor

Signature

This paper is gratefully dedicated

To My Father and Mother.

It has been mainly through their truthfulness and quite example that I built a bedrock of stability.

Thank you very much.

Acknowledgement

First, I am highly grateful to my advisor Dr. Tassew Woldehanna, School of Economics, Addis Ababa University, for offering his expertise and criticism as I ventured into technicalities of the paper.

I also wish to avail this opportunity to express my gratitude to my beloved family and relatives for inspiration, encouragement and full sponsorship channeled through 'Mengesha Foundation'. Let God preserve our impressive relationship and integrity. I am also greatly indebted to my friend Wondim Getahun, who has always been a source of affection, help and constant encouragement.

I thank my friends and classmates who provided me with useful comments. My great thanks also go to Ato Berhanu G/Selassie and W/o Messert Yeshitela for everything they did.

Finally, I am extremely thankful to my fiancée, Environmental Engineer, Tsega Getachew for reading the entire paper to catch errors of every sort, from consistency to questionable statements. As always, her unfailing encouragement, provision of pertinent materials and welcome diversions made the paper possible.

Table of Content

List of Tables

List of Figures

List of Abbreviations

Abbreviations	Expansion
AIB	Awash International Bank
BOA	Bank of Abyssinia
CBB	Construction and Business Bank
CBE	Commercial Bank of Ethiopia
CBO	Cooperative Bank of Oromia
DBE	Development Bank of Ethiopia
DB	Dashen Bank
LIB	Lion International Bank
NIB	Nib International Bank
OIB	Oromia International Bank
UB	United Bank
WB	Wogagen Bank
ZB	Zemen Bank
NBE	National Bank of Ethiopia
ROA	Return on Asset
ROE	Return on Equity

Abstract

This paper attempts to distinguish between the market structure paradigm and the efficiency paradigm using concentration indices and market share into the empirical analysis. Using panel data for the period 2000-2009 pertaining to eight private commercial banks, we find insignificant positive relationship between concentration and profitability. The result also does not suggest relationship between efficiency and profitability. Hence, the paper lends no credence to the impact of imperfections of market conditions as a result of concentration and market share. Moreover, evidence to argue for a more interventionist competition policy in the banking sector is less likely.

Key words: Structure; profitability; efficiency; banks; concentration; panel econometrics.
JEL classification:

1. Introduction

The performance of an economic system is closely and directly related to the performance of the financial institution. Schumpeter (1911) argued that the granting of credit remains central to entrepreneurship and innovation, showing the vital role played by banks in attaining sustainable growth trajectory. This view indicates the significant degree of inter dependency between the financial institution and the real sector of the economy. Financial institutions, notably banks, serve as a means of mobilizing financial surplus from savers of the economy to those having financial deficits. Equivalently, banks acted to mobilize the saving within the economy and to direct them into productive investment (Aderson, 1995). Without sound and efficient banking system, the economy cannot function well. When a bank fails, the whole of a nation's payment system is thrown into jeopardy (Ikhide, 2000).

Ho and Saunders (1981) conceived of banks as risk-averse intermediaries between savers and borrowers, which must contend with demand for loans and receipts of deposits that arrive at different points in time. They reasoned that banks set loan rates and deposit rates optimally so as to minimize the risk they face in respect of interest rates in money markets or the inter-bank market when there is excessive loan demand (or insufficient supply of deposits). Corvoisier and Gropp (2002) also defined banks as intermediaries who are price-setters in the loan market, but face a given deposit rate and bear production costs. They offer differentiated loans and maximize expected profits by choosing the appropriate interest rate on loans.

In Ethiopia, the history of modern banking industry has almost been oligopolistic. During the pre Derg era (1974), there were private and state owned banks with some foreign banks providing fringe competition. However, such financial liberalization was disrupted in 1974 immediately after Derg came to power. During the Derg regime (1974-1991), foreign banks were forced out of the market and private commercial banks were nationalized on January 1975, effectively creating a monopoly situation for the National Bank of Ethiopia as of 1975. This repressed the possibility of people to reap benefits

from fierce competition in the banking industry. Low level of competition can cause relatively lower level of efficiency (Berger et al, 1994). The greater the efficiency, the higher the competitiveness would be and vice versa (Spathis and Doumpos, 2002). The sector was highly regulated through fixing both deposit and lending interest rates, controlling foreign exchange and credit allocation in a discriminatory manner and outright denial of access to entry of both private domestic and foreign banks.

Since the economic reform of 1992, a number of policy changes have been introduced gradually in the financial sector of the economy. These policy changes include interest rate deregulation, exchange rate liberalization, removal of credit ceiling, avoidance of credit discriminations and allowing entry of privately owned commercial banks. In the post Derg Era(1991 to date), National Bank of Ethiopia serves as a central bank while commercial banking functions are performed by two state owned commercial banks and by a number of newly emerging private commercial banks .For instance, as of June 30, 2001, there were two state owned commercial banks with a total of 223 branches and six Ethiopian privately owned commercial banks with a total number of 92 branches.Nowadays,this financial sector liberalization leads to the proliferation of banks with a total of 10 of which 8 Ethiopian privately owned commercial banks are actively operating in the banking system of the country. The government allows such free entry of domestic private commercial banks with an aim to open competition in the banking sector. Competition is not a one time event but a process whereby banks fight against each other in reasonably open markets to secure customers for their services by adopting any means or strategies. From an economic perspective, inter alia, competition as market governer assures (1) a fluid, productive economy (2) responsive, inventive businesses that adjust to changes and (3) a high degree of self-correction of market failures.Yigremachew (2008), based on six private commercial banks, indicates that interest and non-interest incomes and interest expenses are the main determining factor for the profitability of private banks in Ethiopia both in static and dynamic context. While inflation and tax have significant negative effect on operational performance of the private banks, market concentration has been found to have no significant role on private banks profitability. This, however, is in sharp contrast to the structure-conduct-

performance (SCP) paradigm that predicts bank concentration leading to higher profitability of dominant firms in the banking sector. In his findings, there is hardly any economic justification given for the statistical insignificance of market concentration. The empirical finding over eight years period (from 1999 to 2007) for only six private banks could not be an evidence to refute the SCP hypothesis and support the theoretical Chicago based efficient market hypothesis.

This study, therefore, will attempt to test whether the traditional SCP or the efficient market hypothesis (hereafter abbreviated as ESH) applies to the profitability of private commercial banks in Ethiopia.

The performance of a banking industry could be measured by a parametric and non-parametric approach. The non-parametric techniques typically focus on technological optimization rather than economic optimization and do not correspond to the cost and profit efficiency concepts. The use of the non-parametric techniques would result in overstating the inefficiency of firms. The parametric approach overcomes the drawbacks of the non-parametric approach and would enable one to measure technological and allocative efficiency (Zamorano, 2004). The performance indicators include efficiency, ratio of price to marginal cost, product variety, innovation rate, profits, and market power. Muluneh (2006) concluded that the cost efficiency level of private commercial banks was 86 percent for the year between 1997 and 2005.The mean level of cost and alternative profit x-efficiency of private commercial banks between 2000 and 2005 were 81 and 70 percent respectively(Misganaw , 2007).However, profit efficiency concept is superior to cost efficiency concept for evaluating the overall performance of firms as it is based on the more accepted economic goal of profit maximization which requires one to equalize marginal birr of revenues to the marginal birr of costs. Profit efficiency is based on comparison with the best practice point of profit maximization within the date set; where as cost efficiency evaluates performance holding output constant at its current level which generally will not correspond to an optimum profit.

Studies have been conducted on cost efficiency and profit efficiency to determine the level of performance of private commercial banks without having concentration and market share variables. Methodologically, this would not serve to test both the SCP and ESH in the banking sector.

Therefore, it would be within the domain of economic rationality to investigate the causality of which market structure proxied by either k-bank concentration ratio or the Hirschman–Herfindahl index leads to profitability or efficiency proxied by market share leads to higher profitability.

Economic theory predicts different welfare outcomes for different market structures through firms' price and non-price behaviors. The relevance of market structure and behavioral elements to bank profitability is related to the SCP paradigm. The SCP paradigm has been a basis for analyzing firm behavior or performance given the structure of the market. In a highly concentrated market structure, the potential pro-collusive effect is highly likely. This in turn leads to an increase in price and results in a higher than normal profits for all market participants. In the SCP paradigm bank concentration is believed to be a determinant of profitability (Evanoff and Fortier, 1988; Gilbert, 1984).

However, following Demsetz (1973) and Peltzman (1977) there is a competing ESH that argues that an industry's structure may exist as a result of superior efficiency in production by particular firms, therefore obtaining larger market shares. Sherlock (1985) argued that firms possessing a comparative advantage in production become large and obtain a high market share and, as a result, the market becomes more concentrated. The ESH involves testing the relationship that exists between market share and profitability.
In line with the aforementioned theoretical framework, there are no sufficient empirical studies that examine the effect of market structure and market share on the performance of the Ethiopian private commercial banks.

The objective of this study is therefore to explore the existence of a relationship between efficiency and profitability in private commercial banks and examine the effect of bank concentration on the profitability performance of banks in Ethiopia.

The result of the study provides evidence - whether collusion or efficiency is the more important determinants of private commercial banks' profitability. If SCP paradigm holds, competition authority is forced to take measures on the anti-competitive practices and unfair means adopted by banks against consumers to extract maximum of consumers' income. On the other hand, ESH recommends that banks gain market power because of their efficiency; as a result competition authority intervention is less likely on behalf of consumers.

The study is limited to static panel data framework for the period 2000 to 2009. It is also compelled to limit itself on private commercial banks. The research, however, could be approached from dynamic panel data evidence and applying Panzar and Rosse's approach for all banks in the national boundary.

The remainder of the paper is structured as follows. An overview of the Ethiopian banking industry is given in section 2. Some key theoretical models and analysis on SCP and ESH are described in the next section. This is followed by outlining the baseline model and statistical data. The econometric results and empirical analysis are discussed in section 5. The conclusions in section 6 are followed by a brief implication.

2. The Banking Sector in Ethiopia

2.1 Structure of the Ethiopian Banking Sector

From the time of liberalization onwards (since 1992 to date), private banks have been allowed to operate in Ethiopia. To establish a new commercial bank the 1994 proclamation provision requires only a minimum capital requirement of 10 million birr. For the period 1995 to 2001, there were eight commercial banks (excluding the Development Bank of Ethiopia) of which six are actively operating privately-owned commercial banks. Both the public and the private banking sector have witnessed encouraging performances in terms of deposit mobilization, credit disbursement, branch expansion and loan collection. As of June 30, 2001, for example, the six privately-owned commercial banks (Awash International Bank, Dashen Bank, Bank of Abyssinia, Wegagen Bank, United Bank, and Nib International Bank) had a total number of 92 branches (roughly 29% of the total banking sector). Spanning the period 1995- 2001, deposits mobilized and credits disbursed changed from 10.1 and 3.3 billion birr in 1995 to 23.2 and 4.1 billion birr in 2001, respectively. Branch expansion and loan collection also increased over the same period (see Table A1 in Appendix A).

The growth of total number of branches over the period (2000-2005) was roughly 30 %(389 as of 2005). The commercial bank of Ethiopia alone owned 174(44%) branches, which is the largest public bank in the country. The total capital of the banking system reached birr 3486 million at the end of June 2005, of which the privately- owned banks account for birr 1507 million (43.2%). In general, the share of private banks both in bank branches and capital has shown an increasing trend for the period 2000-2005.

Total resource mobilization by the banking system roared to 13.3 billion birr at the end of fiscal year 2004/2005. In the same period outstanding loans of the banking system reached 29.1 billion. Demand deposit constituted 49.1% of the total deposit followed by saving deposits of 44.5%. The share of private commercial banks in deposit mobilization has reached 25% in 2004/2005.

Nevertheless, the market shares of government owned banks in terms of deposit mobilization, loan disbursement and branch expansion have shown a declining trend for the same period. This implies the importance of allowing entry of private banks so as to minimize the dominant position of state-owned banks. Established at different times from 1994 to 2009, currently, there are at least eleven private commercial banks in operation in the country (see Table A2 in Appendix A).

Despite the sluggish and continues proliferation of private commercial banks over time especially from 2001 to date, their relative share is small. For instance, the share of all private banks and all public banks in terms of total capital are 36.5 and 63.5 percent respectively in 2008/09(see Table 1). Similar pattern is observed in terms of disbursement of loan, loan outstanding, loan collection, and mobilization of deposit. However, the general trend of basic performance indicators shows that the share of private banks increases significantly over a fifteen years period. In terms of loan disbursement, for example, the share of the private banks increased from 6.6% in 1997 to 36.6% in 2001(see Table A1 in Appendix A). For Dashen bank alone, loans and advances increased by 3919 million birr, from a figure of 533 million in 2000 to 4452 million in 2009 as depicted in Table 1.

Table 1: Capital of the banking system, 2005/06-2008/09.

Banks	Capital(in millions birr)							
	2005/06		2006/07		2007/08		2008/09	
	Total capital	% share	Total capital	% share	Total capital	% share	Total capital	% share
CBE	1505.3	27.3	4220	45.6	4561	45.77	5041	45.49
CBB	179	3.3	257	2.8	175	1.76	196	1.77
DBE	1822	33.6	1865	20.1	1865	18.72	1800	16.24
Total	***3506.3***	***64.8***	***6342***	***68.5***	***6601***	***66.24***	***7037***	***63.50***

AIB	304.3	5.6	434	4.7	480	4.82	555	5.01
DB	311.1	5.7	612	6.6	731	7.34	815	7.35
BOA	406.8	7.5	419	4.5	416	4.17	421	3.80
WB	256.8	4.7	401	4.3	467	4.69	656	5.92
UB	193.2	3.6	359	3.9	467	4.69	449	4.05
NIB	313.4	5.8	426	4.6	489	4.91	581	5.24
CBO	122.7	2.3	131	1.4	137	1.37	155	1.40
LIB	-	-	134	1.4	177	1.78	192	1.73
ZB	-	-	-	-	-	-	100	0.90
OIB	-	-	-	-	-	-	121	1.09
Total	***1908.3***	***35.2***	***2916***	***31.5***	***3364***	***33.76***	***4045***	***36.50***

Source: central statistics authority

The overall profitability measures (ROA and ROE) show a slight declining trend, with minimum variation, from 2000 to 2009. This partly may reflect the potential effect of competition as more banks are allowed to enter to the banking industry (see Table A3 in Appendix A).

The level of risk as measured in C/A ratio is the highest in DB followed by WB while a lower level of risk is recorded by CBO followed by LIB. The other measure of risk, L/A ratio has shown an increasing trend for almost eight years (2000-2009) for all banks. For the period 2008 - 2009, with the exception of AIB, there were declining trends for L/A ratio (see Table A4 in Appendix A). This could be one probable reason for the reduction of profit for the two consecutive years.

3. Theoretical Review

3.1 The SCP paradigm and ESH: theoretical Model

Since Bain (1956), the originator of the SCP approach, concentration has been considered an indicator and a cause of market power. Concentration, defined as the extent to which most of the market's output is produced by a few firms in the industry, forms the basis for the explicit link between market structure and performance through firms' conduct(Scherer and Ross, 1990). Market concentration is the most widely used measure of market structure. The set of instruments, which relate to the structure of the banking industry include measures of concentration such as the Herfindahl –Hirschamn Index (HHI), used by Corvoisier and Gropp (2002) and measures of market share. For a given level of conduct, the more concentrated the industry is, the greater the degree of market power. However, the degree of market power depends on three factors: demand elasticity, market concentration and extent of collusive behavior of banks. Given a level of concentration and a value of demand elasticity, the more banks collude, the greater the degree of market power. On the other hand, even if banks collude perfectly, if demand is elastic, the degree of market power is small.

The most common measures of market concentration are the Herfindahl –Hirschamn Index and the concentration ratio (CR) (Scherer and Ross, 1990; Morris, 1984; Agu, 1992). The HHI, as a measure of concentration, is the extent to which a few banks dominate market shares in respect of total assets, loans or deposits. The Hirschman-Herfindahl index of concentration is the summed square market shares of all banks in the market, bounded by 0 and 1 : $0 \leq H \leq 1$, i.e., with pure monopoly H =1 and perfect competition H = 0. Or, equivalently, an HHI[1] value near 0 suggests existence of many small banks, while an HHI value near 1 suggests the existence of few big banks.

Decreases in the HHI generally suggest a loss of pricing power and an increase in competition, whereas increases suggest the opposite. Following the aforementioned explanation, HHI can be calculated as:

[1] It is commonly accepted that HHI below 0.1000 indicate non-concentrated, between 0.1000 and 0.1800 moderately concentrated and indices above 0.1800 imply concentrated.

$$HHI = \sum \left[\frac{x(i)}{x} \right]^2$$

where, $\chi(i)$ is the total assets, or deposits or loans of bank i , and the corresponding χ equals total assets, deposits or loans of all banks in the industry. For each bank, one can calculate $\left[\frac{x(i)}{x} \right]^2$ as a measure of concentration. HHI provides a better measure of market concentration as it is sensitive to the number of sellers of a service and their size distribution.

The other widely used measure of concentration is concentration ratio (CR_k) defined as:

$$CR_k = \sum_{i=1}^{k} Si = S_1 + S_2 + \ldots + S_K$$

Where banks are ordered by market share (the largest being the first and so on). CR_k ranges in value from 0 to 1. A CRk value closer to 0 implies a minimum bank concentration while a value near to 1 shows maximum concentration. It is simply the share of the top k banks in the market, where choice of k depends on data available. CRk only requires data on bigger sellers and has unambiguous meaning.

Following Bain (1951), Industrial Organization economists developed the SCP approach under the general hypothesis that concentration facilitated collusion or non-collusive accommodation such that it raised price; this also meant profitability. The traditional SCP paradigm or collusion hypothesis provides a system for the analysis of a given industry. It propounds that structure influences conduct; both conduct and structure influences performance. The definitive theoretical implication of the SCP hypothesis is that in concentrated markets prices will be less favorable to consumers because of noncompetitive behavior that arises in such markets.

The traditional market SCP paradigm assumes that certain market structures are conducive to monopolistic conduct, and this conduct enables banks to raise price above marginal cost thereby making abnormal profits. Therefore, the link between market

structure and profitability is through banks' pricing behavior. Competition theorists argue that firms in highly concentrated industries refrain from competing among themselves and might also refrain from raising deposit rates or lowering lending rates (Morris, 1984). This would result in higher than average profitability. The traditional expectation is that higher concentration leads to higher and monopolistic performance. In perfectly competitive markets where firms face a perfectly elastic demand, theoretically the model predicts that there will be lower profitability compared with all other markets where the demand is less elastic (George and Joll, 1971). This hypothesis has been empirically tested using the following specification:

$$\prod = f(C, B, D)$$

Where $\prod$ = index of performance (profitability)

C = vector of variables denoting ease of collusion

B = vector of variables representing barriers to entry

D = vector of demand variables

The specification of the SCP paradigm in banking has been based on the various theories of the banking firm (Gilbert, 1984; Clark, 1986). It is a profit- concentration relationship and postulated as:

$$\prod_i = f(CR, Xi)$$

Where $\prod$ = Measure of profitability of the i^{th} bank as measured by the rate of return on assets, rate of return on capital, and rate of return on equity.

CR = Banks' index of concentration

Xi = A vector of control variables that are exogenous to the bank and may affect prices through market or cost consideration.

The most rigorous foundation of the SCP paradigm in banking is given in the seminal work of Hannan (1991). The model as motivated by Hannan (1991) has the following form:

$$\prod_{it} = \alpha_o + \alpha_1 CR_j + \sum_{j=2}^{k} \alpha j Zij \quad + \varepsilon_i$$

Where $\prod$ is the return on assets for the ith bank, CR is a measure of market structure usually proxied by either by a k-bank concentration ratio or the HHI. Z_{ij} are additional

explanatory variables included to control for individual bank risks, costs and market demand factors. The term ε represents the stochastic disturbance term. A support for the SCP paradigm that market structure influences economic performance is found when $\alpha_1$is, in a statistical sense, larger than zero.

Specifically, the SCP supporters contend that if performance is a function of structure and conduct, and conduct, in turn, is a function of structure, then there should be a positive correlation between concentration and market power. The smaller the number of firms, the greater the probability of collusion and the easier it is to reach a price fixing agreement. On the other hand, the more competitively firms (or banks) behave, the lower the degree of market power. Market power can manifest itself in a number of dimensions such as high price, reduced output, limited choice and quality or diminished technological innovation. Traditionally, market structure indicators, such as the number of banks and banking concentration, have been considered the major determinants of competition in the banking sector. The SCP paradigm advocates a direct link between market concentration and the degree of competition. A higher market concentration allows banks to exploit their market power by earning higher profits. However, it appears that the nature of the relationship between competitive structure and level of concentration in the banking markets is ambiguous. In some situations, a highly concentrated banking sector can impair competition. The economic underpinning behind is then that concentration translates into greater market power, thus leading to collusive behavior and excess profits for the financial institutions (Gual and Neven, 1992). In general, in the SCP approach increased concentration fosters collusion and anti-competitive practice. This is, however, challenged by two theoretical strands; contestability theory and efficient market hypothesis.

In contestability theory, a concentrated banking industry can behave competitively if the hurdles to be surmounted by new entrants to the market are low (Baumol, 1982). The proponents of the contestability theory assert that the threat of potential entry forces banks with large market shares to price down to the competitive level where price equals marginal cost. In a perfectly contestable market, there is absolutely free entry and entirely costless exit and the demand for industry outputs are highly price-elastic. These features

and highly price-elastic demands imply that a contestable market is effectively competitive even if it has only a small number of active firms. On the other hand, the efficiency hypothesis states that if a bank enjoys a higher degree of efficiency than its competitors, it can adopt two different strategies. One is to maximize profits by maintaining the present level of prices and firm size. The second is to maximize profits by reducing prices and expanding firm size. If the bank chooses the second option, the most efficient banks will gain market share and bank efficiency will be the driving force behind the process of market concentration. Hence, both the contestability and the efficiency hypothesis assume that the overall competitive environment faced by banks does not necessarily depend on the degree of market concentration.

As a direct challenge to the SCP paradigm, the efficient market hypothesis contends that market concentration is a result of firms' superior efficiency which leads to large market share and profitability. Demsetz (1973) has argued that market concentration is not a random event, but rather the result of firms with superior efficiency obtaining a large market share. Therefore, the causal relationship ran in reverse: i.e., from efficiency to concentration to profitability. Demsetz put forward this critique suggesting that more efficient firms gained market share, leading to an apparent concentration – profits relationship. His argument received greater support when direct tests of the effects of market share were used by economists like Ravenscraft (1983). As Molyneux and Forbes (1995) and Smirlock (1985) note, including concentration and market share in a firm-level profitability equation suggested firm effects dominated. The specification runs as follows:

$$\prod = f(\boldsymbol{CR}, \boldsymbol{MS}, \boldsymbol{X})$$

Where $\prod$ = profit measure

$\boldsymbol{CR}$ = measure of market structure (a concentration measure)

$\boldsymbol{MS}$ = a measure of market share

$\boldsymbol{X}$ = a vector of control variables that account for firm-specific and market- specific characteristics.

The significance of market share (MS) in the above model would imply support for the efficient market hypothesis, while the significance of concentration ratio (CR) would support the traditional market SCP paradigm. The efficiency schools argue that any observed positive relationship between market concentration and profitability reflects efficiency rather than the exercise of market power. In such efficiency interpretation of empirical SCP approach, a regression of profitability on concentration for a sample of industries would find a positive relationship, but this would not reflect the exercise of market power merely the superior efficiency of low –cost firms. In any case, not only MS and CR but also several variables are used as determinants of bank profitability.

In most SCP studies, bank performance is measured by the level of bank profitability.
The basic argument in favor of the profitability measures in banking is that banks are essentially multi-product firms and the use of profitability measures eliminates problems associated with cross-subsidization between products and services.The profitability measures include the rate of return on equity (ROE), rate of return on capital (ROC), and rate of return on assets (ROA). In most bank studies, however, emphasis is given on measuring profitability in terms of ROC and ROA. Smirlock (1985) used all the three measures and notes that the use of ROA has provided the strongest evidence on the concentration –profitability relationship in banking. Keeton and Matsunaga(1985) asserts that ROA is especially useful in measuring changes in bank performance over time since banks' income and expense components are more closely related to assets. Several studies of the market structure-conduct-performance hypothesis in the banking system have used both ROA and ROC (Civelek and Al-Alami, 1991; Agu, 1992).

In an empirical investigation of the performance of the banking industry, several control variables are included to account for bank-specific variables and market demand characteristics. Bank –specific variables that have been used in the literature include bank size, bank efficiency, bank risk, and bank product specialization. Market structure variables that have been used include bank concentration, market share and ownership. Berger (1995) has suggested that the way to test actual bank behavior is to introduce efficiency, concentration, market share measures as explanatory variables.

Bank size is measured as banks total deposits or total assets (Evanoff and Fortier, 1988; Molyneux and Forbes, 1995) to capture possible cost advantages associate with size. A priori, the impact of bank size on profitability is indeterminate. For example, large banks compared with small banks may garner economies of scale and have greater diversification opportunities. However, a positive impact of bank size on profit from economies of scale may be partially offset by greater ability to diversify assets resulting in a lower risk and a lower required return (Smirlock, 1985). Another explanatory variable is bank efficiency. Firms with superior management should be more efficient and so incur lower costs per unit of revenue, hence possibly higher profits.

As a measure of bank risk, capital – asset ratio (CAPAST) produces a perverse sign although it is statistically significant (Molyneux and Forbes, 1995). Evanoff and Fortier (1988) found a significant negative relationship between profitability performance and CAPAST. Lower capital-asset ratio is associated with high risk. Another measure of risk included as a control variable is the Loan-Asset Ratio (LTOAST). It is expected to be positively correlated with bank profitability. Another variable such as the ratio of demand deposit to total deposit (DDTDEP) has a positive influence on the level of profitability. Evanoff and Fortier (1988) and Smirlock (1985) found a significant and positive relationship between DDTDEP and bank profitability.

To control for the impact of the changes in market demand characteristic market size and market growth rate are included in the specification of bank performance models. Market size is measured by total market deposits. The correlation between market size and bank profitability may be either positive or negative. The growth rate of the market is included because rapid market growth expands profit opportunities for existing banks, but if growth encourages entry then a negative relationship may be observed. Civelek and Al-Alami (1991) have argued that larger market size or expanding market enables banks to differentiate their products and consequently generate higher profits.

3.2 The SCP paradigm and ESH: Empirics

The profit-structure relationship is a frequently explored topic within industrial as well as financial economics. In his landmark study Bain (1951) found evidence in favor of a positive and significant relationship between concentration and profitability using US manufacturing data.Civelek and Al-Alami (1992) find a statistically significant relationship between concentration and performance in most years with perverse signs in some years in the Jordanian banking system, while Molyneux and Forbes (1995) find overwhelming evidence of a significant positive relationship between concentration and profitability. On the other hand, Agu (1992) finds no significant statistical correlation between concentration and profitability. Therefore, empirical evidences on market structure paradigm (concentration- profitability) in banking are mixed. Other empirical tests of the SCP paradigm in eighteen Asian and Pacific Basin countries showed that, concentrations in the banking sector lead to monopoly profits being earned and is a signal of collusive behavior among the leading banks. Moreover, competitive imperfections allowed banks to set prices that are less favorable to consumers thereby decreasing total consumer and producer surplus. The study further implicates that regulatory actions, such as anti-trust laws, are justified on efficiency grounds as well as for raising economic welfare (Chowdhury, 1996). Other studies showed increasing bank concentration boosts the interest rate spread and the profit rate, suggesting that concentration impairs competition(Clarke et al.,2003; Martinez Peria and Mody, 2004; Wong, 2004). On the basis of extended data set covering the activities of 747 Austrian banks from 1995 to 2002, Hahn (2008) found support for the traditional structure- conduct-performance hypothesis.

The empirical literature on the application of both the SCP and the ESH for developing countries is limited and also less conclusive (Mugume, 2007; Okealaham, 2004; Chirwa, 2003; Nannyonjo, 2002). According to Du plessis and Gilbert (2007), a new empirical literature had supported the SCP paradigm in South African industrial firms for the period 1980-2006.The evidence, however, does not unequivocally support the conclusion that market power is necessarily a sign of monopolistic practices. The effect of a

concentration index for the Ethiopian private commercial banking industry, proxied by HHI, for the year 1997 to 2007 was relatively insignificant while employing the standard static model. In the dynamic panel model, however, there was no clear evidence on the relevance of market concentration in explaining the profitability of private commercial banks in Ethiopia.The study therefore concluded that the SCP paradigm had no significance in determining the profitability of private banks in Ethiopia (Yigremachew, 2008).

Al-Obaidan (2008) confirms the "efficiency" paradigm, in the commercial banking industry of six oil-rich Arab countries: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates, advanced by Demsetz (1974), Smirlock (1985), and Bresnahan (1989) that suggests the degree of concentration need not result in anti-competitive bank performance, but should be considered a consequence of the superior efficiency of banks. Therefore, the most efficient banks may gain market share and may be the driving force behind the process of market concentration. Hence, greater market concentration is not necessarily a consequence of the collusive behavior of banks, or a consequence of impaired competition in banking markets. On the other hand, data from the Malawian banking industry for the period 1970-1994 did not support the relationship between market share and profitability. Thus, it was not the efficiency of commercial banks that explains variations in profitability over time in the Malawian banking industry (Chirwa, 2001).

4. *Methodology*

4.1 Baseline model

This empirical study tests the SCP paradigm and ESH on commercial banks using banking industry data from 2000-2009. Empirically, one can distinguish the SCP paradigm from the ESH hypothesis by looking at the endogenous variables measuring the performance of a particular bank, which is usually estimated as function of exogenous market structures and other control variables (Smirlock, 1985; Evanoff and Fortier, 1988; Hannan, 1991; Chirwa, 2001) of the linear[2] form as in:

$$\ln \prod_{it} = \alpha_o + \alpha_1 \ln CR_{it} + \alpha_2 \ln S_{it} + \sum_k \ln\alpha_{k+2} X^k_{it} + \lambda_t + \eta_i + \varepsilon_{it}$$

Where $\prod_{it}$ = Profitability, either ROA or ROE, for bank i in period t.
CRit = Market concentration, either HHI or CR, for bank i in period t.
S it = Market share of bank i in period t.
X^k it = Vector of control variables, for k= 1, 2… 6.
λ t = Trend variable (unobservable time effect)
η_i = Bank-specific effect or time-invariant component
ε_{it} = Error term ($\varepsilon_{it} \sim IID(0, \delta^2)$)
α_o, α_1, α_2…, α_7 = Parameters to be estimated.

Both CR and HHI are employed in the model separately as they have different properties that might result in different estimates. The HHI includes all the banks in the market, so in principle it captures all movements of concentration. The CR_3 comprises the market shares of the three-largest banks in the data set and thus, only captures some of the movements in the market. . In accordance with the literature, we claim the findings of the econometrics analysis based on the model should be read as: the SCP is supported by the data if the coefficient on CR (or HHI) is positive and statistically significant regardless of the sign on market share. If the coefficient on CR (or HHI) is negative or insignificant and the coefficient on S is positive and statistically significant this arguably reflects market power and supports the relative market power hypothesis. X is a vector of control variables included to account for firm-specific and market demand characteristics.

[2] The linearity assumption is not binding. Bourke (1989), among others, suggests that any functional form of bank profitability is qualitatively equivalent to the linear.

The λt and η_i are respectively unobserved time- and bank-specific effects, with time period t = 2000... 2009, and banks i = 1, 2, ..., 8 and ε_{it} is the remainder stochastic disturbance term. Based on this baseline model, the empirical model to be estimated in this study is in static panel data framework and given as:

$$\ln\prod_{it} = \alpha_{o+}\alpha_1 \ln CR_{it} + \alpha_2 \ln S_{it} + \alpha_3 \ln ASSET_{it} + \alpha_4 \ln CAPAST_{it} + \alpha_5 \ln LTOAST_{it} + \alpha_6 \ln DDTDEP_{it} + \alpha_7 \ln MKDEP_{it} + \alpha_8 \ln MKGRO_t + \lambda_t + \eta_i + \varepsilon_{it}$$

As profitability variables, ROA and ROE are analyzed as dependent variables in this research. The list of explanatory variables of profit and the expected result is given in Table 2.

Table 2: Regresssors explaining the profit -structure relationship

Regressors	Expansion	Sign of coefficients	Explanation
CR(HHI)	Concentration Ratio (Herfindahl-Hirschman Index)	$\alpha_1 > 0$	*The more concentrated the industry the higher the level of profitability.*
S	*Market share*	$\alpha_2 > 0$	*Larger market shares are a result of efficiency, which in turn leads to higher profitability*
ASSET	*Asset*	$\alpha_3 > 0$	*Reflects economies of scale*
		$\alpha_3 < 0$	*Reflects greater ability to diversify assets, which results in lower risk and lower required return.*
CAPAST	*Capital-asset ratio*	$\alpha_4 < 0$	*Lower ratios show risky positions*
LTOAST	*Loan-asset ratio*	$\alpha_5 > 0$	*The higher the ratio, the higher the profitability*
DDTDEP	*Demand deposit-total demand deposit ratio*	$\alpha_6 > 0$	*The higher the ratio, the higher the level of profitability.*

MKDEP	*Market deposit*	$\alpha_7 > 0$	*When a larger market provides new opportunities*
		$\alpha_7 < 0$	*If the large market makes entry relatively easy.*
MKGRO	*Market growth*	$\alpha_8 > 0$	*When a market grows*
		$\alpha_8 < 0$	*If the growing market makes entry relatively easy.*

Source: Chirwa, 2003

4.2 Statistical Data

For examining the profit-structure relationship in a banking industry, a test is conducted using panel data. It consists of annual data on profits, total assets, the value of total loans and capital of eight private commercial banks namely Awash International Bank, Dashen Bank, Bank of Abyssinia, Wogagen Bank, United Bank, Nib International Bank, Cooperative Bank of Oromia, Lion International Bank for the period 2000-2009. The main data sources for these were extracted from National Bank of Ethiopia year- ending bank balance sheets and profit/loss accounts.

The study is compelled to do with unbalanced annual panel data[3] due to banks' varied year of establishment. Panel estimation, even though unbalanced, is still preferred to cross-section analysis as it enables the researcher to combine time-series and cross-sectional data in order to account for unobservable individual bank-specific effects. That is, it has great flexibility in modeling differences in behavior across individual bank units (Green, 2003).

[3] Unbalanced panel are more likely to be the norm in studies of a specific country's bank profitability(see Baltagi 2001)

5. *Empirical Results*

5.1 Descriptive Results

Concentration Indices and Market Share

As performance indicators, the importance of concentration indices and market share arise from their ability to capture structural features of the banking sector. The most frequently used measures of concentration indices, that is, the k- bank concentration ratio (CRk) and the Herfindahl-Hirschman Index (HHI)[4], reflect the changes in concentration as a result of the entry of a bank into the market or its exit from it.

Table 3 presents the values of CR_3, CR_5 and HHI based on market shares of eight banks active in the Ethiopian banking market. The result shows that the possible values of these indices vary over time. For instance, the variation is high for the CR_3 with respect to CR_5 over the entire period and a persistent decline for HHI and CR. This decline in concentration suggests competitive pressure may set in . However, CRk and HHI are only indicative of market structure and provide a crude analysis of competition among banks. *The highest value of CR was recorded in 2000.* In the same year, the three- bank concentration ratio was 76.1 while it was 96.5 for five- bank concentration ratio. Thus, the largest five banks were much more dominant than the largest three banks (DB, AIB and BOA).

Table 3: Concentration indices for eight banks, based on bank deposits (2000-2009)

Banks	***Market share of deposits***								
	2000	***2001***	***2002***	***2003***	***2004***	***2005***	***2006***	***2007***	***2008***
DB	*27.4*	*28.8*	*29.2*	*29.8*	*30.3*	*28.9*	*28.4*	*28.2*	*27.7*
AIB	*26.8*	*24.4*	*22.8*	*21.4*	*20.8*	*19.8*	*19.8*	*18.0*	*17.4*
BOA	*21.9*	*21.2*	*22.2*	*19.8*	*17.7*	*16.6*	*16.8*	*15.8*	*15.6*
WB	*16.9*	*14.6*	*12.6*	*13*	*12.2*	*13.2*	*13.7*	*15.8*	*13.3*
NIB	*3.5*	*6.8*	*8.5*	*10.8*	*11.6*	*12.5*	*11.2*	*10.9*	*11.1*
UB	*3.5*	*4.2*	*4.6*	*5.3*	*7.4*	*8.8*	*9.4*	*8.9*	*11.0*

[4] The literature proposes a two-to-five-firm concentration ratio involving the leading firms in the sector ,see Rhoades (1977)

CBO	-	-	-	-	-	*0.15*	*0.76*	*1.6*	*2.2*
LIB	-	-	-	-	-	-	-	*1.2*	*2.0*
				Values					
HHI	*2258.72*	*2151.3*	*2117.5*	*2052*	*2002.2*	*1910.8*	*1883*	*1820.5*	*1743.4*
CR_3	*76.1*	*74.4*	*74.2*	*71*	*68.8*	*65.3*	*65*	*62*	*60.7*
CR_5	*96.5*	*95.8*	*95.3*	*94.8*	*92.6*	*91*	*89.9*	*88.7*	*85.1*

Market Share
June, 2009

Bank	***Market share***	***HHI***	***CR_3***	***CR_5***
DB	*26.9*	*723.6*	*26.9*	*26.9*
AIB	*16.8*	*282.2*	*16.8*	*16.8*
BOA	*15.2*	*231*	*15.2*	*15.2*
WB	*12.6*	*158.8*	*0*	*12.6*
UB	*12.3*	*151.3*	*0*	*12.3*
NIB	*11.2*	*125.4*	*0*	*0*
CBO	*2.7*	*7.3*	*0*	*0*
LIB	*2.5*	*6.3*	*0*	*0*
Total	*100*	*1686*	*58.9*	*83.8*

Source: own calculation

In 2009, the banks were found to be moderately concentrated, with high HHI value 1686 and a three-bank concentration level of 59%. Dashen Bank commanded a 26.9% share of the market, while Awash International Bank and Bank of Abyssinia had a market share of 16.8% and 15.2% respectively. Of the remaining market players, Lion International Bank had the lowest market share of 2.5%.

A look at the performance of banks shows that DB dominates the private banking industry. Table 4 gives the trend of deposits held by thee largest banks. As a

proportion of total deposits, the size of deposits held by three banks have been on the decline throughout the period, showing the persistent decline of dominance of the banks. Thus, the entry of new banks particularly in the latter part of the period have been reflected partially in improved competition, accord to economic postulations.

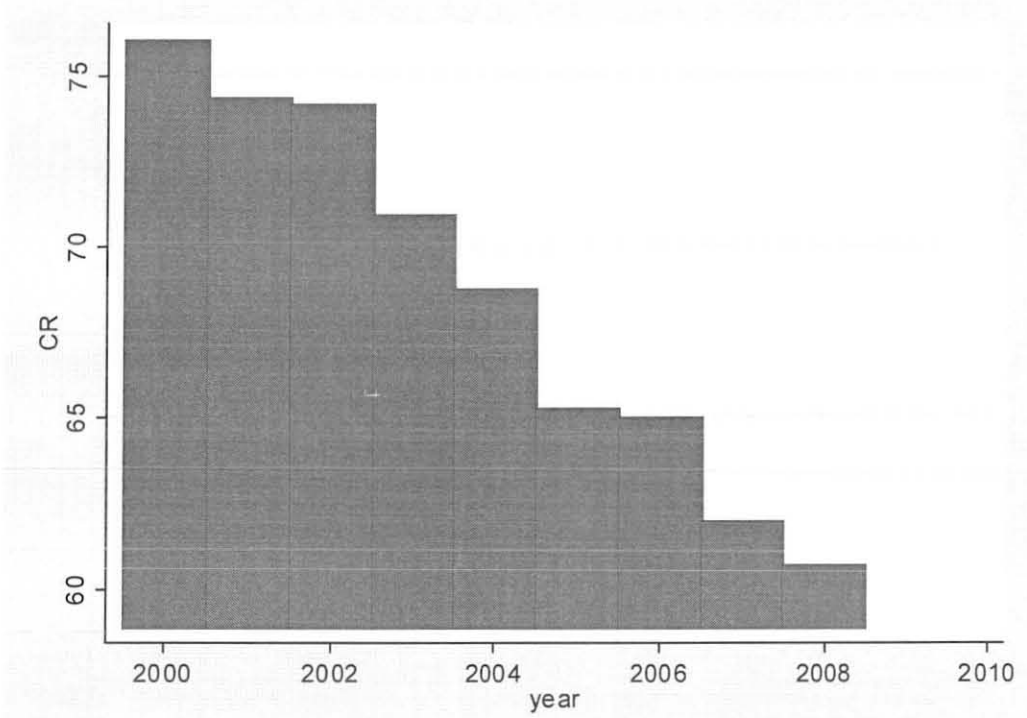
Table 4: Share in total industry deposit by bank category.

Bank	***Market share***									
	2000	***2001***	***2002***	***2003***	***2004***	***2005***	***2006***	***2007***	***2008***	***2009***
AIB	*26.8*	*24.4*	*22.8*	*21.4*	*20.8*	*19.8*	*19.8*	*18.0*	*17.4*	*16.8*
DB	*27.4*	*28.8*	*29.2*	*29.8*	*30.3*	*28.9*	*28.4*	*28.2*	*27.7*	*26.9*
BOA	*21.9*	*21.2*	*22.2*	*19.8*	*17.7*	*16.6*	*16.8*	*15.8*	*15.6*	*15.2*

source: own calculation

Figure 2 depicts the three- bank concentration ratio between 2000 and 2009 for deposits. The three largest banks held an average deposit of 68% during 2000-2009. Clearly, the values show the persistent dominance of DB, AIB and BOA in the private commercial banking industry.

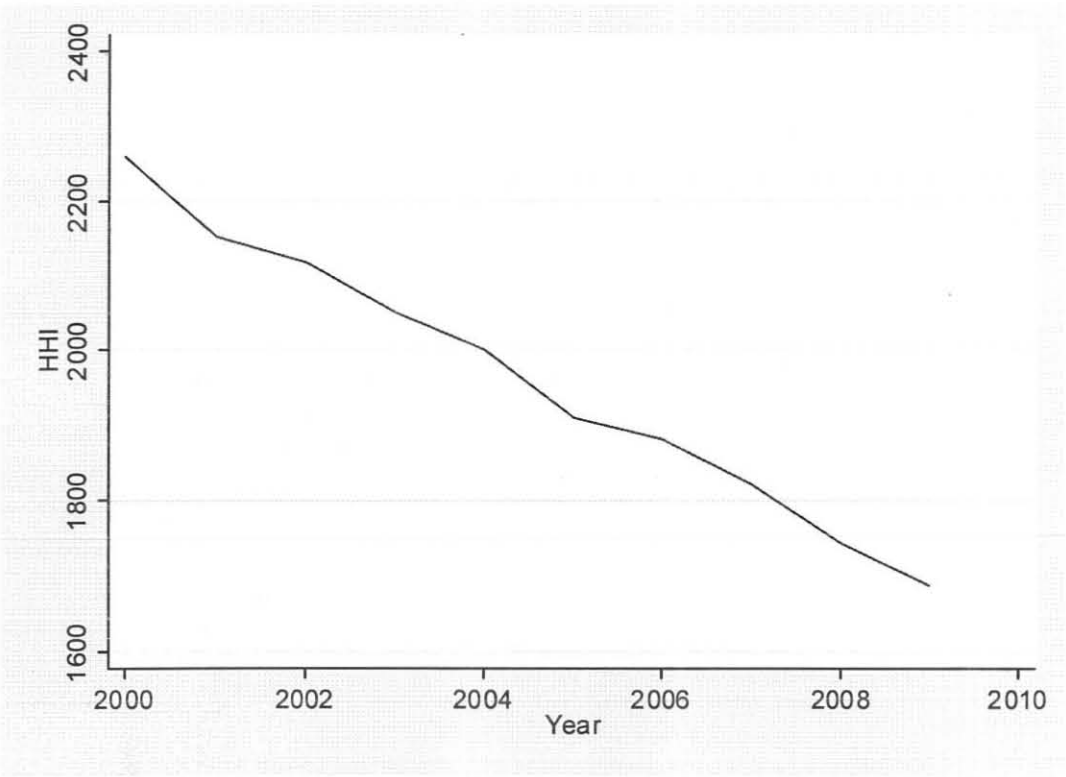
Figure 2: Concentration of deposits: Three -bank concentration ratio, 2000-2009.



Source: NBE and Own calculations

Although more than half of the sectors' share belonged to the leading banks, the establishment of new commercial banks either through government encouragement or through market mechanism especially as of 2009(see Table A in Appendix A) will tend to increase competitive practice.

Figure 3: *Banking concentration: Herfindahl-Hirschman Index (HHI), 2000-2009*



Source: own manipulation

The HHI shows a similar pattern (see Figure 3). The largest HHI during 2000-2009 amounted to approximately 2259 and the smallest is 1686 in 2009. The value of HHI decreases from an already high of 2259 to 1686, a decrease of 573 points which partly denotes the surge of competitive pressure in the market. Such decline of dominance seems to indicate the NBE authorities to conclude that actual and potential entry of new banks in the Ethiopian banking industry are an impetus to the development of the sector.

5.2 Econometric Results

In order to choose the appropriate model for empirical investigation of the present study, three different estimation techniques have been compared. OLS estimation suggests that the specified model fits the data reasonably well with a goodness of fit of 63%. The test for model adequacy as given by the over all F-statistic is also robust (see Table B1 in Appendix B). In the general specification of pooled OLS model, it is assumed that all parameters are the same for each private bank. As Table B2 in Appendix B shows, estimation by Pooled OLS is unlikely to provide estimates even at 10% level of significance. By running a Modified Wald Test, estimation by pooled OLS is also much less preferred to random effect estimation at 5% level of significance. This suggests the possibility of using estimated generalized least square (EGLS) estimator. However, in random effect (RE) model, EGLS is applicable if the explanatory variables are strictly exogenous and uncorrelated with individual specific heterogeneity (η_i).Therefore, the Hausman test[5] is applied to test whether EGLS estimator or fixed effect (FE) estimator is to be chosen for estimation. Based on this test, we fail to reject EGLS at 5% level of significance as the difference in coefficients between FE and RE are not systematic, providing evidence in favor of a random effect model. Furthermore, the test result shows that individual effects are not present. Hence, random effect estimator is chosen for the present study. The estimation results are shown in Table 5. Therefore, the model for the bank profitability is as specified below:

$$\ln \prod_{it} = \alpha_o + \alpha_1 \ln CR_{it} + \alpha_2 \ln S_{it} + \sum_k \ln\alpha_{k+2} X^k_{it} + \lambda_t + \eta_i + \varepsilon_{it}$$

Where η_i = *time-invariant component and features as part of the error term.*

$\eta_i \sim IID(0, \delta^2_\eta)$

$\varepsilon_{it} \sim$ IID $(0, \delta^2\varepsilon)$ capturing all other random effects on $\prod_{it}$.

$E(\eta_i, \varepsilon_{it}) = 0$

η_i and ε_{it} *are independent of the regressors.*

[5] Upon running Hausman test, prob > chi-squared equals 0.0512. Therefore, we fail to reject the null of both FE and RE are the same. However, under the null hypothesis the RE estimator is more efficient than FE.

We have included trend variable in the above model merely to show its presence. The use of static relationship coupled with short time frame work of our dataset makes time effect, λt, to be less likely to occur in the error component of the model. Therefore, it is excluded from the estimation of the RE model described above.

Table 5. Estimated static panel data model for bank's profitability♀

Independent variables	Log-linear model	
	Coefficient	Standard error
Log of hh_{it}	19. 14472	12.27672
Log of S_{it}	-3.661221**	1.606072
Log of $asset_{it}$	4.966249***	1.535009
Log of $capast_{it}$	-0.2396694	0.6358172
Log of $ltoast_{it}$	0.4914741	0.7968109
Log of $ddtdep_{it}$	0.5608278*	0.3177771
Log of $mkdep_t$	-2.532158	1.931764
Log of $mkgro_t$	2.757538**	1.383214
Constant	-158.8838	105.955
Number of observations	58	
Number of groups	8	
Within R^2	0.1592	
Between R^2	0.8855	
Overall R^2	0.6269	
Wald Chi-squared (8)	82.34	
Prob > chi-squared	0.0000	
Sigma_u	0.0	
Sigma_e	0.46564018	
Rho	0.0	

♀ Dependent variable is log of return-on-equity (lnroe).

***, **, * indicate significance levels of 1, 5 and 10 percent respectively.

As to the regression results, only the empirical results of the random effect model using ROE as the profitability variable is given[5]. The empirical result shows that when HHI enters the regression equation concentration affects a bank's profitability positively, but this effect is statistically insignificant even at 10% level of significance. Hence, the data did not lend considerable support for the SCP hypothesis. Smirlock (1985) also found that there is no discernable positive relationship between concentration and profitability. Similarly, Agu (1992) finds no significant statistical relationship between concentration and profitability. Moreover, Jansen and Haan (2003) found no evidence that concentration indicators are linked to profitability, and added that concentration and competition are not related. In line with these findings, the Ethiopian private commercial banks showed a considerable declining trend in HHI index up until 2009 suggesting that the banking industry was moving to a competitive market structure but with a slight reduction of profit.

The inclusion of market share as a proxy variable for efficiency in the model helped to test efficient market hypothesis. The regression result showed that coefficient of market share is negative. However, the coefficient on S_{it} is statistically significant at least at 5% level. The data, therefore, does not seem to imply that the bank specific market share is the better proxy for market power and market imperfections. Put differently, market power (the power to set prices and thus to earn supernormal profits) as measured by market share on bank deposits does not reflect banks' superior efficiency. That is to say, we only find very little evidence for the view that ESH matters on the banks profitability as measured by ROE. In general, the evidence is that in Ethiopian private commercial banks, bank market share based on deposits and HHI per se, over the sample period, do not translate to significant market power. Maudos (1998) notes that market share is a poor proxy for efficiency and proposes inclusion of a direct measure of efficiency to test the efficient market hypothesis.

ROE and asset are positively correlated. The asset coefficient is statistically significant at 1% level. That is, a 1% increase in asset will roughly result in a 5% increase in ROE.

[5] In contrast, estimation based on ROA did not produce sensible results and hence they are not reported as suggested by both the coefficient estimates and specification tests.

This suggests that large banks compared with small banks may *garner* economies of scale.

The estimated log-linear equation shows ROE is negatively related to CAPAST but highly insignificant implying that lower capital-asset ratio is less likely to be associated with high risk. As an additional indicator of bank-specific risk, the LTOAST is also insignificant even at 10% and carries a positive sign, denoting that risky assets attract a lower return and hence generate lower profit. Theoretically, granting of loans where the bulk of banks interest is earned is subject to greater loan risk exposure. If LTOAST, the proxy for overall credit risk, were significant, the granting and pricing of loans would attract high return and hence more profit.

Demand deposit to total deposit, DDTDEP, is positively associated with ROE and it is statistically significant at the 10% level. The significance of DDTDEP indicates demand deposits are a cheaper source of funds for the banking industry. The coefficient of the other control variable MKDEP is positive, supporting the argument that large banking industry makes the entry of new banks into the industry relatively easy, but insignificant even at the 10% level. The significant coefficient on MKGRO at 5% with a positive sign makes the growth rate of the market appears to be a discouragement to potential entrants into the banking industry.

6. Conclusion and implications

6.1 Conclusion

In this paper, we specified an empirical framework to test the SCP paradigm and ESH on the profitability of Ethiopian private commercial banks. For this, concentration and market share variables are introduced as explanatory variables using log-linear model. The SCP investigates the relationship that exits between HHI (or CR) and profitability performance of the banks. The alternative hypothesis, ESH, investigates the relationship between market share and profitability. The estimated log-linear model shows that ROA is positively correlated to Hirschman-Herfindahl Index, asset, loan-asset ratio, demand deposit to total deposit, and market growth. A negative relationship is found with market share, capital-asset ratio and market deposit.

The empirical result, in static panel data framework, shows that the relationship between HHI and profitability, though positive, is not statistically significant. This suggests that concentration may not be reflection of the collusive behavior of banks. Hence, this study finds no evidence to support the SCP paradigm over the time span 2000-2009. Also, the ESH is not verified, as the effect of market share on bank profitability was found insignificant.

6.2 Implications

This study provides some insight for competition authorities and regulators into the issue of economic efficiency and market structure. The absence of market structure paradigm and the efficiency paradigm has implications particularly for competition authorities. In their enforcement roles, competition authorities protect and promote competition by taking appropriate enforcement action against anticompetitive behavior of economic agents such as concentration movements of banks. In this study, based on market share and concentration indices, DB, AIB and BOA were dominant over the entire sample period. However, it seems plausible that there is a decreasing level of concentration that will encourage competitive forces in such a way that it becomes favorable to consumers interest. In line with economic theory, a high concentration index for the banking industry is rather meaningless if other financial institutions are also important suppliers in

the markets considered. Furthermore, dominance is not illegal or problematic per se, except when it is abused. The actual and /or alleged anti-competitive practice, if any, of the dominant banks is less likely to be justified on the ground of efficiency. On the other hand, there is also very little evidence that greater market concentration is necessarily a consequence of the collusive behavior of banks, or a consequence of impaired competition in banking industry. Hence, the dominance of the three banks provides no hint for competition policy intervention against their anti-competitive practice.

Reference

Agu, C.C. 1992. *A analysis of the determinants of the Nigerian banking systems' profits and profitability performance*. Saving and Development, 16(4), 353-369.

Al-Obaidan, Abdullah, M. 2008. *Market structure concentration and performance in the Commercial banking industry of emerging markets.* European Journal of Economics, Finance and administrative sciences. ISSN 1450-2275 Issue 12

Anderson, B. 1995. *Current issues in financial services*. London, Macmillan presses LMD.

Bain, J.S. 1951. *The relation of profit rate to industry concentration : American manufacturing , 1936-1940.* Quarterly Journal of Economics, 65(3),293-324.

Baltagi, B.H., 2001. *Econometric Analysis of Panel* Data (2nd ed.). John Wily and Sons, Chichester.

Baumol, W.1982. Contestable markets: *An uprising in the theory of industry structure*. American Economic Review, 72(1), 1-15.

Berger, A.N. 1994. *The project structure relationship in banking: tests of market power and efficient-structure hypothesis.* Journal of money, credit and banking, 26.

Berger Allen N.1995.*The Profit-Structure Relationship in Banking - Tests of Market-Power and Efficient-structure Hypothesis*. Journal of Money, Credit and Banking, 27(2), 404-431.

Bikker, J. A., J.M. Groeneveld, 2002. *Competition and Concentration in the EU Banking Industry.* Kredit and Kapital, 33, 62-98.

Bikker, J. A., and K. Haaf, 2002.*Competition, Concentration, and Their Relationship: An Empirical Analysis of the Banking Industry* Journal of Banking and Finance, Vol.26, No.11, 2191-2214.

Casu, B., & Girardone, C.2006. *Bank competition, concentration and efficiency in the single European market.* Manchester School , *74* (1), 441-468.

Chirwa, E. (2003). *Determinants of commemrcial banks' profitability in Malawi: a cointegration approach.* Applied Financial Economics , *13* (8), 56-571.

Chirwa, Ephraim.W.T.2001. *Market Structure, liberalization and performance in the Malawian banking industry.* AERC Research paper 108, Nairobi.

Chowdhury, Abdur.R. 1996. *An empirical test of the structure-conduct-performance paradigm in the Asian and Pacific basin countries*. Journal of the Asian Pacific Economy, 1(2), 233-251.

Civelek M.M. and M.W. Al-Alami.1991.An *empirical investigation of the concentration- profitability relationship in the Jordanian banking system*. Savings and Development, 15(3), 247-259.

Clarke, G., R. Gull, M. Soledad Martinez Peria and S.M. S¶anchez, 2003. *Foreign bank entry: experience, implications for developing economies, and agenda for further research.* The World Bank Observer 18, 25-59.

Clark, J.A. 1986. *Single- equation, multiple regression methodology: Is it an appropriate methodology for the structure- performance relationship in banking*. Journal of Monetary Economics, 18(3), 259-312.

Corvoisier,S. and Gropp, R.2002. *Bank concentration and retail interest rates*. Journal of Banking and Finance, 26(1), 2155-2189.

Demsetz, H.1973. *Industry structure, market rivalry and public policy*. Journal of Law and Economics, 16(1), 1-19.

Du Plessis, S.A., and E.S. Gilbert,2007. *Mark-ups and competition – a comparison of the profitability of listed South African and American industrial companies.* Paper presented at the bi-annual conference of the Economic Society of South Africa, held in Johannesburg, 10-12 September.

Evanoff, D.D. and D.L. Fortier.1988. *Reevaluation of the structure-conduct-performance paradigm in banking.* Journal of Finacial Services Research, 1(3), 249-60.

Gual, J., and D. Neven,1992. *'Deregulation of the European banking industry', CEPR*, Discussion Paper, No.703.

George, K.D. and C. Joll, 1971. *Industrial organization : Competition, growth and structural change*. London: George Allen and Wnwin'

Gilbert, R.A.1984. *Bank market structure and competition: A survey*. Journal of Money, Credit and Banking, 16(4), 617-45.

Greene, W. H. (2003). *Econometric Analysis.* New Jersey: Prentice Hall.

Hahn, Franz. R. 2008. *Test for profitability and contestability in banking: Evidence from Austria*. International Review of Applied Economics, 22(5), 639-653.

Hannan, T.H. 1991. *Foundations of the structure–conduct–performance paradigm in banking.* Journal of Money, Credit, and Banking 23: 68–84.

Ho, T. and Saunders, A. 1981. *The determinants of banks interest margins : Theory and empirical evidence.* Journal of Financial and Quantitative Analysis, XVI(4), 581-600.

Ikhide, S.2000. *Efficiency of commercial banks in Namibia.* BON occasional paper No.4.

Jansen, D., and J. de Haan, 2003. "*Increasing Concentration in European Banking: A Macro Level Analysis" De Nederlandsche Bank Research Department*, Research Memorandum WO No. 743,

Kirkpatrick, C., Murinde, V. and Tefula, M. 2008. "*The measurement and determinants of x-inefficiency in commercial banks in Sub-Saharan Africa*", European Journal of Finance, Vol. 14, No. 7 , 625-639.

Martinez Peria, M.S. and A. Mody,2004. *How foreign participation and market concentration impact bank spreads: evidence from Latin America.* Journal of Money, Credit and Banking 36, 511-537.

Maudos,J. (1998), *"Market Structure & Performance in Spanish Banking Using a Direct Measure of Efficiency,"* Applied Financial Economics, 8.

Misganaw, H. 2007. *Analysizing cost and alternative profit efficiency of private Commercial banks in Ethiopia: A stochastic frontier approach.* Master's thesis, Addis Ababa University, unpublished.

Molyneux, P. and W.Forbes. 1995. *Market structure and performance in European Banking* . Applied Economics, 27(1), 155-159.

Morris, C. 1984. *The competitive effects of interstate banking.* Economic Review of Federal Reserve Bank of Kansas City, July/August, 18-31.

Mugume, A. 2007. *Market structure and performance in Uganda's bank industry.* Paper presented to the African Econometrics Society. Cape Town.

Muluneh, A.2006. *Private commercial banking in Ethiopia : efficiency analysis.* A National bank of Ethiopia paper presented at the forth international conference on the Ethiopian banking organized by the Ethiopian economic association .

Nannyonjo, J.2002. *Financial Sector reforms in Uganda (1990-2000): Interest rate spreads, market structure, bank performance and monetary policy. PhD Dissertation.* Stockholm: Economics Department, University of Goteborg.

Okealaham, C.2004. *The banking sector in Southern Africa: a test of the structure-performance hypothesis. International Journal of Management and Decision Making , 5*, 216-245.

Peltzman, S.1977. The gains and losses from industrial concentration. Journal of law and economics, 20, 229-263.

Scherer, F.M. and D. Ross. 1990. *Industrial market structure and economic performance*. Boston: Houghton Mifflin Company.

Schumpeter, J.A. 1911. *A theory of economic development*. Cambridge MA, Harvard University press.

Smirlock, M.1985. *Evidence on the relationship between concentration and profitability* in banking. Journal of Money, Credit and Banking, 17(1), 69-83.

Spathis, Kosmidou, K. and Doumpos, M. 2002.*Assessing profitability factors in the Greek banking system: A multicriteria methodology.* International transaction in Operation research, 9, 517-530.

Waterson, M. 1984. *Economic theory of the industry*. Cambridge: Cambridge University Press.

Wong, J.C., 2004. *Market Structure, Competition and Intermediation in the Latin American Banking Industry*. Available at SSRN: http://ssrn.com/abstract=591122" 2

Yeyati, Eduardo Levy, and Alejandro Micco, 2007. *"Concentration and Foreign Penetration in Latin American Banking Sectors: Impact on Competition and Risk."* Journal of Banking and Finance, 31 (, 1633-1647.

Yigremachew, B. 2008. Determinants of private banks' profitability in Ethiopia: Panel data evidence. The six international conferences on the Ethiopian economy, Addis Ababa.

Zamorano, L.R.M. 2004. *Economic efficiency and frontier techniques*. Journal of Economic surveys, 18(1), 33-77.

Appendix A. Determinants of Profitability

Table A1. Deposit and loans of banks, 2000-2001. (In millions of birr)

Year			*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*
Total Deposit	Public		10075.5	11640.9	13299.2	16718.2	16350.6	18149.	20070.7
	Private		33.6	363.2	582.4	987.0	1525.7	2234.4	3077.3
Total loans	Public	Outstanding	6505.2	9338.4	10789.5	11619.1	13329.5	14164.0	13317.5
		Disbursement	3338.1	4303.8	3588.3	3786.8	3274.9	2919.1	2551.1
		Collections	2263.0	3127.1	3318.8	3355.0	3339.7	2775.2	3243.5
	Private	Outstanding	123281	227402	443.9	777.9	1173.1	1909.9	2650.6
		Disbursement	-	-	253.5	854.9	922.5	1176.7	1475.3
		Collection	-	-	207.7	673.6	777.3	767.2	1055.7
Branch Network	Public		215	217	220	221	221	222	223
	Private		1	19	31	38	58	77	92
COM. Banks	Private		1	3	4	4	6	6	6
	Public		2	2	2	2	2	2	2

Source: NBE

Table A2: Private commercial banks, 1994- 2009

No.	Bank Name	Ownership	Year Of Establishment
1	Awash International Bank (AIB)	Local Private	1994
2	Dashen Bank(DB)	Local Private	1995
3	Bank of Abyssinia(BOA)	Local Private	1995
4	Wegagen Bank (WB)	Local Private	1997
5	United Bank(UB)	Local Private	1998
6	Nib International Bank(NIB)	Local Private	1999
7	Cooperative Bank of Oromia(CBO)	Local Private	2005
8	Lion International Bank(LIB)	Local Private	2006
9	Oromia International Bank	Local Private	2007
10	Buna International Bank(BIB)	Local Private	2009
11	Birhan International Bank *	Local Private	2009

* Others include Zemen Bank, Debub Global Bank, Enat Bank S.C., Abay Bank, Hawassa Bank are all potential entrants except Zemen.

Source : own compilation

Table A3. Indicators of performance (profitability and loans), 2000-2009

Banks	Indicators	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AIB	ROE	20.4	22.0	9.1	14.3	24.5	26.2	39.2	37.2	27.7	21.2
	ROA	2.1	2.6	0.9	1.2	2.0	2.1	3.6	3.7	3.3	2.5
	L& Adv.	**447**	**561**	**637**	**800**	**946**	**1290**	**1872**	**2512**	**2738**	**2713**
DB	ROE	25.2	41.5	31.4	28.6	45.6	40.2	48.0	47.6	45.5	30.48
	ROA	2.0	3.0	2.6	1.9	2.9	2.9	4.1	4.3	4.2	2.85
	L& Adv.	**533**	**714**	**872**	**1267**	**1690**	**2232**	**3164**	**3988**	**4382**	**4452**
BOA	ROE	17.1	24.4	5.1	5.1	28.2	32.4	30.6	23.6	5.2	21.4
	ROA	2.9	4.0	0.6	0.5	3.3	3.7	4.1	2.7	0.5	0.1
	L& Adv.	**522**	**687**	**669**	**809**	**962**	**1234**	**1963**	**2305**	**2817**	**2709**
WB	ROE	14.4	24.5	19.8	16.1	34.6	35.1	37.0	37.8	31.4	25.1
	ROA	1.4	2.4	2.0	1.7	3.9	3.9	4.2	4.4	4.6	3.9
	L& Adv.	**262**	**344**	**406**	**571**	**738**	**1002**	**1593**	**2155**	**2347**	**2112**
UB	ROE	11.4	13.1	7.4	8.1	10.4	34.3	31.2	24.1	26.9	18.9
	ROA	2.9	3.6	2.0	1.4	1.4	4.0	3.7	4.0	3.9	2.4
	L& Adv.	**88**	**134**	**163**	**290**	**384**	**593**	**1004**	**1410**	**1860**	**2152**
NIB	ROE	3.6	28.9	22.3	15.5	28.2	29.5	27.9	24.8	26.5	23.2
	ROA	0.7	4.6	3.7	1.9	3.5	3.8	3.9	4.0	4.3	3.6
	L& Adv.	**59**	**210**	**324**	**550**	**786**	**1133**	**1475**	**1817**	**2114**	**2220**
CBO	ROE	-	-	-	-	-	**-2.0**	**-3.6**	**1.9**	**8.4**	**1.5**
	ROA	-	-	-	-	-	**-1.7**	**-2.4**	**0.7**	**2.1**	**0.3**
	L& Adv.	-	-	-	-	-	**3**	**127**	**239**	**322**	**596**
LIB	ROE	-	-	-	-	-	-	-	-3.6	-1.5	**2.07**
	ROA	-	-	-	-	-	-	-	-1.8	-0.1	**0.49**
	L& Adv.	-	-	-	-	-	-	-	**75**	**182**	**470**

Where: L & adv. are gross loans and advances (in millions of birr) while ROA and ROE are in percents.

Source : NBE

Table A4: Performance indicators (in %), 2000-2009.

Banks	Indicators	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AIB	C/A	**12.4**	**11.5**	**11.8**	**9.8**	**8.8**	**10.2**	**10.3**	**11.3**	**12.4**	**11.7**
	L/A	**58.9**	**61.9**	**58.3**	**57.1**	**53.5**	**58**	**63.4**	**65.6**	**56.8**	**42.2**
	D/TDD	22.3	18.1	17.9	21.1	19.2	21.8	22.4	19.4	**21.3**	**22.8**
DB	C/A	**8.9**	**8.5**	**8.2**	**6.5**	**6.4**	**7.1**	**8.5**	**9.0**	**9.3**	**9.3**
	L/A	**61.6**	**64.9**	**58.7**	**63.6**	**63.1**	**65.3**	**69.6**	**66.0**	**56**	**45.7**
	D/TDD	30.3	29.5	33.0	28.8	28.6	28.0	28.1	28.0	26.3	**27.6**
BOA	C/A	**17.1**	**16.4**	**12.4**	**11.2**	**12.2**	**12.4**	**14.2**	**11.9**	**9.8**	**9.5**
	L/A	**72.7**	**76.7**	**58.6**	**60.7**	**60.7**	**59.9**	**69.3**	**67.9**	**65.9**	**49.5**
	D/TDD	16.7	14.5	14.7	19.2	17.5	20.5	18.5	18.8	22.6	**27**
WB	C/A	**9.7**	**9.9**	**9.9**	**10.5**	**11.3**	**11.1**	**11.3**	**11.6**	**14.7**	**16.3**
	L/A	**50.9**	**59**	**62.9**	**64.2**	**64.7**	**62**	**70.5**	**61.9**	**56.9**	**41.3**
	D/TDD	32.0	35.4	33.4	35.7	43.6	47.9	40.8	44.4	40.2	**50.2**
UB	C/A	**28**	**29.4**	**28**	**19.4**	**14.2**	**11.7**	**11.9**	**16.5**	**14.4**	**11.2**
	L/A	**61.5**	**62.6**	**51.9**	**61.8**	**56.9**	**55.3**	**62.8**	**64.6**	**57.2**	**46.3**
	D/TDD	22.2	21.4	22.2	20.8	22.1	22.0	26.7	23.5	27.6	30.6
NIB	C/A	**25.3**	**18.5**	**18.5**	**14.1**	**13.9**	**12.9**	**14.1**	**16.3**	**16.4**	**15.2**
	L/A	**37.3**	**62.5**	**60.7**	**62.2**	**63.0**	**65.4**	**72.8**	**69.7**	**58**	**46.2**
	D/TDD	47.1	29.5	27.5	25.8	27.5	23.9	22.5	22.5	27.2	**31.3**
CBO	C/A	-	-	-	-	-	**86.8**	**54.5**	**30.7**	**21.8**	**15.3**
	L/A	-	-	-	-	-	**2.3**	**56.7**	**56.4**	**47.5**	**58.3**
	D/TDD	-	-	-	-	-	**86.7**	**65.3**	**60**	**57.4**	**39.5**
LIB	C/A	-	-	-	-	-	-	-	**50.8**	**29.8**	**20.2**
	L/A	-	-	-	-	-	-	-	**28.2**	**31.7**	**49.4**
	D/TDD	-	-	-	-	-	-	-	47.5	41.9	43.5

Where: C/A and L/A are capital -asset and loan -asset ratio, respectively. D/TDD is demand- total demand deposit ratio.

Source: Own calculation based on data from NBE.

Table A5: Market share of deposits, assets and loans per banks

Banks	Market share of:	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
AIB	Assets	24	22.5	21.3	20.1	19.5	18.2	18	17.2	16.5	16.8
	Deposits	26.8	24.4	22.8	21.4	20.8	19.8	19.8	18.0	17.4	16.8
	Loans	23.4	21.2	20.7	18.7	17.2	17.2	16.7	17.3	16.3	15.6
DB	Assets	27.4	27.3	28.4	28.6	29.4	27.9	27.6	27.1	26.8	25.5
	Deposits	27.4	28.8	29.2	29.8	30.3	28.9	28.4	28.2	27.7	26.9
	Loans	27.9	26.9	28.4	29.6	30.7	29.8	28.3	27.5	26.1	25.6
BOA	Assets	22.7	22.2	21.8	19.1	17.4	16.8	17.2	15.3	14.6	14.3
	Deposits	21.9	21.2	22.2	19.8	17.7	16.6	16.8	15.8	15.6	15.2
	Loans	27.3	25.9	21.8	18.9	17.5	16.5	17.5	15.9	16.8	15.6
WB	Assets	16.3	14.4	12.3	12.8	12.5	13.2	13.7	15.7	14.1	13.4
	Deposits	16.9	14.6	12.6	13	12.2	13.2	13.7	15.8	13.3	12.6
	Loans	13.7	13	13.2	13.3	13.4	13.4	14.2	14.9	14	12.1
UB	Assets	4.5	5.3	6.0	6.7	7.4	8.8	9.7	9.8	11.1	12.2
	Deposits	3.5	4.2	4.6	5.3	7.4	8.8	9.4	8.9	11.0	12.3
	Loans	4.6	5.0	5.3	6.8	7.0	7.9	9.0	9.7	11.1	12.4
NIB	Assets	5.0	8.3	10.2	12.7	13.7	14.1	12.3	11.7	12.5	12.6
	Deposits	3.5	6.8	8.5	10.8	11.6	12.5	11.2	10.9	11.1	11.2
	Loans	3.1	8.0	10.6	12.8	14.3	15.1	13.2	12.5	12.6	12.7
CBO	Assets	-	-	-	-	-	1.1	1.4	1.9	2.3	2.7
	Deposits	-	-	-	-	-	0.15	0.76	1.6	2.2	2.7
	Loans	-	-	-	-	-	0.04	1.1	1.7	1.9	3.4
LIB	Assets	-	-	-	-	-	-	-	1.2	2.0	2.5
	Deposits	-	-	-	-	-	-	-	0.71	1.7	2.4
	Loans	-	-	-	-	-	-	-	0.52	1.1	2.7

Source: NBE

Appendix B. Descriptive Statistics of the Variables Used in the Regression

Table B1: OLS Regression Results

Variables	Log-linear model	
	Coefficient	Standard error
lnhhit	19.14472	12.27672
lnsit	-3.661221**	1.606072
lnassetit	4.966249*	1.535009
lncapastit	-.2396694	.6358172
lnltoastit	.4914741	.7968109
lnddtdepit	.5608278***	.3177771
lnmkdept	-2.532158	1.931764
lnmkgrot	2.757538***	1.383214
Constant	-158.8838	105.955
R^2	0.6269	
Adj.R^2	.5660	
F-test	F(8, 49) = 10.29 Prob > F = 0.0000	
Number of observations	58	

* Significant at 1% level, ** Significant at 5% level, *** Significant at 10% level

Table B2: Pooled OLS Regression Results

Variables	Log-linear model	
	Coefficient	Robust standard error
dlnhhit	12.45191	10.03168
dlnsit	-0.1262563	1.518
dlnassetit	0.6700233	1.477632
dlncapastit	0.2968195	0.5767313
dlnltoastit	0.5396988	0.6343568
dlnddtdepit	0.9116296	0.6605306
dlnmkdept	1.028031	1.767446
dlnmkgrot	2.542661*	1.307981
Constant	0.0029718	0.0621843
R^2	0.2628	
F-test	F(8, 49) = 2.88 Prob > F = 0.0103	
Number of observations	58	

* Significant at 10% level

Declaration

I declare that this paper is my original work and has not been presented for a degree in any other university, and that all sources of material used for the paper have been duly acknowledged.

Declared by

Eshetu Getahun

Certified by