Effects of Technological Innovations on Bank's Financial Performance in Industrialized Countries

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Submitted to the
Institute of Graduate Studies and Research
in partial fulfillment of the requirements for the degree of

Master of Science
in
Banking and Finance

Eastern Mediterranean University
December, 2016
Gazimağusa, North Cyprus

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ABSTRACT

In this study, we analyzed the impact of electronic banking services on the profitability performance of the banks. This effect is explained in relation to ROE and ROA as a measure of banks profitability ratio in 8 industrialized countries from the period 2009 to 2013, by dynamic panel data method.

In this case, LLC, IMP and PP tests are done to investigate the order of integration of the variables and the Hausmann specification test carried out to select the best model for our regression analysis. It is found that all the variables are stationary at levels with intercept and trend and Fixed Effect Model revealed as most appropriate for the regression analysis. The findings of the study indicated that overall of electronic banking systems have a significant positive effect on the bank's benefit execution measures ROA and ROE respectively. Other results were found with an inverse relationship due to diversity in the different countries at the level of development, poor technological innovation frameworks as well as the socio cultural ideology of the customers.

Keywords: Banks Performance, Return on Asset, Return on Equity, Profitability, Electronic Banking, Panel data analysis.

ÖZ

Bu çalışmada, elektronik bankacılık hizmetlerinin bankaların finansal performansı üzerindeki etkisini analiz edilmiştir. Çalışmada 2009 yılından 2013 yılına kadar 8 sanayileşmiş ülkede bankaların kârlılık analizi için iki rasyo kullanılmıştır. Bunlar bir özkaynak getirisi(ROE) ve aktif karılılık (ROA) dinamik panel veri yöntemiyle analiz edilmiştir.

Çalışmanın bulguları, elektronik bankacılık sistemlerinin genelinin, gelişmiş sekiz ülke üzerinde bankacılığının finansal performanslarına olan etkileri analiz edilmiş ve pozitif bir sonuç elde edilmiştir. Ancak gelişmiş ülkelerde de zayıf teknolojik altyapı çerçeveleri ve müşterilerin sosyo-kültürel yapıları baz alındığında ters ilişki söz konusu olmuştur.

Anahtar Kelimeler: Bankaların Performansı, Aktif Kârlılığı, Özkaynak Kârlılığı, Kârlılık, Elektronik Bankacılık, Panel veri analizi.

DEDICATION

This humble work is dedicated to Almighty God and my beloved Mother.

Mami Juliana Fongwi

Whose prayers, love, and encouragement have been always a source of motivation for every single achievement I made in my life.

ACKNOWLEDGMENT

I give God all the Glory for being faithful to His words in my life.

My sincere appreciation goes to Prof. Dr. Hatice Jenkins for her valuable support in my academic life.

I sincerely appreciate Assoc. Prof. Dr. Nesrin Özataç, Assoc. Prof. Dr. Korhan Gokmenoglu, Asst.Prof.Dr. Nigar Taşpınar for guiding me in preparing this thesis. My best and humble friend Mr Victor Tita for supporting me in realizing this objective.

To my loving and caring family, I say thank you for your continuous love and support.

Finally, I deeply appreciate all my lecturers who enhanced my knowledge during my study in the department of banking and finance.

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LIST OF ABBREVIATIONS

ATM	Automated Teller Machine
BF	Bank Performance
BLUE	Best Linear Unbiased Estimator
CBFA	Banking Finance and Insurance Commission
DFSA	Danish Financial Supervisory Authority
DW	Durbin Watson
E-VIEW	Econometric View
FMA	Financial Market Authority
FSMA	Financial Service and Market Authority
GDP	Gross Domestic Product
GVA	Gross Value Added
IMF	International Monetary Fund
IMP	IM Pesaran and Shin
LLC	Levin Lin and Chu
NBI	Net Banking Income
OLS	Ordinary Least Square
OSFI	Superintendent of Financial Institutions
POS	Point of Sale Terminal
PP	Phillip Perron
PPP	Purchasing Power Parity
ROA	Return on Asset
ROE	Return on Equity
SIFIs	Systematically Important Financial Institutions

Chapter 1

INTRODUCTION

The banking sector has fostered in technological innovated products and utilization in recent years. Banks are more concentrated in acquiring products that will add more value and generate higher profits for their stakeholders (Mishkin, 1989). The rapid growth of business activities in the finance market has gave birth to the manifestation of new electronic banking products in the banking sector (Berger et al, 1996; Rocket, 2006).Thus, newly existing services offered by the banks to the customers is of great significance.

The extension of technological based applications such as telephone or mobile banking, internet and installed automated teller machines & point of sale terminals machines networks have contributed significantly to a high customer demands, thereby eliminating their time commitment and space(Lichtensten et al.,2006; Jenkins, 2006). These services have reduced the cost of banking operations because there are available twenty four hours to seven days. The increasing customer's demands for electronic based services have empowered banks to embark and invest heavily in this field (Birch& Young 1997).

The electronic based services offered by banks have contributed to cost advantages, high profitability as well as reduced the risk exposure of the banks. Furthermore, studies shows that if there is an increased demand for electronic banking services by

the customers, the initial cost of investment and the profit will be realized in a very short period of time (Kahn et al., 2005; Kemppainen, 2008). In a crucial manner, these electronic based services have improved on the bank cash management in working capital services including the inventory and day to day financial transactions (Saunder, 2008). The services are more profitable and generate fee-based non interest revenue to the banks (Furst et al., 2002).

Empirical findings, investigated in some developed and developing countries indicate that electronic banking has improved on the banks profitability performance (Pigni et al., 2002; Ciciret et al., 2009). As a result, the technology based products and high customer demand for those services have provided significant advantages to the banks as well as extending the usage of these services to other areas. However, some developing and less developed countries were unable to produce the expected results due to the lack of electronic banking infrastructural investments and the customers tend to concentrate on other local traditional distributed networks (Al-Samadi &Wabal, 2011; Hosein, 2013).

1.1 Goal of the Survey

In this research work, we investigate the effects of electronic banking products on the profitability performance of the banks through eight industrialized countries such as Canada, Japan, France, Belgium, Denmark, Netherlands, Austria, and Italy over the period 2009 to 2013. As profitability measures, return on asset and return on equity are tested against electronic banking products like the number of bank's cards irrespective of their functions, the ratio of Point of sale terminal machines, the total number of automated teller machines per country and the number of customers

benefiting from these services. In this case, two research questions are taken into consideration.

1.1 Research Questions

The following questions are considered relevant for this research work

1. To what extend has electronic based banking products affected the profitability performance of the banks? Or what are the relationships between the dependent and independent variable?
2. How have these new electronic banking services contributed to the economic growth of these countries?

1.2 The Scope of Research Work

This research work will be based on the investigation of the effects of electronic banking products such as banks cards (debit/credit), point of sale terminal and automated teller machines on bank gainfulness execution measures. In other words, the aim is to study the long term and also the causal relationship between the variables to the profitability measures of the banks (ROA and ROE). The empirical study is based on sectorial data from eight industrialized countries consisting of a large sample size over the period 2009-2013 and a dynamic panel data is employed as a method of analysis. Hence, this research work is very important to stakeholder and policy maker in improving on their wealth which in turn embarks on the economic growth.

1.3 The Structure of Research Work

This work will be divided into the following chapters; Chapter one is the introduction part which consists of the significance of technological innovation to the profitability performance of the banks, the objective & scope of research work, and finally structure of the thesis. The next chapter is the literature review on the previous

studies carried out by some accredited scholars and researchers on the effects of electronic banking products on banks benefit measures. This is followed by chapter three which covers the study on the background of the different banking systems in all the eight industrialized countries like Canada, Japan, France, Belgium, Denmark, Netherlands, Austria and Italy including the banking framework, the number of banks operating in each country, the regulatory authorities and the impacts of banking on the economy of every nation. Chapter four defines the data collection and the strategy or methodology of the research work. The firth chapter is the empirical & observational analysis and lastly the sixth chapter which is the conclusion summarizing the outcome of the research work with recommendations.

Chapter 2

LITERATURE REVIEW

The banking sector is one of the most important areas that technological innovation has manifested itself. The electronic banking networks have created a high return, low cost advantage and reduced the risk exposure of the banks. Arnaboldi and Claeys (2008), study a comparative conventional banking relationship of electronic banking systems in Spain, Finland, Italy, and UK respectively. They used dynamic panel data as a method of analysis. Results show that electronic banking applications have positively contributed to the profitability performance of the banks. Their findings also indicate that internet banking has significantly increased the banks benefit execution measures as well as competition in the sector.

Pigni et al. and Hasan (2002) investigated the relationship between electronic banking services to banks performance based on Italian financial system. They found that electronic banking services especially internet banking products has affected the bank's profitability performance positively. Hasan (2002) and Ciciret et al. (2009) also reported that a significant relationship exist between operational risk and electronic banking products. The results show that ROA, ROE, stock return, commission and fee income have a positive effect on the electronic banking activities. Kagan et al. (2005), results show that electronic banking systems have directly affected the asset quality, ROE performance and operational profitability of the banks in a positive way.

Malhotra and Singh (2006,2007,2009),Al-Samadi &Wabal (2011), Hosein (2013), Gutu (2014), investigated the relationship between electronic banking systems to banks performance in some developing countries like Romania, Jordan, India and Pakistan, using panel causality test method to run their analysis. Their results indicate that electronic banking services have a positive effect on the bank's profitability performance, thereby reducing operational cost. Sumra et al. (2011) and Asma (2007) reported that electronic banking systems have recovered the initial setup cost exceeded in a relatively short period. However, these have increased electronic banking activities, expands customer based with a significant positive effect on bank's profitability performance.

Robert De Young, William Lang, Daniel L, Nolle (2007) carried out studies on impact of electronic banking services on banks benefit execution measures. They used data in their analysis collected from 424 community banks in the United States. They found out that electronic banking products have affected the bank's gainfulness execution positively. In other words, the utilization of these services related with deposits for accounts check have also increased brokered deposit as well as the average wage rate of the employees. The findings of De Young and Delgado (2005, 2006) also indicate that electronic banking networks or channels have generated more economies of scale as compared to traditional available distributed channels.

Saloner and Shpard (1995) investigated the relationship between automated teller machines on banks probability measures in USA from the period 1971 to 1979. Their result reveals that electronic banking products such as automated teller machine utilization have a significant positive effect on banks profitability performance.

This result was confirmed by Milne (2006) and the study of Berger(2003) also reveals that banks that have acquired modern technological related products such as electronic banking products has impacted positively on their profitability performance.

On the other hand, some of the findings obtained from developing and developed countries contradict the outcomes. Alam et al. (2007), Al-Samadi & Wabal and Khrawish &Al-Sadi (2011), Hosein (2013), Gutu (2014), examined the impact of electronic banking systems on banks profitability performance in countries like Jordan, Romania, and some Asian countries. Their results show that electronic banking systems also have a negative effect on the banks profitability measures.

Al-Samadi & Wabal (2011), study the relationship between electronic banking activities in Jordan and their results show that the high concentration of customers on traditional based banking products has affected banks benefit execution measures negatively. Hosein and Gutu (2011, 2014) findings in developing countries show that the high cost of infrastructure and insufficient number of customers have reduced the gainfulness execution. The research carried out by Alam et al. and Gutu (2007, 2014), in developing countries also indicate that electronic banking services based on old technology have a negative effect on the banks profitability measures.

Sathye (2005) evaluated the effect of electronic banking system on Australian credit unions over the period 1997 to 2001. He also found out that new technological products have not proven as a tool to enhance banks profitability performance.

There are also some recent research works carried out by the different researchers on the impact of new innovated technological products on profitability performance of the banks in developed and developing countries.

Hartmut, Hoetile, Eusebio, Scornavacca (2012), investigated the relationship between electronic banking systems to banks profitability performance. They employed a systematic and comprehensive reviewed articles of 247peers extracted from key research outlet. Results show that there exist significant positive relationships between electronic banking activities diversification to the bank's profitability performance.

Researchers like Oyewole, Hasan, and Abaenew et al. (2013), evaluated the impact of technological products on the profitability performance of Nigerian banks. They found out that new innovated electronic banking services have rapidly increased the bank's profitability performance. Kingoo, Adua, Nguyen Gakur (2012, 2013) also examined the effects of electronic banking products on Kyenian banks and came out with the same or similar results.

Other researchers like Alhaji.A, Aliyu, Tasmin.R, Josu Takala (2014), also investigated the impact of technological innovation on customer service delivery and business performance in Malaysia. They analyzed their findings by the used of Structural Equation Modeling (SEM) to test for their employed hypothesis. Results indicate that a strong and significant relationship exist between electronic banking to banks profitability performance in Malaysia.

Akhisar, Batu and Necla (2015) conducted studies on the effect of innovated technological products on profitability performance of banks in some 30 European countries over the period 2005 to 2013. They used return on assets and return on equity as banks benefit execution measures. They evaluated their analysis by panel data application and found out that electronic banking products have a positive significant effect on the banks profitability performance.

Ovidiu, Seyed & A.Sargu (2015), investigated the relationship between financial innovated products and banks efficiency in some 24 incorporated Romanian Banks, by the used of PCA and DEA comparative method. They concluded that very few of the banks have acquired new technological innovated products which have increased more efficiency in the banking sector with a significant effect on the profitability performance of the banks.

Inorder to improve on the efficiency level of the banks, Sarkar and Weigelt (2012), indicated that technological innovation have increased by the used of outsourcing in some companies. Their results also analyzed that additional resources provision help to increase the high utilization of electronic banking products. Banks are required to adopt new technology and other innovated services in order to reflect on customer's demands for these products. As a result, the designation and the representation of these products are very important.

Chapter 3

THE BACKGROUND OF EIGHT INDUSTRIALIZED COUNTRIES

The banking sector is deemed as one of the most vital sector that have empowered the economic growth and the society as a whole in any nation. In this light, we are going to study the banking systems of eighty industrialized countries like Canada, Japan, France, Belgium, Netherlands, Denmark, Austria and Italy.

3.1 The Canadian Financial Sector

The financial institutions or money related establishments in Canada are considered as the most secure and soundest foundations or institutions on the planet (the world), reported by the world Economic Forum (Klau Schwah, 2010, 2011). In October 2010, Canadians Royal and the Toronto-Dominion Banks were delegated as the 10^{th} and the 15^{th} most secure banks on the planet respectively. The Commercial banks otherwise called chartered banks in Canada have 18,000 introduced automated teller machines of 80,000 set up branches of banks in the whole nation. Canada is ranked as the first interms of installed automated banking machines per Capita, in this manner profiting from new developed or innovated technogical saving money items like phone and internet banking with the high usage of banks cards (credit/charge cards).

The Canadian budgetary framework is divided into two categories, specifically the Bank of Canada known as the Central Bank and the Chartered banks also referring to as business or commercial Banks. National bank and Commercial or Chartered

banks. The Central bank acts as the government bank which provides and maintains the nation's currency while the chartered banks play the role of a financial intermediary in the Canadian money related framework or financial system. In this manner, the banker's (financiers) bank known as the Bank of Canada sets up financial policies and advances monetary improvements in Canada. Nowadays, banks have expanded their traditional functions by rendering services via investment banking and real estate operations.

3.1.1 The Financial Structure in Canada

The Canadian money related framework is a greater amount of the English Model System which permits or allows smaller number of set up monetary foundations with many developed branches over the nation. There more than 3,000 establishments existing in Canada rendering diverse sort of services to the population with a very high level of competition among the companies. The largest financial intuitions in Canada are more focused or competitive and possessed the largest part of the financial market. These institutions are referred to as ''The Big Five'' and possessed more than 90% of the total assets in the financial market. The biggest Canadian financial institutions incorporate Royal Bank, the Bank of Montreal, Toronto Dominion Bank, the Nova Scotia Bank and also the imperial Commercial Bank in Canada. There additionally exist other residential or domestic budgetary structures or associations in Canada known as the '' Second Tier'' financial institutions including National& Western Bank of Canada, HSBC & Laurentian bank of Canada, Tangerine & Credit Union Alliance(Desjardin banking group) and the ATB monetary establishment. Both the five largest nation banks and the second level money related foundations in Canada have similar or comparable administrative and legitimate powers. The Royal Bank which is one of the huge five is considered as the

main largest bank in Canada interms of its high interest saving accounts and the size of the monetary administrations offered by the bank to the public in general.

However, it is not considered as one the best Canadian bank with regards to its high interest accounts (premium records). This is because saving account does not offer a particular high interest yielding saving accounts. It is exhibited by table 3.1.1 below.

Table 3.1: The Canadian Top Five Banks Characterized Based on Their Bank Deposits and Asset Sizes.

Canadian Banks	Asset Sizes in millions(C$)
Canadian Royal Bank (RBC)	$1,150,357,000,000
Toronto-Dominion Bank (TD Bank)	$1,124,800,000,000
Bank of Nova Scotia (ScotiaBank)	$894,961,000,000
Bank of Montreal(BMO)	$681,458,000,000
Canadian Imperial Bank of Commerce (CIBC)	$478,144,000,000

* *Asset sizes acquired from the different banks' financial records as of Q2 2016*

3.1.2 Banks Operating in Canada

There exist over 82banks with more than 8,000branches operating in Canada. Banks in Canada consist of 30domestic banks, 24subsidiaries of foreign banks, and 28 full administrative remote bank offices or full services foreign banks branches. The banks in Canada have contributed a lot in the financial market, thus serving millions of customers a day. There additionally exist three categories of budgetary foundations in Canada. There are domestic money related establishments known as Schedule one banks, foreign subsidiaries monetary organizations called the Schedule two banks and in addition, expanded branches of remote budgetary foundations or foreign financial institutions referring to as Schedule three banks. These banks are

different from each other interms of the different types of services that they offer to the general public in Canada as explained below:

- **Schedule one financial institutions** otherwise called household or domestic banks are non foreign subsidiaries financial institutions which are authorized by Canada bank Act to receive deposits in Canada. As of September 2016, 30 domestic banks were recorded in Canada.

- **Schedule Two Money Related Organizations** called the outside auxiliaries or foreign subsidiaries banks are permitted to collect deposits by the Canada Bank Act. As of October 2015, 24 of such banks were registered in Canada including three in liquidation.

- **Schedule Three Money Related Institutions** are amplified or extended branches of foreign banks which are granted to carry out business transactions, for example monetary operations in Canada under restriction. These money related foundations are limited by the Canada Bank Act not to receive deposits less than $150,000 in Canada. As of August 2016, 28 of such banks were found in Canada. We also have lending banks only.

- **Lending Banks only** are also known as foreign financial institutions which are prohibited from accepting deposits except from financial institutions**.** There exist four categories of these banks in Canada as of August 2016 that were allowed to extend their branches and effectuate financial operation over

the nation of Canada. These foreign banks are permitted to have branches and complete managing an account exchanges in Canada.

3.1.3 Regulatory and Supervisory Authorities of the Money Related System in Canada

The banking system in Canada is regulated by an authorized body which is approved by the Canada bank Act known as OSFI (Office of the Superintendent of Financial Institutions. This framework is likewise organs like protection (insurance), securities and banks controllers.

The OSFI was made known in 1987 and subjected to regulate budgetary establishments and also act as the main regulators of other institutions in Canada such as insurance and money supply or credit institutions as well as pension or retirement saving plans companies. OSFI plays the following roles:

- Monitors the economic and the financial environment in order to figure out issues affecting the financial institutions.
- Provides accounting and auditing standards.
- Advance and administer regulatory methods in order to promotes the adoption of new procedure designed and policies made to empowered and manage or reduce risk management
- Assured the safety of financial institutions and pensions plans
- It provides input into developing and interpreting the legislation with guidelines

Hence, the actuarial services are provided to the Government of Canada by office of the Chief Actuary, which is part of OSFI.

3.1.4 Canadian Banking Industry and the Economy

The banking sector in Canada has contributed a lot to the well being and to the economic growth of Canada. Canadian has recognized the significance of financial institutions to the economy. However, more than 89% of the population believes that a strong banking industry empowered businesses in Canada both at domestic and international level.

In 2014, the banking industry in Canada contributed 3.3% which is approximately $60billion to the GDP of Canada. Thus, the largest financial institutions in Canada contributed about $8.5billion as corporation tax to the state and $14.8billion as dividend income to millions of Canadian shareholders. Banks together with their subsidiaries paid $24.1billion as benefits and salaries to the Canadian population and $1billion spent in financing small and medium size businesses which is equal to 62.5%. The industry provides jobs to over 280,000 Canadian populations, thus increasing the full time industrial employment of about 26% over the past years.

3.2 The Japanese Financial System

The economy of Japan before the WWII was governed by a conglomerate owned and controlled institution by a family known as Zaibatsu, shares were sold in subsidiaries and control left under family owned, holding and financing was done internally. During this war, production was normalized and the Zaibatsu system kept from reforming by American occupation. Nowadays, the Mitsubishi and the Sumitomo can refer their system to the Zaibatsu system.

As of 1871, the Yen and the currency was established, the Bank of Japan created in 1882 to manage the currency production. After the WWII, the value of the currency was made fixed at ¥360 per US $ (1949-1971). As a major reserve currency, the value of Yen has increased steadily, thereby increasing the purchasing power of the currency for foreign good and making the home products less competitive. The exchange rate of Yen to Dollar increased from ¥239per US$1 to ¥128 per US$1 from 1985 to 1988 by the Plaza Accord. Hence, as a result of the past years financial crisis, the value of Yen raised to about 80 with respect to the US dollars, thereby empowering the domestic industry.

The Japan government is represented by the central bank known as the Bank of Japan which setup economic policies and managed the economic growth via commercial bank credit growth quotas. In order to boost the economy, the Prime Minister Koizumi gave out other companies like mail & post office delivery or post service firms to the private individuals which held more than one quarter of the household assets and represent the largest consumer bank in Japan. In effect, power moved from the government to the private market with about $2billion US in control.

Today, the banking system in Japan is dominated mostly by the Mitsubishi, the Sumitomo, Mitsui and the Mizuho financial agencies. These banks reflect back to the Zaibatsu banking System. However, the majority of the stock market tradings are dominated by Tokyo securities which is the largest followed by other stock exchange markets such as Osaka Exchange which are behind the New York Stock Exchange occupying the third position according to the world ranking. Nikkei 225 is the most popular index compiled by Nihon Keizai Shimbun.

3.2.1 The Japanese Banking Structure

The Japanese financial system is the same as that of other industrialized countries. This system is made up of:

Firstly the commercial banking which is entitled to accept deposits and make loans available to businesses and also trade in foreign exchanges.

Secondly, specialized financial institutions owned by the government and which provide funds to the various domestic economic sectors.

Thirdly, security companies which offer brokerage services and endorse (underwrite) corporate and government securities and in addition exchanging the security markets.

Fourthly, the capital markets which create the means of financing public and private debt and also market residuals corporate ownership.

Lastly, the money markets which provide liquidity to the banks and also provide tools to the Bank of Japan to help in implementing its monetary policies.

3.2.2 Banks and the Economy of Japan

The traditional banking system in Japan was defined into components in the late 1980s. These components are made up of 13 main and 64 minor full service financial institutions or commercial institutions, 7 investment companies, 69 savings & mutual credit companies, and 7 long term credit as well as specialized banks. In the 1980s, due to rapid growth of the banking sector in Japan, other non banking group like credit card institutions, consumer credit companies and leasehold established organizations which were exercising some local roles carried out by financial establishments such as given out loans to the general public.

Nowadays, the Japanese financial system has improved as result of rapid growth and consists of the following banking institutions:

- City banks made of 12 Commercial banks which accept savings and provide medium term loans to businesses, industries and agricultural sectors. They were not in a position to regulate the credit and retirement savings funds or pension funds. During the late 1980s, Dai-Ichi Kangyo controls about $241 billion in assets and was created in the 1872 as the First National financial institution. There were other financial institutions established by Zaibatsu such as Fuji & Mitsubishi in 1880s, Mitsui financial company created in 1876 as well as the Sumitomo finance institution in 1895.

- Regional financial establishments which consists of 63 local banks with two third of the financing done by the government of a given state.

- 71 Credit& saving companies which provide loans to medium and large financial productive establishments.

- 3 Financial industries created in Japan by the Meiji government in 1902, which got funds by marketing five years debentures and providing long term loan to large industries. After WWII, extended Credit and Nippon financial companies were created and the financial industries in Japan became private owned institutions.

- 7 Trust Banks, allowed in managing trust and pension funds. The Mitsubishi Trust & Banking and Sumitomo Trust & Banking were considered as the biggest trust banks in the late 1980s holding more than $200billion in assets.

- Postal Saving Bureau known as Saving Banks which consist of more than 23,000 offices over the national territory. It was considered as the largest world saving institutions in the late 1980s with over $500billion in deposit.

- Norinchukin financial establishments controlled by the workers of the fishery and farmer's associations which provide finance or fund to the commercial or financial companies.

- The Japanese Central bank created by 1882 which plays the role of a state bank, thereby managing the supply of money in circulation. Hence 55% of its assets are owned by the government and the rest of 45% by the private investors.

- Bank of Tokyo created by the Meiji government in 1880 with a monopoly for trade financing and to do foreign exchange transactions with the Yokohama Specie Bank. The government gave 1/3 of its capital and also creates correlation or connection with the Japanese central Bank.

- Insurance companies in Japan are considered as the largest in the world due to their purchasing power of more significant life insurance per person than how American does.

- Security Firms such as Nomura, Daiwa, Nikko and Yamaichi were considered as the Big Four security firms created in 1980 having a market value greater than those of most banks. Their market value was significantly larger than American security firms, for example Merril Lynch in Japan.

- Finally , the Ministry of Finance been the Japanese government most powerful agency and made of power linked to the United States Treasury, the reserve service banks as well as the of Commerce. It is also draft the national budget for approval by the legislatures.

3.3 The French Banking System

In France, the financial sector is considered as one of the main private economic sector. There exist some major banking groups in France such as Banque Populaire Group, BNP Paribas, Saving associations, Agricultural Credit institutions, Credit Mutual fund and Postal Bank services which were made known in 1st January 2006. These banking groups are more competitive and control more than 72million current accounts (approximately 80%) with international operations carry out over the whole country.

As of 1984, the concept of universal banking was defined by the France's Banking Act via deregulation of banking and financial activities. Thus, the French groups expanded their activities in some business areas like retail banking, corporate and investment banking. France has 99% of bank penetration rate in the world with complete comprehensive rights which are free of charge to all the basic banking services.

3.3.1 Financial Institutions Operating in Europe and Especially in France

The financial system in France is more competitive with strong records of internationalization. In June 2007, Commission Bancaire known as the Banking Commission recorded the following statistics generated by French credit institutions. There were 450 banking businesses in existence, 40,000 branches of banks, 60million clients, a total of 72million saving accounts, EUR1.100billion in deposits, EUR1, 400billion in credit, 60million customers, 14billion payment transactions processed per year, 48,000 cash points in existence, 3% GDP increase in France with 12,700 installed Point of sale machines over the national territory and a total employment or job offers of 30,000 to 40,000 each year. However, due to its strong international momentum, French credit institutions have extended in more than 84 different nations with more than 1,000 operations, generating about 19% of the businesses externally (Commission Bancaire, December 2005)

According to the French Banking Commission, French credit institutions are more active in Europe and have doubled their operations in the past 5years to 523. As of 2006, 67% of European Foreign Banks were found in France with more than 11% bank accounts with respect to the total assets, that is 103 opened bank accounts in existence (European Banking Commission, October 2007). In 2006, the total net income of some eight main financial institutions in France increases to about 16% as compared to 11% increase in 2005, thus reaching EUR115.5billion. The NBI of three top most internationalized French banking groups increased substantially to about 22% generated by their foreign subsidiaries (Commission Bancaire, 2006). In 2007, 3 major French banks recorded a total of NBI of about 24% overall average as compared to 17% of the major global banks (Banking Commission, 2007).

The French major banks have a solid balance sheets, although the financial crisis has weaken this momentum but the ability of it strong diversification has enable these banks to stand firm and soften the impact of the financial crisis. The banks have contributed a lot to boast the French economy.

3.3.2 The French Banking System and the Economy

The Financial institutions operating in France are the major contributors to economic development over the national territory. This French financial sector has effectively employed more than 400,000people and hired over 30,000people each year.

According to the AFB employment Survey carried out in France in June 2007, the banking sector was considered among the top recruiters and had hired 180,000employees over the past 5years. The banking sector has invested an average of 2.8% of its wages on improving the skills of their workers through training. As of 2006, about 41% of their employees obtained the executive status. The high quality of services offered by the banks has called for more advanced technological investments. Advanced innovated technology has enabled the banks to effectuate 40billion operations per year like payment and stock market operations. The banking sector as a major user of IT services have invested 20% of it expenditure on IT that is a total of EUR9billion as of 2006.

With respect to the CECE (Loan and investment firms consultants, 2006), the French banks contributed a lot to the development of the French economy with the total GDP of about 2.6% and issued more than 1.4billion outstanding loans, which is 5.5times greater than the nation's budget. The issued loans have helped in the realization of housing and household projects. As of June 2007, the sum total of

outstanding consumers and mortgages stood at EUR795 billion which is 11% increase over the years. Hence, a credit institution is one of the industries that have empowered the development of the French economy.

French banks on average in Europe have a high density of extended bank branches and cash points. According to the survey carried out by Banque de France in 2007, more than 40,000 banks and postal bank branches with 48,000 cash points exist in total. Thus, the French banks control over 14.6billion of retail payment operations in 2007. This has enhanced the entire European economy especially the French economy.

3.3.3 The Authorization, Supervisory and Regulatory Authorities of the Financial Sector in France

The various financial institutions are restricted to the same authorization, supervisory as well as regulatory authorizes in France. The different regulatory authorities subjected these establishments to a specific supervision. These include the committee for credit and investment companies, Financial Markets Authorities, Banking Commission, Advisory Committee for Legislation and Financial Regulations (CECEI) as well as the economy Minister. The economy Minister controls all the regulatory authorities in the financial and banking sector after consulting the financial legislation and regulation advisory committee (CCLRF).

3.4 The Belgian Banking System

Belgium as a member of the European Union is considered as a major center for banking and a financial market. As of 1999, EU members such as Belgium and 10 other countries moved into a transitional phase in constructing the Economic and the Monetary Union. In the third phase of transition, member states harmonized their

budgetary and economic policies and introduce a single currency called the EURO. The EURO is the Belgian monetary unit since the 1st January 2002.

In Belgium, the financial system has a high level of capital concentration with 128 banks in existence and 107 are foreign banks. The country's Central Bank is known as the National Bank of Belgium and 50% of the bank's assets is owned by the state. The largest and the oldest bank in Belgium is the Societe Generale de Belgique. This bank is also considered as the largest holding company with specialized financial institutions like agricultural Credit funds and saving banks.

Brussels is considered as the financial capital of Europe and not only Belgium. The Belgian Finance Federation Febelfin (FEBELFIN) was created in 2003 with six professional trade associations which help to enhance the Belgian financial sector. These associations include Association of Belgian banks (ABB), Professional Credit Union (UPC), Belgian Association of Collective Contribution (ABOPC), Belgian Association Member exchanges (ABMB), Belgian Association Manages its capital and advisers to deploy funds (ABGC) and Belgian Leasing Association (ABL).

3.4.1 Belgian Banks and Available Banking Services

Belgium has the largest branch banking per head in the world as well as widely spread electronic banking services. The operations are effectuated by use of computers and ATMs. In Belgium, some of the financial institutions offered online banking services where operations are carried out and runs from the opening of accounts to the use of investment banking services.

All the banks in Belgium charged for each product and services they offered with personal account fees more expensive than in UK and USA. The services they offered such as debit and credit cards with internet banking facilities are charged separately by the different banks. Most of the banks also offer a good number of packages with an annual fee like the fee for internet banking access, banks cards, insurance accounts and ATMs transaction fee. All the banks in Belgium with ATMs accept Bancontact Card, MasterCard, Visa, Credit and Debit Cards.

There exist four major financial institutions in Belgium like the BNP Paribas, Fortis, ING and KBC as well as specialized financial institutions for Expats such as ABK Bank, ABN AMRO, Banque Triodos, Dalen Private Bank, Delta Lioyd Bank, HSBC Expat, ING Belgie, National Bank of Belgium, OBK Bank and Beo Bank. These main banks offer a range of service in English, French and Dutch. There also exists a Belgian Post Office which offers cheaper banking services than the Belgian retail banks and other branches of banks in Belgium such as Citibank, Bank of America, JP Morgan bank and other foreign banks. The Post Office Bank also offer internet banking services and has longer opening hours as compared to retail banks. Many other services are offered such as Offshore Banking, Foreign Exchange Terms, Opening an account, using an account lost Cards, Telephone banking and Banking terminology. All this services offered by the various financial institutions contribute to the well being and the economic growth of Belgium.

3.4.2 Belgian Banking Sector and the Economy

The Belgian banking sector has contributed a lot to the growth of its economy. This can be explain in the various steps including its financial intermediation role in

facilitating the flow of capital between economic agents such lenders and borrowers, its provide jobs, contribute to the national output and generate fiscal revenue.

In 2013, the Belgian banking sector employed more 66,000people, which is approximately about 1.4% of the Belgian total employment and generated €14.2billion of GVA(gross value added) which is equivalent to 4.3% of the national GVA in Belgium. This sector has provided financial products to household, businesses, investors and to the government. Thus, it has improved both productivity and capital efficiency of the Belgian in economy.

Table 3.2: Real GVA of the Belgian Banking Sector, 2001-2013

Year	***Banking Sector GVA constant 2011 €million***	***Banking Sector % Pa Growth***	***Banking Sector GVA % total Belgium GVA***
2003	**10,527**	**(8.7)**	**3.6**
2004	**11,253**	**6.9**	**3.8**
2005	**11,405**	**1.4**	**3.8**
2006	**11,361**	**(0.4)**	**3.6**
2007	**11,094**	**(2.3)**	**3.5**
2008	**10,040**	**(9.5)**	**3.1**
2009	**11,743**	**17.0**	**3.7**
2010	**13,318**	**13.4**	**4.1**
2011	**12,680**	**(4.8)**	**3.8**
2012	**13,864**	**9.3**	**4.2**
2013	**14,062**	**1.4**	**4.3**

Source: National Bank of Belgium, PWC analysis (2016)

The economic impact examined during the 2007 financial crisis shows a reduction in the GDP of 0.7% and 1.5% respectively, which is approximately €2.8 to €5.7billion per annum in relation to the economic growth rate of 1.8% forcast in the long term. This indicates that no further financial crisis will affect the Belgian economy where there is effective regulation. The regulatory reform is in control of the financial sector with the main primary objective which aim at preserving stability in the

financial sector and also ensure that the costs of excess risk taking is absorbed by the bank and the investors instead of businesses and tax payers.

3.4.3 The Main Regulators of Belgium Banking Sector

The Belgian financial market is regulated by the Banking Finance and Insurance Commission (CBFA). The CBFA was created in 2004 by merging the insurance supervisory authority (Controledienst Voor de Verzekeringen-CVD, 1975) with the Banking and Finance Commission (Commisse Voor het Bank en Financiewezen-CBF, 1935).This single agency CBFA regulates all financial markets in Belgium.

The single agency (CBFA) was replaced by the Financial Service and Market Authority (FSMA) thanks to the implementation of 2th July 2010 Law. This new regulatory agency FSMA changes the phase of the supervision of the financial market to another stage of bipartile model known as the Twin Peak Model. The Twin Peak Model formed a new structure with two major objectives in the supervision of the financial sector. These objectives were:

- To maintain stability at the micro and macroeconomic level under the competence of the National Bank of Belgium, this serves as the Belgian Central Bank.
- To ensure equitable and transparent market processes, that is, an appropriate, faire and professional relationship between the market participants as well as maintaining the rule of good conduct to the clients.

These objectives carried out under the competence of the Financial Service and Market Authority and the former Banking Finance and Insurance Commission.

3.5 The Netherland's Banking System

The Netherland's banking sector has considered a major financial institution known as the Central bank with a good number of commercial, savings, mortgages and other banks. In 1814, the Central bank of Netherland was created with it's headquarter in Amsterdam. It plays a role as the state owned bank, lenders bank and also as a banker's bank. It takes control of the operational and fiscal supervision of other officially registered financial institutions. It is also allowed to issued transactions such as foreign exchange transactions, oversees the licensing of security in the domestic market and plays an intermediary role in international payments. It is not permitted to carry out commercial transactions. There also exist other banks with extended branches over the Netherland's territory.

3.5.1 Banks and the Netherland's Economy

The Netherland's banking system is referred to as the Dutch banking system and made up of major banks like the ABN AMRO Bank, ING Groep IV and Rabobank.

The ABN AMRO bank is considered as the largest financial institution in Netherlands and was established in 1824. It offers jobs to over 105,000people with more than 4,500 branches extended in 53 other countries. This bank has a total asset of EUR1, 120,100,000 and ranked as the 8th in Europe and the 13th in the world.

The International Netherland Group (ING Groep IV) offers services such as banking, insurance as well as asset management services. It is also known as the Dutch financial service group. In the late 2009, this financial service was ranked as the 8th by the Fortune Group Global 500.

The Rabobank Group operates as a cooperative and considered as an international financial institution offering a range of services like banking, leasing, asset management services, and insurance with real estate services. This institution is classified as one of the 25th world largest financial institution interms of Tier 1 capital, with more than 10million customers. It has branches extended in 48countries and employed more than 59,000people. These banks have empowered the Netherland's economy and change the standard of living of the population in Netherland.

3.5.2 Banking and Banks Operating in Netherlands

The service sector has more than 2/3 of the Dutch economy and made up of banking, transport and insurance. ABN AMRO, ING and PABO Bank are the major Dutch banks considered among the top 60 banks in the world. They have over 6,500branches in Netherlands and 500 extended branches established in 50 countries. There also exist over 60 subsidiaries banks with branches established in countries like Asia, Europe and America.

The first public bank in Netherlands is known as the ''De Nederlandsche Bank'' (DNB). This bank is also referred to as the Netherlands Central bank, created in 1814 and offers low value of non convertible currency. It became part of the European Central Banks (ESCB) in 1999 with an independent administrative body. The DNB has a crown supervisory Board nominated by a meeting of Executive and Supervisory Board members. DNB is approved to open insurance or pension Fund Companies, thereby insuring that the life insurer is entitled with sufficient resources to run its objectives. It also plays a traditional role in monitoring and supervising all financial institutions.

The Netherlands financial market is composed of Credit unions, Commercial and Mortgage financial companies with four major banks like ING Bank, ABN AMRO Bank which is made of Fortis, RBS and BSCH. It also has a POST Bank, referring to as Post Office with over 7million accounts. This Post Bank offers specialized services to the customers. This system has a good number of credit companies operating in more than 302 institutions. This system is ranked among the top five with a total asset of 87.8%.

Interm of banking System performance measurement, Netherlands banking System is effective and efficient with respect to its administrative expenses ratio to the total sum if it's financial assets. This performance is also measured with respect to its economic profitability interms of its total net income ratio to its total assets. Thus, return on asset as a measure of bank's profitability performance .This system is empowered by regulatory authorities.

3.5.3 Regulating the Netherlands Banking System

The Netherlands have their own currency known as the Dutch Guider. As of the 1999, Netherlands joined the European system of Central Bank and adopt the Euro currency, thereby boosting economic stability and trade in Europe. The functions and the operations of the Netherlands Banks are governed and regulated by the European Federal Reserve Bank. Nout Wellink who is the chief of the European Federal Reserve Bank known as the central bank has joined other countries board members in order to appropriately manage the monetary policy, the Euro currency and to meet the objectives set aside by Europe and Netherlands financial institutions.

Inorder to create a balance atmosphere where the mutual beneficially monetary policies can be implemented, the Netherlands bank known as the Dutch bank carried out the following functions:

- Supervised banks and their institutions in the country, thus, promoting financial stability in Netherlands and in Europe.
- Promote price stability, hold and manage domestic and foreign reserves.
- Make an accurate management of statistics and financial data.
- Print and issue the Europe currency as well as overseeing the payment system.

These have enhanced the regulating system of the Netherlands and Europe banking sectors, thus leading to the growth of the economy as a whole.

3.6 The Danish Banking System

Banks and mortgage Banks in Denmark are considered as the main provider of credit. These banks are classified among the largest banks in Europe with a high degree of concentration measured interms of the GDP ratio. Banking and mortgage banking sectors are made up of a few international financial institutions and many smaller financial institutions, which account for the majority of its total lendings. In Denmark, at the end of 2013, banks and mortgage banks loaned about 80% of it GDP to households and corporate sectors. Banks have empowered the Denmark economic by transforming loan maturity that is converting short term deposits into long term loans, spread risk and ensure an effective payment method between the counterparties. Mortgage banks in particular provide secured loans guaranteed by real properties and financed solely by issuing bonds. Mortgage banks in Denmark

inclusively do not accept deposit and are considered as the largest bond issuing institutions.

The banks and mortgage banks are categorized into two major groups such as systematically important financial institutions (SIFIs) and none systematically financial institutions. SIFIs is known by its activities undertaken which is of great important to the overall economy.

In Denmark, SIFIs are identified once in a year at the group level. CF is a box on SIFIs identification in Denmark. There are two quantitative criteria taking into account for an institution to be qualified as SIFIs which must be attended in two consecutive years. Firstly, the balance sheet of the institution measured as percentage of GDP must be greater than 6.5%. Secondly, the lending measured as a percentage of GDP must be greater than 5%. Lastly, deposit considered as a percentage of total sector deposits must be above 5%. In June 2014, the following financial institutions like Nordea Bank Denmark, Danske Bank, Lyske Bank, Nykredit RealKredit, Sydbank and DLK Kredit were qualified as SIFIs via its criteria.

3.6.1 The Danish Banking Sector and the Economy

According to Eurostat, Denmark norminal GDP was 266.2billion EUR in 2015. The Denmark real GDP growth was between the European Union GDP standard with an annual differential average of 0.0% for the past 10years (2005-2015). In 2015, Denmark recorded a real GDP growth of 1.2% which was below the European Union average of 1.9% and Euro Area average of 1.6%. The statistic of the real GDP growth from 2016 to 2021 is the forecast of the IMF's.

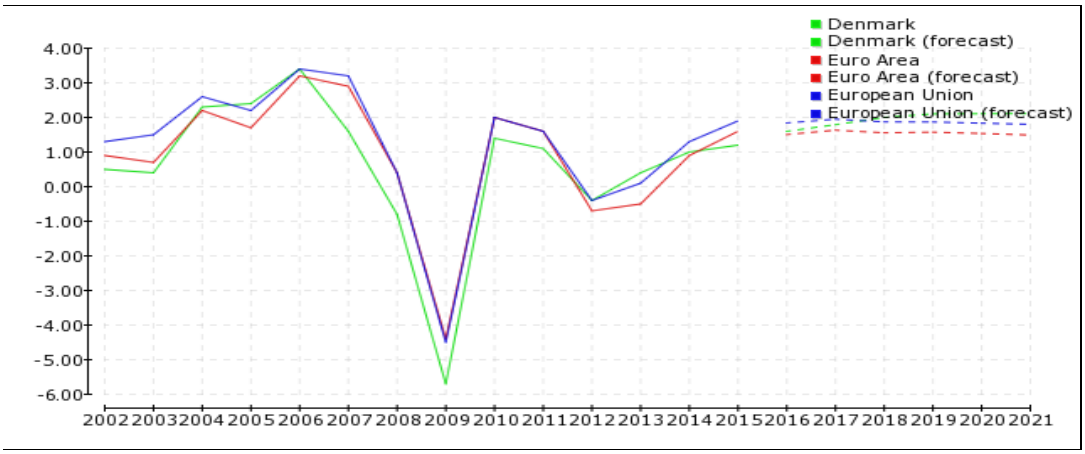

Figure 3.1: Real GDP Growth in Denmark, Source: Eurostat (2016), International Monetary Fund

In 2015, Denmark registered a nominal GDP per capita of 46,900EUR. Denmark recorded a very high average level of wealth, measured interm of GDP per Capita at PPP (Purchasing Power Parity), which is the economic welfare indicator on average. Hence, exceeding the European Union average by 19.9% from 2005-2015. The IMFs estimate of GDP per capita at PPP from 2016 to 2021 is shown on figure 3.2 below.

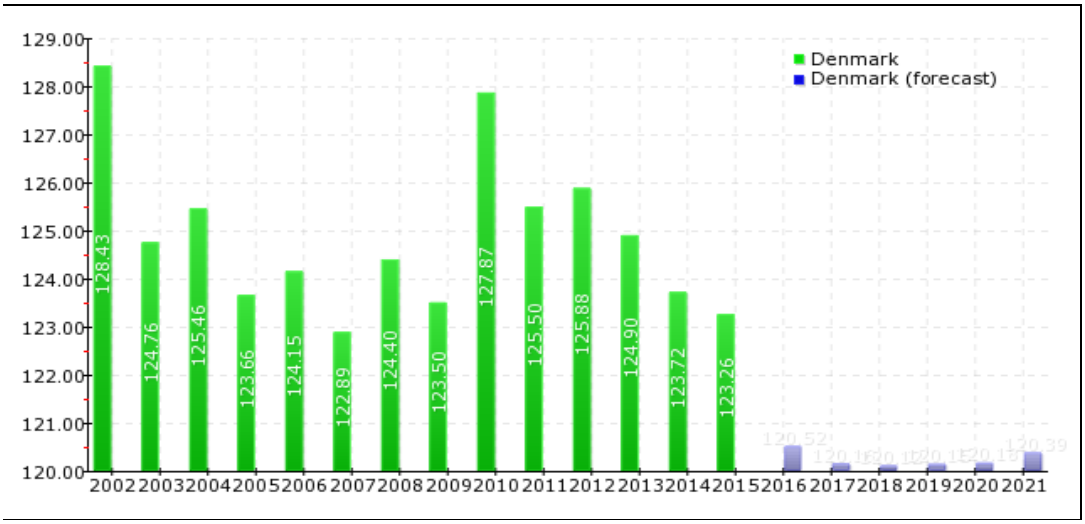

Figure 3.2: GDP per Capita at Purchasing Power Parity (PPP) in Denmark, Source: European Union (2016) =100

The EUR DKK (Euro to Danish Krone) exchange rate ranges from 7.4319 to 7.4697 over the past 11years. It failed to it minimum level in May 2012 and then increased to a maximum level in March 2015. This is interpreted by figure 3.3.

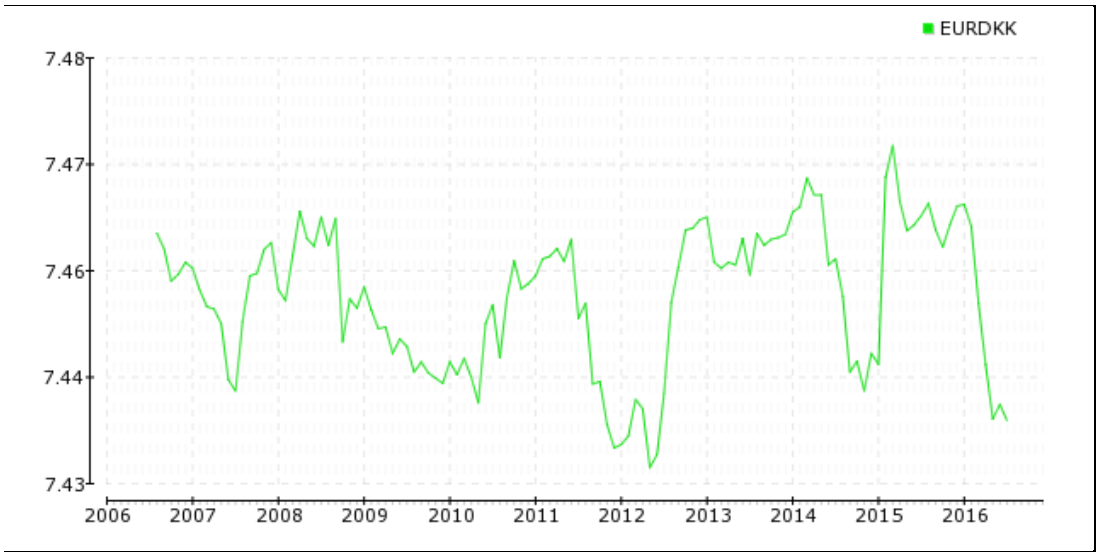

Figure 3.3: Euro to Danish Krone, Source: European Banking Commission (2016)

According to Eurostat, in 2015, the Denmark average Consumer price result was 0.2% more than the European Union average of 0.0% and Euro Area average of 0.0% respectively. The 2016-2021 forcast of inflation rates is given by the IMFs.

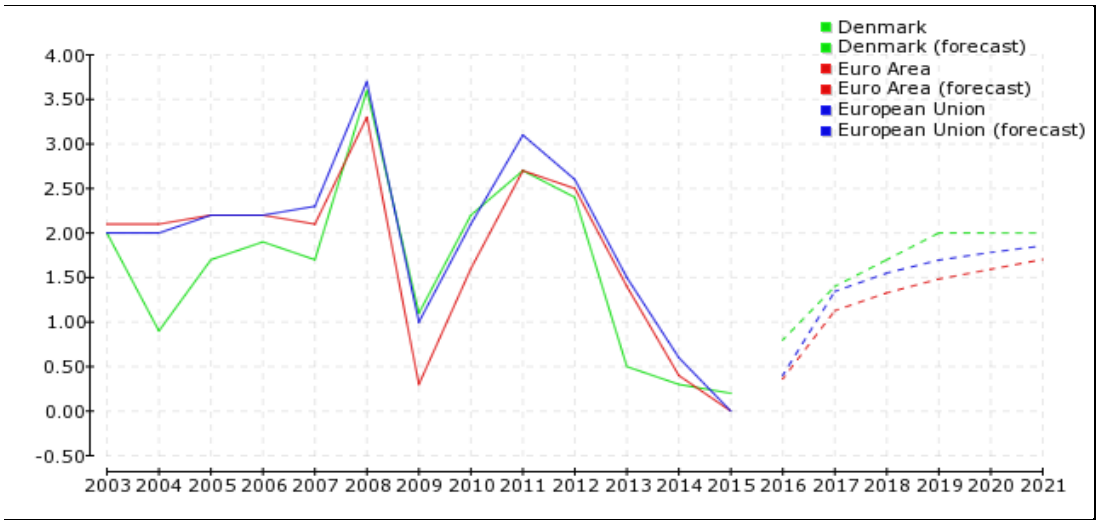

Figure 3.4: Inflation Rate in Denmark, Source: Eurostat, International Monetary Fund (2016)

The report of 2016 by the World Economic Forum's Global Competitiveness indicates that Denmark Financial Market growth recorded 4.8 out of 7.0 maximum and positioned as the 24th from the 138 analyzed economies. Denmark banks were placed on the 41st position with a score of 5.6, measured interms of the soundness of the banks. Interms of confidence and trustworthiness of financial markets, Denmark market took the 16th place with a score of 5.4. All these have help to promote banking in the Denmark economy.

3.6.2 Banks and Banking Structure in Denmark

There exist 111 credit institutions in Denmark. These credit institutions are grouped into different categories as shown on Table 3.6.2.1.

Table 3.3: Number of Banks by Category in Denmark

Category	Number of Banks
Financial companies	**37**
Foreign Financial institutions Branches	**25**
Federal Reserve Banks	**1**
Cooperative Financial companies	**9**
Mortgage or home Equity companies	**7**
Saving institutions	**32**

There also exist 25 branches of foreign banks in Denmark. Table 3.4 indicates the various branches grouped with respect to the country of origin.

Table 3.4: Number of Branches of Foreign Banks in Denmark Grouped by Country of Origin

Country of Origin	Number of Branches
Sweden	**18**
United kingdom	**2**
Luxembourg	**2**
Ireland	**1**
Norway	**1**
Belgium	**1**

3.6.3 The Regulatory and Supervisory Authority of the Denmark Financial Market

In Denmark, the financial markets are regulated by the DFSA (Danish Financial Supervisory Authority) known as the Finanstilsynet, which is under the government authority. Finanstilsynet functions as a secretariat for the Danish Security Council, Financial Business Council as well as for Money and Pension Panel. The Danish Ministers of finance and Economic Affairs are also in charge of regulation in the financial market.

The banks, savings banks and insurance supervisory authorities merged on the 1st January 1988 and gave birth to the Finanstilsynet. In January 1990, the mortgage Credit institution Supervisory Authority from the Danish Housing Agency was transferred to the Finanstilsynet. The ministry of Economic and that of Business and Industry merged in November 2001 and took control over the Danish financial regulatory body known as the Finanstilsynet.

The Finanstilsynet main function is to regulate, supervise and collect statistically data of the financial participants from institutions such as banks, securities and Money market brokers, stock exchanges, insurance companies, clearing and registration organizations, pension funds, investment companies and insurance brokers. It main priority is to:

- Improve on the possibilities of consumers in comparing the prices of products among the different companies
- Intensify the management risk profiles
- Re-enforce the market role of disciple in order to enhance transparency.

This organization known as the Finanstilsynet is structured and managed by executive team composed of 1 chief executive and 3 other executives' directors who work in collaboration with the Economic and Finance minister in charge of business affairs. Finanstilsynet is also part of the European Securities Regulatory committee (CESR) which harmonizes all the financial institutions regulators over the European territory.

3.7 The Austrian Banking System

The banking system in Austria is made up of joint stock banks, private banks, banking houses, postal & private saving banks, mortgage banks, specialized cooperative credit companies as well as building societies. On 2nd of January 1923, the Osterreichische National bank known as the Austrian National bank was established. In 1938, the German Reichsbank took control over the Austrian National bank and re-established it in July 1945. This bank has a fixed capital of $150million by law and 50% of its shares belonging to the state. It acts as a central bank and

preserved the purchasing power of the domestic currency with respect to the foreign currency. It also controls international transactions and make credit institutions requirements for establishment.

There are two major largest and most important credit institutions known as the Osterreichische Landerbank and the Creditanstalt Bankverein. As of 1946, the two commercial banks were nationalized and 40% of their nominal capital was privatized in 1957 to the public. On the 12th January 1997, an indirectly state owned Austrian Bank, dominated by SPO (Social Democratic Party) and the Senior Coalition Party purchased the Creditanstalt Bankverein, thus formed a very strong industrial and financial network. This network owns more than 1/4th of the total assets of all the financial institutions in Austria.

In 2001, the monetary aggregate represented as M1 and consist of the currency and demand deposits stood at $52.9billion. The aggregate symbolizes M2 and made up of M1 and small time deposits, money market mutual fund as well as saving deposits recorded $171.2billion in the same year reported by IMF. In 2002, the Trade index in Austria increase steadily to about 8.71% with a 10.15% growth rate over the past 5years. The market capitalization was $85.815billion in December 2004 with an index of 57.40% at 2,431 compared to the previous year.

3.7.1 Banks and the Austrian Financial Sector

The Austrian financial system is referred to as the universal banking system, where significant potential synergies are offered with high degree of risk mitigation and flexible adaptation to the different environments. According to the sectors, the Austrian banks are established in trade associations. These sectors include joint stock

banks, specialized Credit institutions, housing construction and a single tier mortgage banking sector. There also exist double tier structure like saving banks and Volksbanken as well as three tier structures of Raiffeisen banks.

In the early 1990, Austrian banks extended their roots into the former Czechoslovakia and Hungary. Today, due to dynamic and rapid growth of the banks, the branches are found all over Central and South Eastern Europe with remarkable market shares and subsidiaries in more than 19 countries not excluding Russian and Turkey. At the end of 2003, a total of 987 banks were inexistence in Austria with 21 branches of foreign banks in which ¾ (three quarters) were cooperative institutions and 47 joint stock banks. Austrian banks are highly concentrated with a total market capitalization of 608.1billion Euros, 68.9% of total expenditure ratio, -51.7% cost of staff management.

The largest Austrian banks are BACA (Bank Austria Kreditanshalt), Erste Bank/Sparkassen, BAWAG PSK, Volksbanken group and the Raiffeisen bank group. The bank of Austria which is a subsidiary of the German Bank HVB is considered as the second largest and the largest Austrian Bank. It has 25% of the local banking services in the market and the other 25% owned by RZB banking group and Erste Bank/Sparkassen. The Austrian banking market is made up of all the three structures with BAWAG PSK classified as the 4^{th} largest, occupying 10% of the domestic market. All the largest banks including Volks bank with 6% of its market highly concentrated in the Central and Eastern European as well as in the Balkan markets. Inorder to improve on the competitiveness nature of the banks, new measures are developed in order to regulate the Austrian financial sector.

3.7.2 The Regulatory and the Supervisory Authorities of the Austrian Financial Sector

Banks, pension funds, securities firms and insurance companies are restricted to a particular supervisory authority. The supervisory authorities have faced numerous challenges day by day. Hence, in 2002, Austria reacted to this and established the Financial Market Authority (FMA). FMA is a modern integrated and independent autonomous supervisory authority. In early 2011, a European system of financial supervision (ESFS) was created in order to face the new challenges at the European level.

In Austria, the FMA is subjected to legal supervision under the competence of the ministry of Finance and to monitoring thanks to the Parliament. This Financial Market Authority integrates its duties in the supervision of the banks, especially institutions under the Austrian Central Banks, pension companies, financial securities sector, insurance undertakings and the financial market in general .As to maintain or control stability in the Finance market, a Financial Market Committee was created with representatives from the ministry or department of finance, FMA and from the Austrian Federal Reserve Bank. The Financial Market Authority regulates the activities of all banks as well as those of the various financial corporations in Austria.

The Austrian Federal Reserve Bank known as the National Bank (Osterreichische National bank) ensures stability in the Austrian financial sector, with 50% of its shares owned by the state and the other 50% by the trade unions, employer's, other banks and companies. The role of this bank has changed significantly as a result of its new cooperation with the Economic and Monetary Union. The central bank has

joined the European Central Bank and plays a dual role as follows; it acts as the central bank of Austria and also conducts the European central bank monetary policies.

3.8 The Italian Banking System

The banking system in Italy is made up of two levels. Firstly, the country's central bank and the Bank of Italy. Secondly, specialized financial institutions and commercial banks. The BancoPosta is part of the Italian Post office which offers banking services like saving and current accounts, payment services (post bulletins, cheques and pensions), issue prepaid bank cards, loans, investment services, foreign exchange trading and insurance services. Deutsche bank as an investment and commercial bank with about 550 retail outlets and offers over 1,550 financial services over the nation, employing more than 4,000 workers. This bank is the largest service provider in Italy after Germany. BNP Paribas BNL is a division of BNP Paribas group created in 1913 and considered as one of the main Italian banking group with over 2.5million retail customers, 130thousands professionals and small businesses and about 33thousand businesses of institutions and companies. It accounts for the total revenue of €302billion in 2014. CheBanca serves as a financial institution of Mediobanca with more than 47 offices over Italy, offering services such as deposits and saving accounts, asset management services, mortgage and insurance services via internet and telephone banking. In 2014, Mediobanca employed about 3,570employees. It is a very large bank in Italy with it's headquarter in Milan and operating in retail, investment, private banking and investment management.

Some other financial institutions like Banca Unicredit, Intesa Sanpaolo, Banca Sella, Banca Mediolanum, Veneto Banca, and Credem also offer services in Italy, thereby

improving on the standard of living of the Italian population as well as boosting the economy of the country.

3.8.1 Banking and the Italian Economy

The word bank in the modern era originated from Italy. This word Bank in German language defined as ‘’Blanck’’ which signifies heap or mound and adopted by Italian as ‘’Banco’’ meaning a bench where one kind of money is change into the other by changers in order to carry out banking businesses as well as transactions. The first public financial institution was established in 1157, followed by the Genoa’s bank in 1407 and Barcelona’s bank in 1401 respectively. These banks are defined with respect to their assets and liabilities statement known as the balance sheet. As of 11th October 2008, Italian banking system account for average assets to liabilities ratio has known as the leverage ratio of 12:1 with 86% short term liabilities of the Italian GDP and 43% of the national debt in Italy. In the 14th century Florence, two families namely the Bardi and the Peruzzi dominated the banking sector in Italy with extended branches over Europe. In 1397, Medici Bank considered as the most famous bank in Italy was established by Giovanni di Biccide Medici. The St. George financial institution or Bank referred to as the first government deposit financial institution was created at Genoa Italy in 1407, while the world oldest surviving bank known as the Banca Monte dei Paschidi Siena was made known in 1472. Unicredit bank in Italy is considered as one of the largest in Europe measured interms of capital while Assicurazioni Generali by total assets is the world 7th bank. As of December 2012, Unicredit bank was ranked as the first largest in Italy with respect to Tier 1 capital as shown on table 3.5.

Table 3.5: Bankers Top Five Italian Banks Ranked by Tier 1 Capital.

Rank	Bank	Tier 1 Capital ($m)	Assets ($m)	Pre-tax profits ($m)	Return on capital (%) latest	Return on Asset (%)
1	Unicredit	64,470	1,222,727	-670.67	-1.04	-0.05
2	Intesa.Sanpaolo	47,511	888,485	3,849.60	8.1	0.43
3	BancaMonte	11,393	288,763	-4,818.01	-42.29	-1.67
4	UBI Banca	10,902	174,715	225.59	2.07	0.13
5	Mediobanca	8,466	105,084	274.95	3.25	0.26

Source: thebankerdatabase.com-12/12 (2016)

As of 31st December 2014, Italy had more than 14 banking group and over 400 independent banks in existence controlled by the European central Bank.

3.8.2 Regulatory and Supervisory Authorities of the Italian Banking Sector

The complex nature of the intermediaries and the size of the financial institutions have given birth to the effective supervision of the financial sector. According to regulation (EU) no 1024/2013, ECM on the 4th of November 2014 was given specific tasks, to carry out prudential supervision of the Italian banks and banking group existing in Italy. The Bank of Italy and the European Central Bank under the competence of the EU and the national law maintain stability in the financial sector and also control the individual intermediaries.

According to regulatory assessments, a Joint Supervisory Team (JSTs) made up of the Bank of Italy staffs and the ECB carry out signifant supervision of the banking group in Italy, thus, identify and verify their compliance with respect to prudential criteria by taking necessary stress test and supervisory measures when applicable. The Bank of Italy carry out less significant supervision of the banking groups and

Italian banks, thereby providing harmonized supervisory guide headed by the general police and instructed by ECB. This bank maintains full autonomy and competency in the protection of consumer's ability to fight against terrorist financing and money laundering, control and monitors the market and payment services. Supervise non banking institutions and branch offices of Italian banks of non EU banks. The regulatory and supervisory measures put in place have enhanced stability in the financial sector and boosts the economic growth of Italy.

Chapter 4

DATA COLLECTION AND METHODOLOGY

4.1 Introduction

The research methods explain the various stages and the procedures that a research worker has put in place in order to carry out an accurate and successful research work. It also requires stating the method use in collecting data as well as the strategy used in investigating your research work.

4.2 Data Collection

In this study, the annual data of eight industrialized countries is used. The overall data collected from the banking sector of each country over the period 2009 to 2013 with respect to the variables like ROA referring to return on assets and ROE known as return on equity which are all indicators of a financial institution profitability performance , the sum total of bank cards irrespectively of their functions (debit/credit), total number of installed Point of Sale terminals and total number of installed ATMs known as the Automated Teller machines per country indicating the number of customers benefiting from these new services. The data used in this research work is extracted from the World Bank development and IMF Financial soundness indicators.

The following countries Canada, Japan, France, Belgium, Netherlands, Denmark, Austria, and Italy were considered for this research work based on two important reasons. Firstly, the sizes of the countries high demand for electronic banking

products. Secondly, these countries are more advanced in new technological banking services.

4.3 Description of the Variables

- **ROE Known as Return on Equity**

The return on equity is additionally a measure of bank benefit execution or profitability performance. ROE outlines or delineates the capacity of a company in changing over the stakeholder's speculations or investment into benefits or riches. A high ROE remind us how great a company creates wages from the inside. It is determined from the formular below:

Return on Equity=Net Income/Total Equity Capital

Total Equity capital is also known as total shareholder's Equity

- **ROA referred to as Return on Assets**

Return on resources or assets measured the productivity of a company or an organization in connection to its aggregate resources or assets. ROA shows how efficient management generates extra earnings to the enterprise via the use of its assets. In other words, this demonstrates how effective administration produces additional income to the venture through the utilization of its advantages. When the return on assets is high, it indicates extra earnings or income on less investment or less resources. This is very useful for the company. ROA is computed as stated below:

Return on Asset=Net Wages (income)/Add up to resources (Total assets)

- **Bank Cards (debit/credit cards)**

A Bank card is a plastic card with a magnetic stripe readable by a machine via an identification code and issued by a bank to its clients. This plastic instrument helps the banks clients to carry out banking transactions via ATMs (Automatic Teller Machines) and also use for electronic commerce purposes through internet or magnetic stripe readers. The two types of bank cards are namely:

- The Debit Card which enables the cardholder to withdraw funds up to the available amount in the account.
- The Credit Card which enables the cardholder to withdraw stock up to the amount of credit bound approved by the bank.

These cards help to facilitate payment transactions between the banks and their customers.

- **POS Terminal (Point of Sale Terminal)**

A POS Terminal is an electronic device made of software and hardware that allows card payment operations to be effectuated at retail locations. The point of sale terminal does the following functions:

- It accepts the credit and debit cards issued by the banks to their clients' in order to carry out banking transactions.
- Check if there is a sufficient fund in the client's account at the bank.
- It settles the seller's account by moving funds from one account to the other in the banks, that is, from customers account to the sellers account.
- Its registers all transactions carried out by the customers and print out the required receipt.

The cost of POS terminal installation depends on the supplier's terms and on the size of the business. In the case of a small merchant, additional fee is paid for each transaction as well as rent for the POS terminal machine.

- **ATMs known as Automated Teller Simple Machines**

This is an electronic outlet which grants the holder of a bank card to effectuate complete banking transactions or finish keeping money exchanges without the guide of a human teller. This electronic device was first used in 1967 in London and later spread worldwide, thus used in every major country today.

In modern banking system, it provides a range of services to the customers such as cash withdrawal services, cash deposits, account balance reporting and so on, with the help of a PIN code (Personal Identification Number). In this system, only customers with bank accounts owning a credit or debit card gain access to the ATMs. The ATM has a system made up of an electro-mechanical input and output controlled by an electronic user. This device has helped the bank to gain more clients as well as reduced the customer burden on the bank teller.

4.4 The Strategy or Methodology

The dynamic board information or panel data method will be utilized as part of this exploration or work. The panel data regression is done by the used of Econometric views (E-Views) statistical software. The general form of the panel data regression equation is given as:

$Y_{it}=\beta_0+\beta_1 X_{it}+U_{it}$ …….. (1)

Here, Y_{it} represents the dependent variable, β_0 a constant value, β_1 the regressors coefficient, X_{it} the regressors or explanatory variables, U_{it} is the disturbance term with i and t indicating the cross sections and time respectively.

While trying to research the effect of technological innovation or mechanical advancement on bank's benefits execution, the factors or variables are tried for stationarity by the utilization of the panel or board unit root tests of Phillip Perron (1988), Levin, Lin & Chu (2002) and IM, Pesaran & Shin (2003). This is followed by the diagnostic Test procedure that is undertaken in order to obtain valid results by testing for multicollinearity, heteroscedasticity as well as autocorrelation which are the main assumptions of the ordinary least squares. The Hausmann test (1982) is also undertaken in order to determine the specification of the regression model.

4.4.1 Model Specification

In this research work, the following econometric regression equation is used:

Y_{it}=f($CARD_{i,t}$,$POS_{i,t}$, $ATMS_{i,t}$)……...(2)

Where:

Y_{it} Being the dependent variable is expressed as function of the explanatory variables.

This equation is transformed into linear specification form in order to capture the growth effects of the variables, and it is written as follows:

$\text{Ln}ROA_{i,t}=\beta_0+\beta_1 \ln CARDS_{i,t}+\beta_2 \ln POS_{i,t}+\beta_3 \ln ATMS_{i,t}+\varepsilon_{i,t}$ (3)

$\text{Ln}ROE_{i,t}=\beta_0+\beta_1 \ln CARDS_{i,t}+\beta_2 \ln POS_{i,t}+\beta_3 \ln ATMS_{i,t}+\varepsilon_{i,t}$ (4)

$\text{Ln}BF_{i,t}=\beta_0+\beta_1 \ln CARDS_{i,t}+\beta_2 \ln POS_{i,t}+\beta_3 \ln ATMS_{i,t}+\varepsilon_{i,t}$ (5)

Here, $BF_{i,t}$ Stands for the dependent variables and include ROA & ROE which are used as measures of banks benefit execution. The variables or factors ROA determined as Net Salary separated by aggregate resources and ROE equivalents to Net pay isolated by the aggregate value capital or aggregate shareholder's value.

The independent or explanatory variables include,$CARDS_{i,t}$, $POS_{i,t}$ and $ATMS_{i,t}$ representing the total number of bank's cards (debit/credit), point of sale terminals and automated machines per country respectively. Every one of these factors mirror the cooperation of the individual cross area 'i' at relating time't'

β0: represents an invariable or intercept and β1, β2, β3: the coefficients of the autonomous factors with $\varepsilon_{i,t}$ indicating the disturbance term of the white noise.

Each of the factors utilized in this study have as of now been analyzed in past writings as explained in chapter II with various example scales, thus, the factors all demonstrated that there exist a connection or correlation between the dependent and the free factors or regressors. However, the following sections provide brief explanations of the sequential tests mentioned in the methodology section.

4. 4.2 Hausmann Specification Test (Random/Fixed effect model)

Inorder to avoid misspecification of the regression analytical series of tests, the Hausmann test is employed as to select the best model for our panel data analysis. This test determines whether fixed effect or Random effects are the best linear unbiased estimators (Yaffee, 2005; Bruderl, 2005). The null hypothesis or invalid theory favored the Random effect model against the option settled impact or fixed effect model as alternative (Green, 2008). It also indicates whether the error terms $\boldsymbol{(U_{it})}$ are correlated with the regressors.

$\boldsymbol{Y_{it}}$= â$_0$ + â$_1$ lnX_{it} +$\boldsymbol{U_{it}}$..... (6)

Here, $\boldsymbol{Y_{it}}$ is the explained variable, â$_O$is a constant, X_{it} is the autonomous factor or independent variable in the comparing time (t), and $\boldsymbol{U_{it}}$ representing the error term.

The Hausmann test hypotheses are stated as follows:

Ho: Random impact model is fitting or appropriate.

H1: Fixed impact model is suitable or appropriate

If we consider the arbitrary impact (random) display, and the invalid hypothesis (Ho) rejected, it infers the model is more appealing or desirable and the p-regard (probability value) produced by the test is more prominent or greater than the level of significance á=5% (Green, 2003).

The likelihood ratio test is associated keeping in mind the end goal or objective to confirm the Haussmann's test outcome which stipulates that fixed impact is most proper model for the board data examination (panel data analysis).

The settled impact (fixed effect) is display as:

Y_{it}=á$_1$+á$_2D_{2i}$+á$_3D_{3i}$+á$_4D_{4i}$+á$_5D_{5i}$+á$_6D_{6i}$+á$_7D_{7i}$+á$_8D_{8i}$+â$_2X_{2it}$+â$_3X_{3it}$+â$_4X_{4it}$+

â$_5X_{5it}$+â$_6X_{6it}$+â$_7X_{7it}$+U_{it}..... (7)

Here, D symbolizes the dummy variables, á$_i$ representing the differential intercept coefficients of each country banking system new technological products, â$_i$ indicating the coefficients of the independent variables, Y_{it} and X_{it} representing the dependent and independent variables respectively.

The fixed effect model and the dummy variables are interchangeable. This model ignores heterogeneity problem and assume or expect that the slope coefficients and the intercepts are steady after time and space while the disturbance term gets differentiates over the individual and time.

4.4.3 Unit Root Test Procedure

This test plans to explore the coordination (integration order) demand of the factors or variables. As per Gujarati (2009), the joining of the factors is one of the basics for creating econometric strategies or procedures. A variable is stationary if its mean and difference (variance) stay unaltered efficiently after some time. In a manner of speaking, the trend or example of the data must show a level of irregularity. Keeping in mind the end goal to determine the order of integration of the variables or factors, Phillip Perron (1988), IM, Pesaran & Shin (2002) and Levin, Lin & Chu (2002) unit root tests are associated in levels in view of the invalid speculation (Ho) and the option theory or alternative hypothesis (H1). The blend of the cross sectional and time arrangements data makes the panel or board unit root test to have more informative data, more variability, more degree of freedom, less collinearity among variables and more efficiency as compared to the test on distinct series (Ramirez, 2007) .The hypothesis for the various tests are same and expressed as:

H_0: arrangement (series) or variable has a unit root

H_1: variable does not have unit root

In this investigation work, most of the general unit root test models are looked into by the suggestion test strategy with pattern (trend) and intercept of Enders (1995).

The far researching structure of the board unit test can be formed as:

$\Delta Y_t = a_t + a_2 + \sum_i^p = \hat{a}_j$ + j-i +μ_t ..... (8)

Where Y is the regressand, α shows the drift, μ speak to the Gaussians background noise (white noise) and P is the slack or lag level. Other information paradigm like the Akaike is utilized to examine if there is a mistake in the background noise checking the slack 'p' as for the explained variable (Katircioglu et al., 2009).

In assessing the board (panel) unit root tests trial IPS (IM, Pesaran and Shin), LLC (Levin, Lin and Chu), Phillip Perron test at 1%, 5% , 10% level of significance, we call for the probability values (p-value) and compared with the level of significance. If p-value is greater than 1%, 5%, and 10% level of significance, we do not reject Ho, hence panel data has unit root. If vice versa, we reject Ho, it implies panel data does not have unit root. If the problem of non stationarity is detected, it must be resolved. The first estimation on the variables is done at first difference instead at level estimation (Gujarati, 2009).

4.4.4 Diagnostic Test Procedures

Inorder to obtain a valid result from this research work after the unit root test results, the main assumptions of the OLS (ordinary least squares) regression is taken into consideration by verifying for the existence of multicollinearity, heteroscedasticity and autocorrelation among the variables. In this study, the presence of multicollinearity in the variables is tested by the used of Pearson's correlation matrix known as the correlation analysis method. The Glejser test and the Durbin-Watson are applicable to test for the presence of heteroscedasticity and autocorrelation respectively.

4.4.4.1 Multicollinearity

After reporting the unit root test result of stationarity, the Pearson Correlation matrix is applicable to detect the problem of multicollinearity among the variables. According to the assumptions of the ordinary least square (OLS), ‘’ there should be no multicollinearity among the explanatory variables’’ (Gujarati, 2009). Multicollinearity is defined as the existence of a linear relationship among the independent variables or explanatory variables. Although there is always a correlation among the regressors but the degree at which variables are related matters. The problem of multicollinearity is detected when there is a high correlation among the explanatory variables which makes it very difficult in explaining the variations of a single independent variable with dependent variable. Thus, this can lead to incorrect estimation of the regression coefficients as well as infinite standard error.

According to Kennedy (2008), if the relationship among the explanatory variables is greater than 80%, it implies there is a serious problem of multicollinearity which must be rectify. The main aim of this step is to make sure that there is no high correlation among the regressors above the aforementioned limit for non existence of multicollinearity problem. The previously mentioned restrain recommended by Gujarati (2009) is given as follows:

$-1 \leq r \leq 1$, where ‘’r’’ is the connection coefficient which characterizes the pattern and the direct relationship between the factors or variables. The can either exist a negative or positive relationship between the factors.

If r=+1, a perfect positive relationship exist among the independent variables

r=-1, a perfect negative relationship exist among the explanatory variables

r=0, implies no relationship between the regressors.

According to Glauder and Farrar (1967), in order to avoid the multicollinearity problem among variables, correlation coefficient must be less than 0.8 and 0.9 respectively.

If, r is between 0.90 to 1 or -0.90 and -1, a high correlation exists between the independent variable, thus multicollinearity problem.

If r is between 0 to 0.50 or -0.50 and 0, it shows a weak positive or negative correlation among the explanatory variables.

If r ranges from 0.50 to 0.90 or -0.90 and -0.5, then a strong positive and negative relationship exists among the variables.

Another method to detect multicollinearity is to run the regression model via E-Views application and check the R^2 values and the t-ratios respectively.

If R^2 value is higher and t-ratios are not significant, it indicates the presence of multicollinearity among the variables.

4.4.4.2 Autocorrelation (Serial Correlation)

This is the 5th assumption of the OLS regression suggested by Gujarati (2009), which states that '' there should no serial correlation or autocorrelation between the disturbances''. Inorder word, the residuals are randomly distributed among the observations. If serial correlation exists among the disturbances, the estimated estimators will be linear, unbiased and inefficient. According to Keel and Kelly (2006), the existence of autocorrelation among disturbances is a technical problem violating the OLS assumptions which should not be ignored.

In this study, Durbin-Watson (DW) test is used to detect the existence or non existence of serial correlation among the disturbances. This test detects the 1st order serial correlation and defines the linear association between the residual terms. The DW test value is denoted as ''d'' and ranges between 0 and 4(Gujarati, 2009).

If d value is closed to 0, it indicates a positive correlation

If d value is closed to 4, its show a negative correlation

If d value closed to 2, it signifies the absence of autocorrelation

This decision is taken based on the table 4.1 below.

Table 4.1: Autocorrelation Decision Table

Null Hypothesis	**Decision**	**If**
No autocorrelation	Do not reject	du< d< 4-du
No negative autocorrelation	Reject	4-dL<d<4
No negative autocorrelation	No decision	4-du≤d≤4-Dl
No positive autocorrelation	Reject	0<d<dL
No positive autocorrelation	No decision	dL≤d≤du

Source: Gujarati 2009

4.4.4.3 Heteroscedasticity

This is the 4th assumption of the OLS (ordinary least squares) which stipulated that '' homoscedasticity should exist between the disturbances''. That is, there should be equal variances of the error terms ($å_{i,t}$).

In this piece of work, the Glejser test will be used to detect for the presence of heteroscedasticity. If heteroscedasticity problem exist, the standard errors generated is not trusted, wrong t-ratios and non efficient estimated estimators. Thus the

estimated estimators are not the best. In this light, the Glejser model equation is as follows:

Abs (resid01) =â$_0$+â$_1(CARDs)_{i,t}$+â$_2(POS)_{i,t}$+â$_3(ATMs)_{i,t}$+å$_{i,t}$…….... (9)

The hypotheses are states as:

H_0: Homoscedasticity exist

H_1: Heteroscedasticity exist

If the null hypothesis is rejected, it implies there is heteroscedasticity problem. This problem is resolved by using the heteroscedasticity consist standard error (white period) thereby performing the regression analysis.

The aim of this step is to have a genuine result and BLUE estimators (best linear unbiased estimators).

4.4.4.4 Regression Analysis Procedure

After carrying out all the relevant tests of multicollinearity, autocorrelation as well as heteroscedasticity and the problems identified and resolved, we proceed with the regression analysis since our result will be genuine and in line with the OLS assumptions.

In this research work, the regression analysis is done via the E-Views applications with respect to the panel data of the eight industrialized countries collected over the period 2009 to 2013 and the results interpreted as in the next chapter.

Chapter 5

EMPIRICAL AND OBSERVATIONAL ANALYSIS

Taking after the distinctive tests indicated in the previous section, this part will give the detail eventual outcome of the tests with more total examination. So as to guarantee that the suppositions of the Ordinary Least Squared are not abused in our regression model of study, the unit root test result is initially completed to guarantee that all the factors in the model are stationary. This is trailed by the multicollinearity test in order to know the density of relationship existing among the regressors. At that point, the Hausmann test is done to decide the most proper model for our regression analysis or investigations and additionally the likelihood test which affirms the Haumann test result. The DW trial of autocorrelation is continued to ensure that there is no serial connection among the unsettling influences (error terms). At long last the check of heteroscedasticity in order to make sure that the variances of the error terms are equal and the regression analysis ran via E-Views application and the outcome deciphered or interpreted as in the chapter.

5.1 Unit Root Test

Inorder to proceed with the regression analysis, the unit test is first done to ensure that every one of the factors is stationary at level I (0). Stationarity is known when the mean, variance and covariance are constant overtime. If the variables are proven to be stationary at level I (0), regression analysis will be possible, and if not stationary, we will apply the co integration test to check whether there is going to be a long haul relationship between the factors.

In this exploration work, the unit root test(s) of Im, Pesaran & Shin (IPS) , Phillip Perron(PP) and Levin, Lin, & Chu (LLC) will be use to test for the stationary nature of the factors or variables.

The hypotheses mentioned above in the previous chapter for the panel unit test are as follows:

H_0: Variables are Non stationary or has a unit root

H_1: Variables are stationary or does not have unit root

The tables below show the results generated from the E-Views software of the various test procedures.

Table 5.1: Panel Unit Root Tests

VARIABLES	**LLC**	**IPS**	**PP**
ROA			
τ_T	-9.90177*	-6.44344*	33.5988*
τ_μ	-5.12122*	-1.33360***	11.6120**
τ	-181.940*	-	37.1992
ROE			
τ_T	-46.7260*	-14.9362*	44.2644*
τ_μ	-5.70311*	-1.74479**	14.1907***
τ	-0.61846	-	8.36587
CARDS(debit/credit)			
τ_T	-91.6085*	-6.53983*	32.2424*
τ_μ	-0.46445	1.13730	11.8774
τ	1.83370	-	7.16215

Table 5.2: Panel Unit Root Tests

VARIABLES	LLC	IPS	PP
POS			
τ_T	-27.1338*	-5.30568*	40.7125*
τ_μ	1.91936	1.55620	11.7145
τ	4.50946	-	3.03163
ATMs			
τ_T	-63.1499*	-6.61974*	52.1730*
τ_μ	-1.90555**	-3.23296*	50.6877
τ	1.35492	-	21.5655

Where, ROA, ROE, CARDS, POS, and ATMs address the yearly bank return on asset after cost or tax, yearly benefits or annual return on equity after appraisal, signify total number of banks cards accessible for utilize per yearly irrespective of their functions, mean number of point of sale terminals or machines in existence, and total number of automated teller machines per annual or yearly independently.

$\boldsymbol{\tau_T}$ addresses model with pattern or trend & intercept, $\boldsymbol{\tau_\mu}$ addresses exhibit with simply intercept and $\boldsymbol{\tau}$ addresses appear without pattern and intercept.

*, ** and *** addresses rejection of the invalid theory (null hypothesis) at 1%, 5% and 10% level of significance independently.

The outcomes from the tables above, of the series of panel information unit root tests, demonstrate that every one of the factors is stationary at level $\boldsymbol{\tau_T}$ I (0). These models are factually huge or statistically significant with most of their prob values under than 1%, 5% and 10% level of centrality individually. Consequently, the invalid theory is rejected and the factors utilized as part of our examination work are stationary. Hence, the models are good for the regression analysis.

5.2 Correlation Analysis (Test for Multicollinearity)

The unit root tests results indicate that the series is stationary and regression analysis can be undertaken. It is also very vital to check if the ordinary least square assumptions are not violated. In this piece of work, the Pearson correlation matrix is used to identify for the problem of multicollinearity. According the OLS assumptions, no linear correlation should exist between the independent variables or regressors. This analysis is conducted on the variables in series according to Farrar and Glauber (1967) as mentioned in the previous chapter and the results as seen on table 5.3 below.

Table 5.3: Correlation Coefficient of Variables

	LogROA	LogROE	LogCARDS	LogPOS	LogATMs
LogROA	1.000000				
LogROE	0.814800	1.000000			
LogCARDS	0.486043	0.313066	1.000000		
LogPOS	-0.259944	-0.493687	0.242895	1.000000	
LogATMs	-0.206635	-0.446697	0.119422	0.949940	1.000000

The result from the table above shows that there exist no high correlations between the independent variables indicating the absence of multicollinearity problem. Thus, the OLS assumption is not violated and we can proceed with our analyses.

In other words, the result shows a set of positive and negative correlations between the variables. The dependent variables such as ROA and ROE are highly positively correlated. There is a significant relationship between the numbers of cards irrespective of their function to the profitability performance of the banks. The number of ATMs machines per country indicates a strong positive correlation with the POS terminals and cards with a remarkable negative relationship to the

dependent variables (45% less than 50% respectively). Hence, there is no multicollearity among the variables.

5.3 Hausmann Test

According to panel data regression analysis, there exist two types of models such as the random effect and the fixed effect model respectively (Yaffee, 2005; Bruderl, 2005). In this study, the Hausmann test is completed in order to choose the most suitable model for the regression analysis. This is done according to Green (2005) with respect to the following stated hypothesis beneath and the outcome as recorded on table 5.4 and table 5.5 separately.

H_0: Random impact is fitting

H_1: Random impact is not fitting

Table 5.4: Hausmann Test Result For Equation '3' (ROA)

Test Summary	Chi-Sq-Statistic	Chi-Sq.d.f	Prob-value
Cross-Section-Random	16.601336	3	0.0009

Table 5.5: Hausmann Test Result For Equation '4' (ROE)

Test Summary	Chi-Sq-Statistic	Chi-Sq.d.f	Prob-value
Cross-Section-Random	8.447231	3	0.0376

The likelihood or probability values acquired as observed on the tables above 0.0009 and 0.0376 respectively are less than the 10% significant level (0.0009<0.10 or 0.0376<0.10). The null hypothesis is rejected and random impact is considered not suitable for our regression analysis.

5.4 Likelihood Ratio Test

As to affirm the Hausmann test result got, the probability proportion (likelihood ratio) test will be use to approve if settled or fixed impact is suitable for our investigation.

The speculation (hypothesis) for this test is as follows:

H_0: Fixed impact is not suitable

H_1: Fixed impact is suitable

Table 5.6: Likelihood Ratio Test Result For Equation '3' (ROA)

Effects Test	Statistic	d.f	Prob value
Cross-Section F	3.120585	(7,29)	0.0140
Cross-Section Chi Square	22.458728	7	0.0021

Table 5.7: Likelihood Ratio Test Result For Equation '4' (ROE)

Effects Test	Statistic	d.f	Prob value
Cross-Section F	2.261526	(7,29)	0.0577
Cross-Section Chi Square	17.423878	7	0.0149

The prob values as observed on the tables about are less than 10% level of significance. These outcome produced by the likelihood ratio test affirmed the Hausmann test comes about. Thus, fixed impact is suitable for our regression analysis.

5.5 Autocorrelation

The 5th fundamental assumption of the OLS also stipulates that '' there should be no serial correlation among the error terms or disturbances''. This is to avoid linear unbiased and inefficient estimators of our regression equations or models. In this light, autocorrelation is tried by Keele and Kelly (2006) by the utilization of Durbin Watson test as mentioned in the previous chapter. The Durbin-Watson is denoted as'd' with qualities going from 0 to 4 (Gujarati, 2009).

As indicated by the outcomes acquired from regressing equation '3' and '4', d(ROA)= 2.324 and d(ROE)=1.955 respectively, K(number of regressors)=3, n(number of observations)=40, dL(lower limit)=1.338 and du(upper limit)=1.659 at α(level of significance)=5%.

As indicated by autocorrelation choice table as written in chapter four above,

du < d< 4-du computing at. α=5%. We have,

Equation three (ROA) 1.659<2.324<4-1.659 equals to 1.659<2.234<2.341 and Equation four (ROE), 1.659<1.955<4-1.659 equals to 1.659<1.955<2.341. We do dismiss the invalid theory or the null hypotheses; consequently, there is no serial connection or autocorrelation in both models between the error terms.

5.6 Heteroscedasticity

This is another fundamental assumption of the OLS which states that 'there should be equal variance of the error term. That is, there should be homoscedasticity among the disturbances. This step is carried out in order to avoid having wrong t-ratios values, inefficient estimators and entrusted standard errors generated from our regression models. In other words, to obtain BLUE estimators and a genuine result from our regression models. Heteroscedasticity is the inverse of homoscedasticity which must be checked before proceeding with our regression analysis as mentioned

in chapter four. The Glejser test will be used with respect to the following hypothesis below to detect for heteroscedasticity.

H_0: Homoscedasticity

H_1: Heteroscedasticity

According to the results obtained for both regression equations, the prob values for equation 3&4 are 0.586623 and 0.506707 respectively. These values are great greater than 10% level of significance. Hence, we do not reject the null hypothesis and there is no heteroscedasticity problem in the models among the disturbances. We are going to continue with the regression analyses.

5.7 The Regression Analyses

Finally, after carrying out all the necessary panel data tests and confirming the non violation of the ordinary least square assumptions with genuine results obtained, we then moved on with our simple regression analyses.

Inorder to determine the statistically signification effects of the explanatory variables to the dependent variables, a multiple regression equation is used. The results obtained as shown on table 5.7.1 & table 5.7.2 below and interpreted with respect to the dependent variables for example, return on assets (ROA) and profit for equity (ROE) as the measures of bank gainfulness execution (bank performance) and additionally the free factors or independent variables like annually total sum of bank Cards (debit/credit), Point of sale terminals and automated machines. The effect is determined by means of hypothesis testing.

Table 5.8: Regression Analysis Output for Equation 3 (ROA Model)

Variables	Coefficient	STD Error	T-Statistics	Probability
C	-2.022530	0.824841	-2.452024	0.0207
CARDS	0.353724	0.070265	5.034113	0.0000
POS	-0.763865	0.217385	-3.513879	0.0015
ATMS	0.614993	0.222461	2.764495	0.0100
R-Squared	0.519289			
F-Statistics	10.08235			0.000113
Durbin –Watson	2.324550			

Table 5.9: Regression Analysis Output for Equation 4 (ROE Model)

Variables	Coefficient	STD Error	T-Statistics	Probability
C	2.037970	0.645620	3.156610	0.0038
CARDS	0.210555	0.054998	3.828406	0.0007
POS	-0.530493	0.170152	-3.117766	0.0042
ATMS	0.331854	0.174125	1.905840	0.0670
R-Squared	0.506917			
F –Statistics	9.595177			0.000160
Durbin –Watson	1.955848			

5.7.1 Regression Equations Results Output (ROA and ROE Model)

Ln$ROA_{i,t}$=-2.022+0.354ln$CARDS_{i,t}$-0.764ln$POS_{i,t}$+0.6151ln$ATMS_{i,t}$+å$_{i,t}$

Ln$ROE_{i,t}$=2.038+0.211ln$CARDS_{i,t}$-0.530ln$POS_{i,t}$+0.332ln$ATMS_{i,t}$+å$_{i,t}$

5.7.2 Interpretation of Overall Results for ROA and ROE Model

According to the results on table 5.7(a)&table5.7(b) above, the R-Squared (R^2) are 0.519289 and 0.506917 respectively, which implies that 51.93% and 50.69% of the total variations of advantage for resource(ROA) and the advantage on regard or benefits (ROE) are explained by the models. The F-prob qualities are 0.000113 and 0.000160 under 10% level of significance , thus or along these lines, the models are truly huge at á=10%(level of essentialness alpha) or statistically signifant at 10%.

From the outcomes on the tables, the probability values or likelihood estimations of the intercepts for both models are less than the level of significance alpha (prob value=0.0207, 0.0038<10%). We dismiss the invalid hypothesis (Ho). Along these lines, the estimated coefficients of the intercepts are honestly basic (statistically significant). Economically, when all the independent variables or autonomous components are kept constant, the banks return on assets or resources (ROA) will decrease by 2.023% while return on equity or regard (ROE) increases by 2.038% respectively. In other words, the intercept has a negative fundamental impact on ROA by 2.023% with t-statistic or estimation of -2.452024 and prob value equals to 0.0207 and a positive significant effect on ROE by 2.038% with t-stat and prob value identical to 3.156610 and 0.0038 automously.

With respect to the return on assets (ROA) model, the numbers of cards irrespective of their functions have T-Stat of 5.034113 and Prob value equals to 0.0000 under 5% or 10% level of centrality. The invalid hypothesis (Ho) is rejected at 5% level of criticalness. Along these lines, the banks cards have a significant or quantifiably basic impact on the banks return on resources (ROA) with F-prob value equal to

0.000113. In the event that the measure of banks cards expand by 1%, the bank's ROA goes up by 0.35%, while on ROE model, the return on equity is influenced positively by 0.21%, with T-Stat &prob value equivalent to 3.828406 and 0.0007 respectively as reported on table 5.7(b) above.

The measure of Point of Sale Terminal Machines (POS-terminals) masterminded in every nation oppositely impact or negative impact on the gainfulness execution (performance) of the banks. In our simple regression results on table 5.7(a) and 5.7(b) above, the independent variable (POS-terminal) antagonistically impact the efficiency execution of the banks by a diminish of 0.76% on ROA and 0.53% on ROE for each 1% augmentation in the measure of POS terminal machine per country.

Automated Teller Machines (ATMs) are fundamentally utilized by the clients than different hardware managing a record benefits in the industrialized nations with a profitable outcome on the bank's arrival on resources(ROA) as well as a positive impact on the passage on regard (ROE). In our break faith works out as expected as gave a record of table 5.7(a) and 5.7(b) autonomously, we found out that ATMs machines have a solid or strong fundamental effect on bank's return on resources or assets by 0.615% and also a positive impact on advantage for estimation or return on equity of 0.33% for each 1% advancement in the measure of modernized teller machines in every nation.

Chapter 6

CONCLUSION AND RECOMMENDATIONS

This research work is conducted keeping in mind the end goal to assess the relationship between electronic managing an account administration with the bank's gainfulness execution measures of profit value (ROE) and profit for resources (ROA) respectively. The most essential part of this work reflects from different reviews or studies as clarified in the writing survey or literature review chapter with both methodology and data considered from eight industrialized nations. Hence, the accompanying diagnostic tests are effectively done in view of the evaluated models of profit for resources and profit for value as components of banks benefit execution.

Firstly the panel or board unit root tests of IM, Pesaran and Shin (2002) ,Levin, Lin and Chu (2002), and Phillip Perron (1988) utilized and the invalid theory or hypothesis (Ho) rejected showing that every one of the factors are stationary at level I $\tau_T(0)$ with intercept and pattern.

Besides, the Hausmann determination test is applied to choose the best model for our regression (Yaffee, 2005; Bruderl, 2005) and the invalid theory or null hypothesis is rejected and random impact not the most suitable model and demonstrated by the likelihood proportion test affirming fixed impact the most fitting model for the examination.

Thirdly correlation analysis carried out thanks and set of positive and negative relationships existing between the electronic managing an account administration, for example banks cards (charge or visas), point of sales machines and mechanized teller machines (ATMS) as autonomous factors or independent variables with profit for value (ROE) and profit for resources (ROA) are very emphatically corresponded as measures of bank gainfulness execution.

Most importantly, empirical and observational discoveries demonstrate that all advanced managing an account administrations obtained by banks have an incredible huge impact on the bank execution benefits. Notwithstanding, a portion of electronic saving money administrations for example the aggregate or the total number of point of sales terminal machines have influenced both the banks ROE and ROA contrarily. (Lichtensten et al., 2006). This is because of reasons, for example the absence of electronic managing an account framework and the socio social conduct of the clients in the distinction nations (Hosein, 2013; Gutu, 2014). Opposite, the proportion of automated Teller machines (ATMS) and the quantity of issued bank cards regardless of their capacities have influenced the banks benefit proportion emphatically or positively. The increased in the number of users or clients in every nation utilizing ATMS have a diminishing operational cost (Murthy& Venugopal, 2008). This has led to an increase in the number of ATM machines along these lines increasing the bank return on resources or assets (ROA) as a measure of benefit execution.

The general impacts of electronics saving money administrations have contributed emphatically (positively) to the arrival on value (ROE) and profit for resources

(ROA) as the measure of banks gainfulness execution (Hasan, 2002; Ciciret et al., 2009).

I exceedingly recommend that both open (public) and private establishments and also the condition of the various industrialized nations ought to enhance electronic saving money infrastructural advancement with a specific end goal to improve the arrival on value and profit for resources of the banks which thus advanced monetary development in the nation as well as promote the economic growth.

I additionally propose that both local banks and outside or foreign banks ought to attempt to utilize more advanced or propelled innovations which are effective in this manner enhancing their administration to the enthusiasm or interest of the clients keeping in mind the end goal to support the monetary development and improve on the standard of living of population in the societies.

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APPENDICES

Appendix A: Correlation Matrix

	LOGROA	LOGROE	LOGCARDS	LOGPOS	LOGATMS
LOGROA	1.000000	0.814800	0.486043	-0.259944	-0.206635
LOGROE	0.814800	1.000000	0.313066	-0.493687	-0.446697
LOGCARDS	0.486043	0.313066	1.000000	0.242895	0.119422
LOGPOS	-0.259944	-0.493687	0.242895	1.000000	0.949940
LOGATMS	-0.206635	-0.446697	0.119422	0.949940	1.000000

Appendix B: Hausmann Test Results for Roa

Correlated Random Effects - Hausmann Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	0.407455	3	0.9387

** WARNING: estimated cross-section random effects variance is zero.

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LOGCARDS	-0.390198	0.353724	14.942046	0.8474
LOGPOS	1.846856	-0.763865	16.916836	0.5256
LOGATMS	-3.316500	0.614993	44.260693	0.5546

Cross-section random effects test equation:
Dependent Variable: LOGROA
Method: Panel Least Squares
Date: 11/21/16 Time: 10:26
Sample: 2009 2013
Periods included: 5
Cross-sections included: 8
Total panel (unbalanced) observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7.584197	27.10467	0.279811	0.7824
LOGCARDS	-0.390198	3.866212	-0.100925	0.9206
LOGPOS	1.846856	4.119461	0.448325	0.6585
LOGATMS	-3.316500	6.657051	-0.498194	0.6235

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.594682	Mean dependent var	-1.236570
Adjusted R-squared	0.401674	S.D. dependent var	1.242061
S.E. of regression	0.960753	Akaike info criterion	3.024089
Sum squared resid	19.38399	Schwarz criterion	3.527935
Log likelihood	-37.38542	Hannan-Quinn criter.	3.191100
F-statistic	3.081119	Durbin-Watson stat	2.797185

Prob(F-statistic)	0.014298

Appendix C: Hausmann Test Results for Roe

Correlated Random Effects - Hausmann Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	1.300785	3	0.7289

** WARNING: estimated cross-section random effects variance is zero.

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LOGCARDS	1.522046	0.210555	9.280639	0.6668
LOGPOS	0.814701	-0.530493	10.507199	0.6781
LOGATMS	-2.148427	0.331854	27.490716	0.6362

Cross-section random effects test equation:
Dependent Variable: LOGROE
Method: Panel Least Squares
Date: 11/21/16 Time: 10:29
Sample: 2009 2013
Periods included: 5
Cross-sections included: 8
Total panel (unbalanced) observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-8.079529	21.36132	-0.378232	0.7091
LOGCARDS	1.522046	3.046980	0.499526	0.6226
LOGPOS	0.814701	3.246567	0.250942	0.8043
LOGATMS	-2.148427	5.246453	-0.409501	0.6863

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.578511	Mean dependent var	1.593080
Adjusted R-squared	0.377802	S.D. dependent var	0.959912
S.E. of regression	0.757174	Akaike info criterion	2.547840
Sum squared resid	12.03957	Schwarz criterion	3.051687

Log likelihood	-29.76544	Hannan-Quinn criter.	2.714851
F-statistic	2.882337	Durbin-Watson stat	2.244986
Prob(F-statistic)	0.019655		

Appendix D: Likelihood Test Result for Roa

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

Effects Test	Statistic	d.f.	Prob.
Cross-section F	0.558031	(7,21)	0.7810
Cross-section Chi-square	5.459038	7	0.6041

Cross-section fixed effects test equation:
Dependent Variable: LOGROA
Method: Panel Least Squares
Date: 11/21/16 Time: 10:36
Sample: 2009 2013
Periods included: 5
Cross-sections included: 8
Total panel (unbalanced) observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.022530	0.824841	-2.452024	0.0207
LOGCARDS	0.353724	0.070265	5.034113	0.0000
LOGPOS	-0.763865	0.217385	-3.513879	0.0015
LOGATMS	0.614993	0.222461	2.764495	0.0100

R-squared	0.519289	Mean dependent var	-1.236570
Adjusted R-squared	0.467784	S.D. dependent var	1.242061
S.E. of regression	0.906122	Akaike info criterion	2.757184
Sum squared resid	22.98961	Schwarz criterion	2.940401
Log likelihood	-40.11494	Hannan-Quinn criter.	2.817915
F-statistic	10.08235	Durbin-Watson stat	2.324550
Prob(F-statistic)	0.000113		

Appendix E: Likelihood Test Result for Roe

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

Effects Test	Statistic	d.f.	Prob.
Cross-section F	0.509582	(7,21)	0.8170
Cross-section Chi-square	5.020310	7	0.6575

Cross-section fixed effects test equation:
Dependent Variable: LOGROE
Method: Panel Least Squares
Date: 11/21/16 Time: 10:40
Sample: 2009 2013
Periods included: 5
Cross-sections included: 8
Total panel (unbalanced) observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.037970	0.645620	3.156610	0.0038
LOGCARDS	0.210555	0.054998	3.828406	0.0007
LOGPOS	-0.530493	0.170152	-3.117766	0.0042
LOGATMS	0.331854	0.174125	1.905840	0.0670

R-squared	0.506917	Mean dependent var	1.593080
Adjusted R-squared	0.454086	S.D. dependent var	0.959912
S.E. of regression	0.709241	Akaike info criterion	2.267225
Sum squared resid	14.08462	Schwarz criterion	2.450442
Log likelihood	-32.27559	Hannan-Quinn criter.	2.327956
F-statistic	9.595177	Durbin-Watson stat	1.955848
Prob(F-statistic)	0.000160		

Appendix F: Regression Result for Roa and Roe

Regression Result for Roa

Cross-section fixed effects test equation:
Dependent Variable: LOGROA
Method: Panel Least Squares
Date: 11/21/16 Time: 10:47
Sample: 2009 2013
Periods included: 5
Cross-sections included: 8
Total panel (unbalanced) observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-2.022530	0.824841	-2.452024	0.0207
LOGCARDS	0.353724	0.070265	5.034113	0.0000
LOGPOS	-0.763865	0.217385	-3.513879	0.0015
LOGATMS	0.614993	0.222461	2.764495	0.0100

R-squared	0.519289	Mean dependent var	-1.236570
Adjusted R-squared	0.467784	S.D. dependent var	1.242061
S.E. of regression	0.906122	Akaike info criterion	2.757184
Sum squared resid	22.98961	Schwarz criterion	2.940401
Log likelihood	-40.11494	Hannan-Quinn criter.	2.817915
F-statistic	10.08235	Durbin-Watson stat	2.324550
Prob(F-statistic)	0.000113		

Regression Result for Roe

Cross-section fixed effects test equation:
Dependent Variable: LOGROE
Method: Panel Least Squares
Date: 11/21/16 Time: 10:49
Sample: 2009 2013
Periods included: 5
Cross-sections included: 8
Total panel (unbalanced) observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.037970	0.645620	3.156610	0.0038
LOGCARDS	0.210555	0.054998	3.828406	0.0007
LOGPOS	-0.530493	0.170152	-3.117766	0.0042
LOGATMS	0.331854	0.174125	1.905840	0.0670

R-squared	0.506917	Mean dependent var	1.593080
Adjusted R-squared	0.454086	S.D. dependent var	0.959912
S.E. of regression	0.709241	Akaike info criterion	2.267225
Sum squared resid	14.08462	Schwarz criterion	2.450442
Log likelihood	-32.27559	Hannan-Quinn criter.	2.327956
F-statistic	9.595177	Durbin-Watson stat	1.955848
Prob(F-statistic)	0.000160		