KOICA-KAIST Scholarship Program

Financial Development and Economic growth: The Case of Mongolia

Tsolmon Altantulkhuur

Finance MBA

KAIST

2014

Financial Development and Economic Growth: The Case of Mongolia

Financial Development and Economic Growth: The Case of Mongolia

Advisor : Professor Joo-Hoon Kim

by

Tsolmon Altantulkhuur

KAIST

An Independent Research Paper submitted to the faculty of KAIST in partial fulfillment of the requirements for the KOICA-KAIST Scholarship Program. The study was conducted in accordance with Code of Research Ethics¹

> March 26th, 2014 Approved by Professor Joo-Hoon Kim (_____)

¹Declaration of Ethical Conduct in Research: I, as a graduate student of KAIST, hereby declare that I have not committed any acts that may damage the credibility of my research. These include, but are not limited to: falsification, papers written by someone else, distortion of research findings or plagiarism. I affirm that my research paper contains honest conclusions based on my own careful research under the guidance of my academic advisor.

MBAP	Tsolmon Altantulkhuur, Financial Development and Economic growth: The Case of Mongolia
20124596	Graduate School of Finance, Finance MBA. 2014. 42 p. Advisor Prof. Joo-Hoon Kim

ABSTRACT

Mongolia went through the transitional stage from centrally planned economic system to liberalized political and economic system during last two decades. The country is still on the early stage of development of market economy but one of the fastest growing economies around the world. At a same time, Mongolian financial sector, especially banking sector, is the fastest growing industry among the others since its economic and financial reform started. It arises the questions of whether financial sector development leads to economic growth or otherwise economic growth leads to financial sector development.

Therefore, this thesis aims to analyze the causal relationship between financial sector development and economic growth in a case of Mongolia. The empirical analysis is performed using Granger Causality test procedure under Vector Auto Regressive model with quarterly data of economic growth and financial development proxies which dimensioned into financial depth, access, efficiency and stability in 1995-2012. The empirical tests provide an evidence that a presence of significant causal relationship from financial development to economic growth in a case of Mongolia. This unidirectional causality can be explained by the result of Mongolian Government policies which have liberalized its financial sector since 1990s. The empirical analysis found that financial indicators causes economic growth in different time horizons. Among the financial deepening indicators, an increase in broad money drives to economic growth in short term while growth in private sector credit and capital market lead to economic growth in long term. Improvement in access to the finance followed by economic growth in short term, while financial sector efficiency causes economic growth in long term. In summary, Mongolian economic growth strongly follows the financial sector development. Therefore, macroeconomic policies to strengthen and stimulate financial sector development are highly recommendable.

Keywords: Mongolia, Financial development, Economic Growth, Banking Sector, Granger Causality

Abstracti
Table of Contentsii
List of tablesiii
List of Figures
Glossaryiv
I. Introduction1
II. Literature survey
2.1 The unidirectional relationship from financial development to economic growth
2.2 The unidirectional relationship from economic growth to financial development
2.3 The Bidirectional relationship between financial development and economic growth
III. Overview of financial sector in Mongolia
3.1 Economic overview
3.2 Financial sector reform in Mongolia
3.2.1 Banking sector
3.2.2 Securities market and Non-banking financial sector
3.3 Current situation of Mongolian Financial Sector
3.3.1 Banking sector
3.3.2 Securities market
IV. Empirical study
4.1 Model
4.2 Data
4.2.1 An indicator of economic growth
4.2.2 Indicators of financial sector development
4.3 Stationary test
4.4 Causality test
V. Conclusion
References
Appendixes

LIST OF TABLES

Table 1. The ratios of Main indicators of banking sector to GDP (%)	14
Table 2. Data description and sources	25
Table 3 ADF Unit root test (level, no trend and no intercept)	26
Table 4. ADF Unit root test (1 st order)	27
Table 5. Causal relationship between financial depth and economic growth	28
Table 6. Causal relationship between financial accessibility and economic growth	29
Table 7. Causal relationship between financial sector efficiency and economic growth	29
Table 8. Causal relationship between financial stability and economic growth	30
Table 9 Main economic and financial reforms in 1991-1992	39
Table 10. Descreptive Statistics	42
Table 11. Correlation Matrix	42

LIST OF FIGURES

Figure 1. GDP growth rate of Mongolia	8
Figure 2. Inflation of Mongolia (CPI, annual %), 1992-2000, 2001-2013	9
Figure 3. Industrial composition of GDP of Mongolia in 2012	10
Figure 4. The ratio of M2 to GDP and economic growth rate	15
Figure 5. The ratio of banking sector total asset to GDP	16
Figure 6. The Ratio of Total Credit to GDP and the ratio of Bank deposit to GDP	17
Figure 7. The ratio of NPL to Total loan	17
Figure 8. Financial accessibility of Mongolia	
Figure 9. Interest rate spread	19
Figure 10. Noninterest income and overhead cost of banks (%)	
Figure 11. Banking sector profitability	
Figure 12. Government and corporate bond trade volume	
Figure 13. Stock Market Capitalization to GDP (%)	
Figure 14. Market Capitalization in current USD	23
Figure 15. GDP contribution by some sectors of Mongolia	
Figure 16. Mongolia's Banking sector default probability	
Figure 17. Bank liquid reserves to bank assets ratio (%)	
Figure 18. Risk Weighted Capital Adequacy Ratio of Mongolian Banks	41
Figure 19. Number of domestic listed companies	41

GLOSSARY

ADB	Asian Development Bank
ADF	Augmented Dickey-Fuller
BoM	Bank of Mongolia
CBB	Central Bank Bills
CPI	Consumer Price Index
FRC	Financial Regulatory Committee
FSC	Financial Stability council
GDP	Gross Domestic Product
IMF	International Monetary Fund
ITI	Investment and Technological Innovation
MNT	Mongolian togrog (National Currency)
MoF	Ministry of Finance
MSE	Mongolian Stock Exchange
NBFI	Non-banking financial institution
NPL	Nonperforming Loan
OECD	Organization of Economic Co-operation and Development
SCC	Savings and credit cooperatives
SME	Small and Medium Enterprises
SOE	State Owned Enterprises
TDB	Trade and Development Bank
USD	U.S Dollar
VAR	Vector Auto Regressive

I. INTRODUCTION

Mongolia is a country which made economic and political reform at same time in 1990s. This simultaneous transformations had brought numerous challenges for the country. Generally, in first decade of the transformations, basic fundamentals of market economy and multi-party political system were set by reform policies, in second decade, reform policies focused to strengthen prior achievements. In 1990s, structural reforms including currency reform, price and wage liberalization, privatization of small and medium enterprises and state owned companies and legal environment reforms introduced successfully. One of the successful reform policies was the financial liberalization policy which starts from creating two-tier banking system and encourages private commercial banks. Although, stock market emerged in 1991, it still remains illiquid until today and Mongolian financial sector is dominated by banking sector. In recent years, Mongolian economy has grown rapidly due to development in mining industry. In parallel, financial sector, especially banking industry, relatively strengthened through these years even though it faced several crisis in mid and late of 1990s and mid and late of 2000s. These crisis also gave chances policymakers to strengthen financial sector policy framework and financial institutions to empower their capabilities to overcome risks and external threats.

As financial sector plays significant role to allocate resources efficiently to the economy, its effect on the economic growth is enormous. On the other hand, better and bigger financial sector is required as much as an economy grows. In Mongolia, financial assets of the financial institutions and broad money (M2) has grown rapidly hand in hand with GDP. It arises the question of whether financial sector development leads to economic growth or otherwise economic growth drives financial development. This issue was well studied by many economists and scholars in terms of cross countries and individual country cases. Thanks to prior scholars' works, the relationship between economic growth and financial development was analyzed well, but the results were inclusive. The previous empirical results vary among the countries which have been tested. Some results show the financial development had caused economic development while others support the opposite case.

Therefore, this thesis aims to investigate the causal relationship between financial sector development and economic growth in a case of Mongolia. There are two possibilities of the relationship which are unidirectional or bidirectional.

In 1990s, because Mongolian government put efforts to liberalize private and financial sector in order to stimulate further economic growth, there is a high probability of financial development causes economic growth. In contrast, some countries such as China and South Korea implemented financial repression policy which controls financial sector heavily and allocates resources to prioritized economic sectors until they achieve

certain level of economic growth and then they started reforming their financial sector. In this case, there is a causal relationship from economic growth to financial development.

The remainder of the thesis proceeds as follows: In chapter 2, in order to explore theoretical and empirical relationship between financial development and economic growth a literature survey is executed. Therefore, in chapter 3, the empirical analysis is performed using Granger Causality test procedure under Vector Auto Regressive model with quarterly data of economic growth and financial development proxies which dimensioned into financial depth, access, efficiency and stability in 1995-2012. In this study, I try to analyze the financial development by not only financial depth indicators which are widely used by other scholars but also indicators of efficiency, accessibility and stability compared to other works. The empirical tests provide an evidence that a presence of significant causal relationship between financial development indicators and economic growth depends on time horizons. Finally, conclusion is made in the last chapter.

II. LITERATURE SURVEY

Early economic growth theory argues that exogenous technological progress provide a driving force for the long run economic growth rate whereas financial intermediaries were not included explicitly in economic models.

Thanks to the contributions of pioneers such as Bagehot (1873), Schumpeter (1912), Hicks (1969), Goldsmith (1969), McKinnon (1973), Shaw (1973) and many others, the relationship between economic growth and financial development has been attracting many scholars' interests but still remains one of the popular research area which has no single explanation.

Schumpeter (1912) viewed that a well functioned financial system would induce technological innovation by identifying, selecting and funding those entrepreneurs that would be expected to successfully implement their innovative products and productive processes. Hicks (1969) argued that financial institutions facilitates economic growth through capital formation. In his perspective, financial institutions affect interest rates by reallocating financial resources among different capital producing technologies. Therefore, financial institutions manage their liquidity risks and it is a crucial factor for market developments.

In contrast, Joan Robinson (1952) argues that financial sector follows where enterprise leads. There are many authors agree with this argument and they argue that economic development demands better financial services and financial sector adjusts for this demand. Robert Lucas (1988) says that role of financial sector is over stressed and according to this view many development economists including Noble Laureates Bauer, Colin Park, Hirshman, Lewis, Myrdal, Prebisch, Rosenstein-Rodan. Rostow, Singer and Tinbergen neglected financial sector role when they analyzed economic development.

Nowadays economists try to answer what the causality is rather than if financial development is an important for economic growth. Levine (1998), King and Levine (1993a, 1993b), Rousseau and Wachtel (1998), Rajan and Zingales (1998), and Okedokun (1998) investigated the issue in more empirical aspect.

2.1 The unidirectional relationship from financial development to economic growth

Levine (1997) argues that financial systems can accomplish five functions to ameliorate information and transactions frictions and contribute to long-run growth. These five functions are: facilitating risk amelioration, acquiring information about investments and allocating resources, monitoring managers and exerting corporate control, mobilizing savings, and facilitating exchange. These functions facilitate investment and hence higher economic growth. McKinnon (1973), King and Levine (1993), Levine et al. (2000), and, Christopoulos and Tsionas (2004) argues that there is a causal direction from financial development to economic growth. They say

that appropriate financial policies will lead to long run economic growth. Their fundamental objective is to determine if there is a significant causality from financial development to economic growth. For example, King and Levine (1993a) found, by studying 80 countries over the period 1960-1989, the level of financial development to be a good predictor of economic growth. They used real per capita GDP growth, the rate of physical capital accumulation, and the rate of improvement in economic efficiency as dependent variable and four financial development indicators which includes financial depth (M2/GDP), magnitude of banking sector (deposit money/(deposit money + central bank domestic asset)), private sector credit, and other controlling variable (technology growth and human capital accumulation etc.) as explanatory variables. They found out that lack of financial development could possibly induce some form of "poverty trap" because of the possible existence of multiple steady state equilibriums.²

Shan and Morris (2002) examined the relationship for 19 OECD countries using Toda and Yamamoto's (1995) model using variables of real GDP, ratio of total credit to GDP, spread of borrowing and lending interest rates, productivity, ratio of gross investment to GDP, ratio of total trade to GDP, CPI, official interest rate, stock and market price index etc. They concluded that financial development leads to economic growth.

Evans, Green, and Murinde (2002) examined the relationship for 82 countries using panel regression including variables as labor, physical capital, human capital, and monetary factors including money and credit. They show that financial development is important as human capital in the economic growth process.

2.2 The unidirectional relationship from economic growth to financial development

Robinson (1952), Gurley and Shaw (1967), Goldsmith (1969), Jung (1986) and others argue that if the economy grows, there will be increasing demand for financial services and it will lead to financial sector's expansion and development. All these views are generally based on the indicator which is ratio of broad money to GDP which is standard measure of financial development and on the other hand it is inverse of the velocity of circulation of the broad money. Therefore, because of a downward trend in the velocity of circulation of money, positive relationship between the financial sector development and economic growth exists. Hence, then the positive relationship between financial development and real GDP can reflect an income elasticity of the demand for money with respect to income, which is greater than one. Consequently, according to this argument Ghali (1999) argues that the direction of causality will be from real GDP to financial development, and that through the demand for money.

² Financial Development and Economic growth: The case of eight Asian countries, Dipendra Sinha and Joseph Macri

These findings can lead us to financial repression policy. In other words, government focus on economic growth rather than financial development with a financial repression policies by intervening in financial resource allocation. Financial repression policy can achieve rapid economic growth but after the economic development reaches certain level the government needs to liberalize the financial sector for further development.

2.3 The Bidirectional relationship between financial development and economic growth

There are also authors such as Demetriades and Hussein (1996), Blackburn and Huang (1998), Khan (2001), and Shan, Morris, and Sun (2001) who believe two way causality. They argue that financial development and economic growth support each other, if financial development helps economic growth, economic growth helps to develop financial systems. In early period, for example, Patrick (1966) claims that the causality goes from finance to growth and then switch from growth to finance. In other words, financial sector development encourages real capital formation per capita, consequently, when the economy is in the growth stage, an increasing demand for financial services induces an expansion not only in the financial sector but also in the real sector.

Shan, Morris, and Sun (2001) examined the relationship between financial development and economic growth for 9 OECD countries and China using VAR model. The result shows that 5 out of 10 countries have a bilateral Granger causality, 3 of the have reverse causality with economic growth leading to financial development and other 2 countries do not have a causal effect at all. Arestis, Demetriades and Luintel (2001) investigated stock market development, credit market development and economic growth using time series analysis for 5 developed countries. Their result shows that bank based financial system is more likely to promote long-run growth than capital market based countries.

Sinha and Macri (2001) investigated the relationship between financial development and economic growth for 8 Asian countries which consist of 7 developing countries and Japan. Their result says that bilateral causal relationship exists for 3 countries, unidirectional relationship from finance to growth for 2 countries, reverse causality from growth to finance for 3 countries including South Korea.

In terms of research method, some scholars like Berger, Hassan and Klapper, (2004), Dawson (2003), Deidda (2001), Khan and Senhadji (2000), King and Levine (1993), Lensink (2001), Odedokun (1996), Rajan and Zingales (1998), and Sala-i-Martin (1997) applied cross country regressions whereas others such as Calderon and Liu (2003), Edison, Levine, Ricci and Slok (2002), and Manning (2003) employed panel data regression. Therefore, some others have used a combination of both cross and panel data regression. There are

also studies which used Granger causality tests to examine the relationship by Arestis, Demetriades and Luintel (2001), Bhattacharya and Sivasubramanian (2003), Chang (2002), Darrat, Abosedra and Aly (2005), Demetriades and Hussein (1996), Ghirmany (2004), Luintel and Khan (1999), Thangavelu and James (2004), and Shan and Morris (2002) etc.

Since financial development is not easily measurable, papers attempting to study the link between financial deepening and growth have chosen a number of proxy measures and subsequently, have come up with different results (King and Levine, 1992; Savvides, 1995; Khan and Senhadji, 2003; Hassan and Bashir, 2003; Chuah and Thai, 2004; Al-Awad and Harb, 2005, among others). However, the general consensus of these studies is that there is a positive correlation between the financial sector and growth and that the development of bank credit has an important impact on economic growth.

Financial repression policy and financial liberalization

Economists generally argue that financial repression policies prevents the efficient allocation of capital and in that way harms economic growth. Mckinnon and Shaw (1973) examined the impact of the government involvement in the financial sector development. They argued that financial repression policy has negative impact on the development of the financial sector and economic growth as well. Roubini and Sala-i-Martin (1992) viewed that because financial repression leads to inefficient allocation of capital, high costs of financial intermediation, and lower rates of return to savers, it is theoretically clear that financial repression inhibits growth.

Financial repression refers to a set of government regulations, laws, and other non-market restrictions prevent the financial intermediaries of an economy from functioning at their full capacity. Financial repression policies also can be government directives for commercial banks to allocate credit at subsidized rates to specific firms and industries to implement industrial policy. It is also more cost effective than going through the public sector's budgetary process. South Korea and Japan are the successful examples of government's directives which used financial repression policies to boost their export oriented economies during 20th century. South Korea is one of the cases of most successful financial reforms which had tight and effective control over interest rates. In 1960s, higher real interest rates led to rapid growth of bank deposits which enabled government to finance its industrial policies that promotes export oriented economic growth. Cho (1989) viewed that this government intervention in the financial market shared the associated risks with the commercial banks and it enabled commercial banks to get involved long-term activities. In 1980s, interest rates and credit allocation were

still under control of the government. However, the government intervention was reduced relatively at that time. The Japanese financial repression and liberalization policies are also successful example and in the 1950s and 1960s the government actively and successfully intervened in the pricing and allocation of credit. World Bank (1993) also viewed that in a few economies of North East Asia, government interventions resulted in higher and more equal growth than it would not have occurred.

Demetriades and Arestis (1997) say that successful reform of the real sector came to be seen as prerequisite to financial reform. Thus financial repression would have to maintain during the first stage of economic liberalization. Caprio (1994) argue that managing the reform process rather than adopting a laissez-faire stance is important, and that sequencing along with the initial conditions in finance and macroeconomic stability are critical elements in implementing successfully financial reforms.

Kaminsky and Schmukler (2002) argue that financial liberalization can create short-term volatility despite its long-term gains. Therefore, fully liberalized financial sector does not mean prerequisite condition of further development and removing all the regulations and controls lead to crises rather than economic growth in a short run. Some developing countries which liberalized their financial markets experienced crises partially because of the external shocks that financial liberalization introduces or amplifies.

III. OVERVIEW OF FINANCIAL SECTOR IN MONGOLIA

3.1 Economic overview

Mongolia is the one of the countries which shifted from centrally planned economy to a market based economy in 1990. The country had been came under the political and economic influence of former Soviet Union until 1990 even though the country declared its independence in 1911. After the collapse of communist regimes in 1989, Mongolia embarked irrevocably on the transition to a market economy.

At a same time, as the world financial markets had been rapidly evolving and integrating, the transition economies faced to challenge of reforming their financial and private sectors efficiently and properly. In early 1990s, Mongolian Parliament passed several important legislations for the finance economy such as Privatization Law, Banking law, and Bankruptcy Law. As a result, privatization program of state enterprises initiated and Central bank, several commercial banks and Mongolian stock exchange established. Generally, Mongolian economic and financial institutional framework established during that time.

In recent years, Mongolia is regarded as one of the fastest growing economy in the world due to a boom in mining sector (Figure 1). Because of its extensive deposits of copper, coal, molybdenum, tin, tungsten, gold and other minerals, the country attracted foreign direct investors in the mining industry. Despite rapid economic growth, the proportion of the population below the poverty line remains in high level and it was 27.4% in 2012 even it decreased by 19% compared to previous year³. Therefore, a stability in legal environment, external factors such as global economic downturn and commodity prices decline in the world market influence the economy severely. Especially during the Global financial crisis, the GDP growth rate was -1.3% in 2009.





Source: National Statistics office of Mongolia

³ Joint estimation of World Bank and National Statistics Office of Mongolia in 2012.

Due to world market price decline of main exporting commodities, a decrease in net capital inflow caused a sharp reduction in foreign exchange reserve. Thanks to strong policy response from the Mongolian authorities with the financial support by IMF, other international financial institutions and donor countries, two years later Mongolia experienced it's the highest economic growth rate of 17.5% in 2011. However, keeping the high economic growth rate sustainably became a major challenge for Mongolian authorities and because of uncertainty in Mongolian legal environment which resulted a sharp decline in foreign direct investment and Chinese decreasing demand in imported coal, the economic growth rate fell down to 11.7% in 2013.

Furthermore, high inflation rate tends to erode GDP gains, with an average rate of 12.3% in 2013. In early years, Mongolia experienced hyperinflation with the rate of 325% in 1992 right after the transition to market economy. As a result of macroeconomic stabilization policy, financial sector reform which includes privatization of commercial banks and restructuring, the inflation declined to less than 10% in 2000. However, Mongolian economic reliance on a few major industries keeps the country vulnerable on external shocks such as world commodity market prices fluctuations. These external shocks reflects to the higher inflation in Mongolia and during the global financial crisis, it peaked to 23.2%.



Figure 2. Inflation of Mongolia (CPI, annual %), 1992-2000, 2001-2013

In terms of economic activities, besides mining (21%), wholesale and retail (16%) and agriculture (15%) are the main industries in the composition of GDP of Mongolia by 2012 (Figure 3). Besides impact of world market prices of main exporting products, a weather condition is still one factor influences the economy especially on agriculture, which is one of the main industry but still not developed well.

Source: The Bank of Mongolia





Source: National Statistics office of Mongolia

3.2 Financial sector reform in Mongolia

3.2.1 Banking sector

Prior to 1991, Mongolia had the mono banking system administered by the State bank of Mongolia which carried out functions to transfer government resources to public enterprises and commercial banking functions as well as. Mongolian banking system was changed from mono banking system to dual-tier banking system under the new Banking Law enacted by Mongolian parliament in 1991. After the legislation, five banks established from the former State bank and nine were created later. The banking law enabled the central bank to manage money and credit using indirect instruments but allocation of resources to the market remained in market mechanism.

Therefore, Mongolian Government implemented a strategy which intended to stabilize macro economy and reform financial sector. The main objectives of the reform program was to promote establishment of a competitive, autonomous, market-based, and sound financial system that could regain public confidence and efficiently mobilize and allocate resources for economic growth. The objective was to be achieved through a financial sector reform program designed to:

- a) strengthen financial intermediaries,
- b) strengthen the legal and regulatory framework for the sector, and

c) establish a market-based financial intermediation process⁴.

One of the important element in this reform program was to establish a well-defined operating and regulatory frameworks for the banking sector which meets international standards and norms. On September 3rd 1996, Mongolian Parliament passed Law on Central banking and the powers and responsibilities of BoM were enhanced in a range of activities including the supervision of commercial banks.

The reason of this legislature was that banking system confronted several banks' bankruptcies and instability in the financial sector. Because of liquidity problem and lack of internal risk management and external control over the banks, banks did not maintain capital adequacy ratios and issued more loan than they should had issued with exceeding the amount of total deposits. In September 1994, the government forcibly merged two small banks with two large banks and provided highly subsidized loans to cover the cost of mergers. In summer 1996, two additional banks were closed, prompting bank run. The BoM injected large volumes of liquidity in response, but public confidence in the banking system continued to erode. In December 1996, the government closed large two insolvent banks. After this banking crisis, the BoM implemented restructuring and recapitalizing the banks. According to World Bank, the direct cost of the banking crisis in Mongolia in 1996 was 8.7% of GDP.

The reform program also included some actions to eradicate government influence on credit decisions and to improve banks own autonomy by increasing shareholders and managers responsibilities. As a result of the reform, all commercial banks implemented appropriate credit policies and procedures, improved risk management and information systems. In terms of human resources capabilities, necessary trainings were supported by donor countries. Besides banking sector, the reform program encouraged diversification and competitiveness of financial institutions. In this regard, legal framework for nonbanking financial institutions was developed.

In 2000-2005, the Government initiated a Medium-Term Strategy for Financial Sector Development which also addressed the liquidity and solvency issues of commercial banks. One of the main points of that strategy was to continue the improvement of a market oriented financial system. The restructuring of the commercial banks was to be pursued more strongly to reduce the role of the government in allocating financial resources, through liquidation of non-viable banks, and privatization of the more viable banks. ITI Bank and Reconstruction Bank were liquidated and state owned TDB, the largest bank, was privatized in 2000. Subsequently, Agriculture Bank and Savings banks were restructured and privatized. These actions also

⁴ Asian Development Bank, Evaluation Study: Financial Sector in Mongolia—Transition to a Market Economy Built on Successful Financial Reforms, Rapid Sector Assessment, 2008

encouraged a financial development in rural areas and financial sector diversifications by promoting nonbank and capital market subsectors. In the result of the reform, corporate governance practices in banks improved, movable property regarded as loan collateral, the types of immovable properties could be used as collateral expanded and transaction costs associated with collateral registration reduced. Therefore, the reform strengthened bank supervision and regulations by establishing minimum capital requirements, asset classification, an exit policy to facilitate the liquidation of troubled banks, and the foundation for developing a Government bonds market and an interbank market.

3.2.2 Securities market and Non-banking financial sector

The initial step of Mongolian plan to efficiently functioning market economy through the privatization of state owned assets was entered when the complex policy measures of restructuring the whole economy, introducing fair market competition, and the sustainable encouragement of a viable private sector development were taken by the Government. In order to achieve these objectives in the shortest period, and to provide the basis for a more efficient allocation of economic resources, regulating the flow of capital and to mobilize savings into the private sector, the establishment of securities market was at the core of the Mongolian privatization program.

The Mongolian Stock exchange (MSE) was founded in 1991 with the introduction of the mass voucher privatization program. It was used to initially distribute and collect vouchers, and to sell state assets through direct share offerings. At the onset of the privatization program, each citizen of Mongolia were given MNT 3000 worth of "Pink" vouchers, and MNT 7000 of "Blue" vouchers. Pink vouchers were used for the privatization of small business units, and blue vouchers were used to privatize large scale industrial enterprises. Secondary trading at MSE started in August 1995 and all of the 419 publicly listed companies were privatized through the mass voucher privatization program.

The role of securities markets is to facilitate the reallocation of property rights. However, much of the standard benefits of securities markets, such as compliance with the disclosure requirements the internationally accepted accounting principles and the improvement of corporate governance by monitoring managers and trading shares actively, have not yet materialized in Mongolia. While market capitalization is relatively high, the turnover ratio is extremely low in Mongolia, reflecting a lack of liquidity in the market, investor perceptions that the market is risky, widespread noncompliance with disclosure requirements, and Government indecision to further the privatization process by releasing state held shares to the public through the MSE.

Establishment of Financial Regulatory Committee (FRC) which replaced Mongolia Securities and Exchange Commission enabled to oversee nonbank and capital market. FRC introduced prudential norms, minimum capital and licensing requirement for NBFIs.

A reform strategy promoted capital markets to

- (i) strengthen the regulatory body
- (ii) accelerate privatization of SOEs to increase the number of stocks listed on MSE; and
- (iii) introduce the Law on Trusts and Law on Investment Funds, as part of the effort to establish a legal framework for promotion of new investment instruments.

The MSE was to be separated into two institutions: the MSE would oversee trading functions, while the Central Depository System handled clearing, settlement, and depository functions.

Overall, Mongolian financial reform strategies were expected to facilitate resource mobilization and increase the efficiency of resource allocation, in this manner benefiting the whole population. In addition, the reform program was expected to facilitate access to credit by private entrepreneurs, which would impact positively on employment opportunities in the country's growing private sector. Through these developments, the reform program was also expected to have a positive impact on poverty reduction. For example, first phase of financial reform led to an average annual GDP growth rate of 3.9% in 1995–1999. Inflation was reduced from over 50% in 1996 to less than 10% in 1998, according to ADB.

3.3 Current situation of Mongolian Financial Sector

3.3.1 Banking sector

A. Financial deepening

Mongolian financial sector consists of 13 commercial banks including one state owned bank, 245 nonbanking financial institutions (NBFI) and about 143 savings and credit cooperatives (SCCs) as end of 2013. The banking sector currently dominates the financial sector. The Financial Regulatory Commission, Bank of Mongolia (BoM) and Financial Stability Council (jointly established by the Bank of Mongolia, Ministry of Finance (MoF) and Financial Regulatory Commission (FRC) on May, 2007) are responsible for financial stability and supervision of the financial sector in Mongolia. As the Central Bank, the BoM ensures the stability of the national currency. According to its legal mandate, the BoM promotes balanced and sustained development of the national economy, through maintaining the stability of money, financial markets, and the banking system. In order to implement its objectives, the BoM conducts activities such as issuing currencies in circulation, formulation and implementation of monetary policy, acting as the Government's fiscal intermediary, supervision of banking activities, organization of inter-bank payments and settlements, management of the official foreign exchange reserves⁵. The BoM is responsible for supervision of banks while the FRC is responsible for supervision of all other financial institutions including insurance companies, savings and credit cooperatives and non-banking financial institutions including securities companies. The mission of the Council is to contribute to a sustainable economic growth by developing a sound and competitive financial infrastructure along with improving financial services in terms of quality and access⁶.

Indicator Name	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
M2/GDP	38.5	35.9	37.5	38.2	48.4	34.6	43.7	55.6	57.8	54.6
Domestic credit	19.9	27.1	26.6	20.0	28.2	31.8	29.8	30.1	40.3	30.8
provided by										
banking sector										
(% of GDP)										
Banking sector	49.8	51.5	57.0	62.3	73.6	60.6	73.0	74.2	84.5	85.6
total asset/ GDP										
Bank deposits	25.1	27.2	29.1	29.2	33.7	32.3	34.4	41.3	46.5	41.3
to GDP (%)										
Gross value	4.1	4.2	3.7	2.9	3.1	3.6	3.3	2.9	3.4	4.2
added of the										
financial sector										
to GDP										
NPL/Total loan	4.8	6.4	5.8	4.9	3.3	7.2	17.4	11.5	5.8	4.2

Table 1. The ratios of Main indicators of banking sector to GDP (%)

Source: World Bank, National Statistics office of Mongolia, Bank of Mongolia

In 2012, as a factor of financial deepening, the ratio of M2 to GDP reached 54.6% while domestic credit provided by banking sector was 30.8% of GDP. In 2012, banks deposits to GDP ratio was 41.3% with a continuous growth trend. In 2000-2012, the average margin between credit and deposit was 4.7% of the GDP. Banking sector total asset has been increasing steadily since 2000s and reached 85.6% of GDP in 2012. Therefore nonperforming loans to total loan outstanding was 4.2% in 2012 which fell down from 17.4% during Global Financial crisis in 2009.

⁵ The Bank of Mongolia, <u>www.mongolbank.mn</u>

⁶ Financial Regulatory Commission of Mongolia, <u>http://www.frc.gov.mn</u>



Figure 4. The ratio of M2 to GDP and economic growth rate

Although banking sector reform had a limited success in 1990s, with banking crisis in 1996 and 1998-1999, since 2000 financial reform led to the development in financial sector and an increase public confidence in banks. Thanks to restructuring and privatization of commercial banks, financial intermediation deepened and access to the financial services improved significantly. For instance, the ratio of M2 to GDP which was 21.1% in 2000 increased significantly to 54.6% in 2012. Therefore, this increasing trend aligns with the Mongolian GDP growth rate (Figure 4).

Since Mongolian financial industry is dominated by the banking sector which accounts 96% of total financial assets, its impact on the whole economy is enormous. In 2012, banking sector total asset equals to 85.6% of GDP with MNT 12 trillion (approximately USD 8.6 billion) and it increased nominally by 3.3 times compared to that during the crisis in 2008. The rapid increase in ratio of banking sector total asset to GDP from 19.2% in 2000 to 85.6% in 2012 shows that Government financial reform policies contributes substantial return for the economy through intermediating financial resources. However, Mongolian banking sector is relatively concentrated and the largest bank accounted 24%, top three banks accounted 70%, top five banks accounted 87% of total banking sector asset in 2011⁷.





By the end of 2012, total loan outstanding in banking sector was MNT 7.0 trillion (approximately USD 5.0 billion) with the growth rate of 24% compared to previous year. In terms of nominal value, total loan outstanding by banking sector grew by 47% per year between 2000 and 2012.

A credit by banking sector accounts for 30.8% of the GDP in 2012 which was 40.3% in 2011. The growth rate of the ratio of total credit to GDP has been increasing rapidly in a last decade with average growth rate of 12% per year. In contrast, the ratio of total bank deposit to GDP was 41.3% in 2012 which went down from 46.5% in 2011. Although there are declines in both ratios in 2012 because of higher growth rate in the GDP than credit and deposit growth, ratios of credit and deposit to GDP increase constantly in recent years.

Source: World Bank

⁷ World Bank, Financial Sector Assessment in Mongolia, 2011





Total Loan outstanding — Domestic credit provided by banking sector (% of GDP) — Bank deposits to GDP (%) Source: World Bank, Bank of Mongolia

After Mongolian financial sector experienced banking crisis in 1996 and 1999-2000, the authorities strengthened Central banks supervision capabilities and as a result nonperforming loans decreased significantly in 2000s. However, during the Global financial crisis, banking sector had a 17.4% of nonperforming loan in 2009. At that time, banks faced liquidity problems. Therefore, two insolvent banks were put into receivership and government merged two banks by transferring good capitals of insolvent bank (Zoos bank) to the State bank which had been newly established by the government.





B. Financial accessibility

As financial sector deepens, its accessibility for enterprises and individuals increases as well (Figure 8). According to World Bank, in 2011 bank accounts per 1000 adults were 3183.1 which doubled from previous year. Furthermore, number of bank branches per 100,000 increases steadily in recent years and it reached 66.4 in 2011.

Source: World Bank, Bank of Mongolia



By 2011, 78% of the adults in Mongolia have an account with a formal financial institutions and 25% of the adults have a loan from financial institutions and it is higher than some east and central Asian countries (China, Russia, Malaysia, Kyrgyz Republic, Kazakhstan, and Vietnam etc.)⁸. According to World Bank, Mongolia has one of the highest bank branch penetration rates in the world, with 66 branches per 100,000 adults compared to 12 in Korea, 3 in Vietnam and Russia, and 10 in Azerbaijan. However, due to its large territory, Mongolia's geographical branch penetration is one of the lowest in the world. It has 0.67 branches per thousand km square. The low population density makes the provision of traditional banking services outside of the large cities costly. There are about 1,300 bank branches in Mongolia. Khan Bank and Savings Bank have more than 75 percent of all branches in the country and have the most significant presence in rural areas. Most of their branches are located outside Ulaanbaatar. In recent year, electronic payment method is evolving fast, but remains underdeveloped in rural areas.

The World Bank's Enterprise Survey shows that access to finance is the most important constraint among the top-10 constraints as reported by firms. More than 30 percent of firms in Mongolia perceive access to finance as the biggest problem to their operations (higher than the average of 17 percent in the EAP region). Access to finance is particularly constrained for small and medium enterprises (SMEs), which due to their nature are more sensitive to an unstable macroeconomic environment, characterized by high inflation and foreign exchange rate fluctuations. A recent survey by the BoM suggests that SMEs top constraint for their business operations is the unfavorable macroeconomic and financing environment. In particular, the most constraining factors are: high interest rates, followed by short maturities of loans that are inadequate to meet

⁸ Global Findex database, World Bank, Financial Inclusive database, 2011

investment needs, followed by small loan amounts, and predominantly immoveable collateral-based lending requirements⁹.

C. Financial efficiency

One of the indicator which measures the banking sector efficiency is the interest rate spread. As banking sector develops, there is a decreasing trend of interest rate spread which is difference between lending and deposit rate. In Mongolia, the spread shrunk significantly in recent years. For instance, the interest rate spread was 20.2% in 2000 while it dropped sharply to 6.8% in 2012 because of faster decline in lending rate. In November 2010, Mongolian Parliament approved the program on configuring market environment to reduce interest rates which implemented by the Government, BoM, and FRC. According to the program, main objectives to reduce the interest rates are to (i) keep the inflation in low and stable level, (ii) improve banks prudential operations, (iv) fasten the capital market development, (v) improve financial sector infrastructure and legal environment.



Source: World Bank

Furthermore, noninterest income¹⁰ and overhead cost¹¹ are the good indicators to measure banking sector efficiency. Banks noninterest income to total income bottomed at 17.4% in 2003, since then, it increased steadily to 37.4% in 2011. In contrast, banks overhead costs to total asset has been decreasing significantly and it was 1.7% in 2011.

⁹ World Bank, Financial Sector Assessment in Mongolia, 2011

¹⁰ Bank's income that has been generated by noninterest related activities as a percentage of total income (net-interest income plus noninterest income). Noninterest related income includes net gains on trading and derivatives, net gains on other securities, net fees and commissions and other operating income.

¹¹ Operating expenses of a bank as a share of the value of all assets held. Total assets include total earning assets, cash and due from banks, foreclosed real estate, fixed assets, goodwill, other intangibles, current tax assets, deferred tax assets, discontinued operations and other assets.

In terms of profitability, banks return on asset fluctuates in range between 0.5% and 2% while bank return on equity fluctuates in range between 4.5% and 23%. The profitability of Mongolian banks was higher than those banks operating in an environment of controlled interest rate regime (World Bank). Mongolian banks' source of income was limited to interest earning assets, which were basically composed of loans and Central Bank Bills (CBBs). Interest spread between deposits and loans continued to shrink due to competition pressure. Meanwhile, BoM's policy and heated competition between banks for CBBs were putting the yield of the central bank paper down. On the other hand, rapid rise of operating expenses of the banks had yet to be reversed due to rapid expansion of branch network and heavy investment in fixed assets. Non-interest incomes were almost negligible on Mongolian banks income statements, while these incomes, such as those from insurance, investment, mutual fund and annuity products and services, contribute significantly to commercial banks' earnings in more developed markets.





D. Stability of banking sector

Source: World Bank

The financial system registered fast recovery and expansion in 2001-2005. Rapid expansion of loan granting led to the higher default risks. In terms of banking sector stability, Mongolia's banking sector Z-score¹² or the probability of default of a banking system remains higher than 22.3% in 2011 (Appendix 3).

By 2005, Mongolia's financial sector was on a fast track of expansion in assets, variety of institutions, and number of customers. Thanks to high commodity prices abroad and rapid economic growth at home, demand

¹² It captures the probability of default of a country's commercial banking system. Z-score compares the buffer of a country's commercial banking system (capitalization and returns) with the volatility of those returns.

was rising for financing businesses growth, residential housing and household consumption. There was an outcry for longer term lending and eased loan terms and conditions. Meanwhile, there were signs of underestimation of impaired assets and capital, squeezed profit margin and increased operational risk, which might threaten the stability and soundness of the financial system.

As Figure 17 (Appendix 4) shown, since 2001 a bank liquid reserves to bank asset ratio¹³ decreased significantly and bottomed at 13.9% and 14.3% in 2007 and 2008, respectively, since then it increased dramatically. Because Mongolian economy experienced severe fiscal and current account deficit during the Global financial crisis, because of price collapse in commodity exports, copper in particular. Generally, during the crisis time, banks tend to increase the share of liquid reserve to total asset relative to normal economic condition. Therefore, it is seen that Mongolian banks increased their liquidity ratios in 2009 and 2010 dramatically. As economy started stabilizing in 2011, the banks liquidity ratios fell down from 46.6% to 32.0%. The adequacy and availability of capital ultimately determine the healthiness of financial institutions to sustain large losses. The Mongolian banking system's risk-weighted capital adequacy ratios performed to be adequate with greater than 10% in 2010-2012. As shown in Figure 18 (Appendix 5), during the global financial crisis, RWCAR bottomed at 5.5%.

3.3.2 Securities market

The capital market of Mongolia is the one of the smallest market in the world in terms of market capitalization. Financial market is dominated by banking sector and the nonbank financial sector constitutes less than 3% of the total asset in the financial sector. In particularly, capital markets contributing less than 1%. This underdevelopment of the capital market is not able to support the growth momentum of the country in the long run.

In recent years, Mongolian policymakers' appreciation about the capital market development grows rapidly. Main regulatory bodies (MoF, BoM, and the FRC) are vigorously cooperating to reform capital markets and MoF established a new unit which is in charge of financial sector policy and capital market development. One of the recent achievement in the Mongolian capital market development is a strategic partnership with the London Stock Exchange group in 2010 for modernizing Mongolian Stock Exchange. The expected results of this cooperation are the up-to-date market infrastructure including software, licensing, training, and maintenances.

¹³ Ratio of bank liquid reserves to bank assets is the ratio of domestic currency holdings and deposits with the monetary authorities to claims on other governments, nonfinancial public enterprises, the private sector, and other banking institutions.

For the bond market, government bonds account for 98% of the total bond market. In contrast, corporate bond market is very small because companies prefer to get financing from banks or abroad. Therefore, more than 50% of the corporate bonds sold were short-term and institutional investor base is very narrow.



Figure 12. Government and corporate bond trade volume

Source: Mongolian Stock Exchange

Market capitalization, and number of transactions have risen rapidly over the past two years, albeit from a very low level. By end- 2011, the market capitalization of MSE increased by MNT 794.6 billion or by 58 percent compared to 2010, reaching MNT 2.2 trillion (US\$1.6 billion). However, it decreased by 18.1% and reached USD 1.3 billion in 2012. The price indices and turnover levels of the MSE surged in 2009 and 2010, with the MSE becoming one of the best-performing emerging stock markets in the world. However, the Mongolian stock market is still small and illiquid. The ratio of stock market capitalization to GDP peaked at 18% in 2011. In 2012, the total market capitalization is 12.6% of GDP. Number of listed companies are still few, 329 in 2012, and their sizes are also small. Top 20 companies which compromises MSE Top 20 index account for more than 80% of the total market capitalization.



Figure 13. Stock Market Capitalization to GDP (%)

Figure 14. Market Capitalization in current USD

Turnover ratio of stock traded¹⁴ in 2012 was 2.84% (USD 200,000) and generally it is the lowest among the other emerging market peers. One more problem is that majority of the securities of MSE Top 20 index are illiquid. In terms of intermediation, in 2012, 88 companies operated as broker-dealer, out of which 22 as underwriter, 16 investment advisers, and 1 credit rating agency. One of the 88 broker- dealers carries out more than 50 percent of total transaction volumes on MSE. Therefore, there are no intermediaries for fund management, no mutual fund in the domestic market, and no derivatives market.

¹⁴ World Bank definition: Turnover ratio is the total value of shares traded during the period divided by the average market capitalization for the period. Average market capitalization is calculated as the average of the end-of-period values for the current period and the previous period.

IV. EMPIRICAL STUDY

4.1 Model

To analyze the causal relationship between financial sector development and economic growth, I use the following VAR model.

$$\begin{cases} GDP = f(FD) \\ FD = g(GDP) \end{cases}$$
(1)

Where:

GDP: Growth rate of real GDP per capita

FD: Financial sector development variables including:

{Financial deepening; accessibility; efficiency; stability}

The bivariate VAR model to be tested:

$$y_{t} = \alpha_{0} + \alpha_{1}y_{t-1} + \dots + \alpha_{l}y_{t-l} + \beta_{1}x_{t-1} + \dots + \beta_{l}x_{-l} + e_{t}$$
(2)
$$x_{t} = \gamma_{0} + \gamma_{1}x_{t-1} + \dots + \gamma_{l}x_{t-l} + \theta_{1}y_{t-1} + \dots + \theta_{l}y_{-l} + u_{t}$$
(3)

The model will be tested for possible pairs of (x, y) series in the group. The reported F-statistics in causality tests are the Wald statistics for the joint hypothesis for equation (2) and (3), respectively:

$$\beta_1 = \beta_2 = \dots = \beta_l = 0 \tag{4}$$
$$\theta_1 = \theta_2 = \dots = \theta_l = 0 \tag{5}$$

4.2 Data

In order to analyze the causal relationship between economic growth and financial sector development, the indicators or variables should be chosen wisely. Because of data availability and consistency, I analyzed Mongolian quarterly data between 1995 and 2012¹⁵. King and Levine (1993) chosen the 4 variables including ratio of M2 to GDP, ratio of deposit money in the commercial banks to total banking system, ratio of claims on nonfinancial sector by banks to total domestic credit and ratio of claims on nonfinancial sector by banks to total domestic credit and ratio of claims on nonfinancial sector by banks to total domestic credit and ratio of claims on nonfinancial sector by banks to component. In this research paper, I will follow the general practices to choose the variables which commonly used in previous studies. Therefore, additional variables which reflect to financial accessibility, efficiency and stability as financial development indicators.

4.2.1 An indicator of economic growth

The standard measure of economic growth is growth rate of GDP per capita and in this study I used real GDP per capita (PPP) at constant price in 2005 in U.S dollar terms. Because the quarterly data contains seasonality, Census X12 is used to make seasonal adjustment on the data.

¹⁵ Some data of financial accessibility, efficiency and stability are available since 2000s.

4.2.2 Indicators of financial sector development

Financial deepening indicators: Roubini and Sala-i-Martin (1992), King and Levine (1993) and many other subsequent authors used the ratio of broad money to GDP as financial deepening indicator. In order to measure banking sector magnitude, I used ratio of domestic bank credit to private sector to nominal GDP as second indicator of financial sector development. Capital market development is also crucial for financial sector development, thus, ratio of market capitalization to the GDP is used as one proxy as well.

Classification	assification Variable Name Description						
Economic growth indicator							
Economic growth indicator	Y (DY)	Real GDP per capita by quarter	National Statistics Office of Mongolia				
	Financial devel	opment indicators	<u> </u>				
Financial deepening	ASSET	Ratio of banking sector total asset to GDP	Bank of Mongolia				
	DEPOSIT	Banking sector deposit to GDP	Bank of Mongolia				
	M2	Ratio of M2 to GDP	Bank of Mongolia National Statistics office of Mongolia				
	PRIVATE	Ratio of claims on private sector by banks to GDP	Bank of Mongolia National Statistics office of Mongolia				
	МКТСАР	Ratio of Stock Market capitalization to GDP	Bank of Mongolia National Statistics office of Mongolia				
Financial Accessibility	ACC	Log of Bank accounts number per 1000 adults	World Bank				
	BRANCH	Log of Banks branches per 100,000 adults	World Bank				
Financial Efficiency	SPREAD	Loan rate minus deposit rate	World Bank				
	ROA	Return on asset of banks (after tax)	World Bank				
	ROE	Return on equity of banks (after tax)	World Bank				
	NONINT	Bank Non interest income to total income	World Bank				
	OVERHD	Bank overhead cost to total asset	World Bank				
Financial Stability	CAR	Capital Adequacy Ratio	Bank of Mongolia				
-	NPL	Nonperforming loan to total loan	Bank of Mongolia				
	LIQGDP	Liquid Liabilities to GDP	World Bank				
	LIQI	Liquid assets to total deposits and short term funding	World Bank				
	Ζ	Z-score of banks	World Bank				

Table 2. Data description and sources

Financial accessibility indicators: One of the financial development measure is its accessibility. In this regard, I included bank accounts number per 1000 adults and bank branches per 100,000 adult. Due to data limitation, there is no available data to measure the access to finance for enterprises.

Financial efficiency indicators: Efficiency of banking sector refers to its profitability and efficient operation. Therefore interest rate spread can be a good proxy to measure competition among the commercial banks. As banking sector grows, interest rate spread tends to shrink and it also reflects to banks' healthiness. Although, interest rate can be affected by macroeconomic policies and economic circumstances, generally it shows the efficient allocation of resources. Therefore, financial sector efficiency is the qualitative measure of financial development and therefore the quality of financial sector contributes economic growth in the long run. Economic growth requires not only bigger financial market but also better one. In this study, financial sector efficiency, particularly banking sector efficiency, is measured by interest rate spread, banking sector's ROA, ROE, noninterest income, and overhead cost.

Financial stability indicators: Pierre and Terhi (2010) found that banking sector stability affects real economic output using panel VAR model for OECD countries. Financial stability reduces the uncertainty and it has positive impact on output. Therefore, I included financial sector, particularly banking sector, stability as one measure of financial development. Liquidity measures and probability of bank defaults also included in this category.

4.3 Stationary test

A series is said to be (weakly or covariance) stationary if the mean and covariance of the series do not change over the time. If the time series is not stationary or to series is I(d) which means integrated in order of d, it should be used in the regression as differenced by order of d until it becomes stationary. A difference stationary series is said to be integrated and is denoted as I(d) where d is the order of integration. Stationary time series should be checked by unit root test and Augmented Dickey- Fuller (ADF) test is widely used. At first, the test used in variables on their own level and result shown in Table 4.

As a result of ADF unit root test, all the variables are stationary in the level except variable Y. Accordingly, the unit root of variable Y is tested again in its first order. Because when time series is stationary its further orders are also stationary, additional unit tests for stationary series are not required. Moreover, the results of ADF test with intercept and both of trend and intercept for all variables are same as previous tests result.

Table 3 ADF Unit root test (level, no trend and no intercept)

	t-stat	Probability	Unit Root
ACC	-5.7446	0.0000	Stationary
ASSET	-11.0519	0.0000	Stationary
BRANCH	-5.7446	0.0000	Stationary
CAR	-5.5978	0.0000	Stationary
DEPOSIT	-9.9073	0.0000	Stationary
Y	-1.9074	0.0543	Non stationary
LIQ	-7.2801	0.0000	Stationary
LIQGDP	-9.0000	0.0000	Stationary
LOAN	-6.4390	0.0000	Stationary
M2	-11.1558	0.0000	Stationary
МКТСАР	-7.6104	0.0000	Stationary
NONINT	-7.2801	0.0000	Stationary
NPL	-6.3813	0.0000	Stationary
OVERHD	-7.0000	0.0000	Stationary
ROA	-7.0000	0.0000	Stationary
ROE	-7.0000	0.0000	Stationary
SPREAD	-7.3559	0.0000	Stationary
Ζ	-7.0000	0.0000	Stationary

 Table 4. ADF Unit root test (1st order)

	t-stat	Probability	Unit Root
DY	-13.3935	0.0000	Stationary

4.4 Causality test

VAR models have several advantages compared with other models. One of them is all of variables in VAR model are regarded as endogenous, and OLS method can be applied to each equation separately. When we estimate unrestricted VAR model, it is required to use same number of lags for all of the variables in all equations. Using too many lag length will reduce the degrees of freedom while using too few lagged terms can lead to specification errors. In order to determine the appropriate lag lengths, the multivariate generalization of Akaike's information criterion is used¹⁶. The lowest values of these criteria gives the appropriate length of the lag. In doing so, we used VAR lag order selection criteria and focused on AIC and LR criterion. After determination of the lag order, we estimate bivariate VAR models for possible pair variables of economic growth and financial development indicators.

¹⁶ Introductory Econometrics for Finance 2nd edition, Chris Brooks, 2008

The causality analysis is carried out by using the equations (2) and (3). Table 5-8 shows the results of causality tests between economic growth and financial development indicators. Financial development indicators can be divided into 4 groups: financial depth, access to finance, efficiency, and stability¹⁷.

Table 5 shows that financial depth indicators cause economic growth in unidirectional way. ASSET, DEPOSIT and M2 cause economic growth in a short term (within 1 year, according to the causality tests with the lags between 1 and 4 quarters.) at 5% significance level whereas variables of MKTCAP and PRIVATE cause economic growth in longer term (2 years and 3 years respectively) at 5% significance level.

No. Null Hypothesis Obser Order of **F-Statistic Probability** Causality the lag vation Banking sector 1. DY does not Granger 0.01757 0.8950 68 1 Cause ASSET Asset \rightarrow Growth ASSET does not Granger 0.0049 68 1 8.48309 Cause DY 2. DY does not Granger 68 1 0.18016 0.6726 Deposit \rightarrow Growth Cause DEPOSIT DEPOSIT does not 68 1 15.3444 0.0002 Granger Cause DY 3. $M2 \rightarrow Growth$ M2 does not Granger 1 9.70198 0.0027 68 Cause DY DY does not Granger 68 1 0.19465 0.6605 Cause M2 4. DY does not Granger 8 0.8504 0.5665 Market 50 Capitalization \rightarrow Cause MKTCAP Growth 8 MKTCAP does not 50 2.75183 0.0191 Granger Cause DY 5. DY does not Granger 61 12 1.51206 0.1650 Private sector credit Cause PRIVATE \rightarrow Growth 12 0.0374 PRIVATE does not 61 2.15656 Granger Cause DY

 Table 5. Causal relationship between financial depth and economic growth

Table 6 reports that variables of financial accessibility causes economic growth in short term. Because of banking sector dominated financial market in Mongolia and limited data availability, variables of this group refers to proxies of an access to banking services. The result concludes that there is unidirectional relationship from financial accessibility to economic growth.

¹⁷ World bank's Framework of measuring financial development

No.	Null Hypothesis	Observation	Order of	F-Statistic	Probability	Causality
			the lag			
1.	DY does not Granger	34	1	0.17313	0.6802	Bank Accounts \rightarrow
	Cause ACC					Growth
	ACC does not	34	1	4.58527	0.0402	
	Granger Cause DY					
2.	DY does not Granger	34	1	0.26443	0.6107	Bank Branches \rightarrow
	Cause BRANCH					Growth
	BRANCH does not	34	1	6.01393	0.0200	
	Granger Cause DY					

Table 6. Causal relationship between financial accessibility and economic growth

Granger causality tests in Table 7 report that there are unidirectional relationship from financial efficiency variables to economic growth in lag order of 8-15. It reports that financial sector efficiency causes economic growth in 2-4 years.

Table 7. Causal relationship between financial sector efficiency and economic growth

No.	Null Hypothesis	Observation	Order of	F-Statistic	Probability	Causality
			the lag			
1.	DY does not	51	8	1.20876	0.3234	Interest rate
	Granger Cause					Spread \rightarrow Growth
	SPREAD					
	SPREAD does not	51	8	2.32546	0.0414	
	Granger Cause DY					
2.	ROA does not	38	13	2.39281	0.0778	$ROA \rightarrow Growth^*$
	Granger Cause DY					
	DY does not	38	13	0.28658	0.9821	
	Granger Cause ROA					
3.	ROE does not	38	13	3.13448	0.0329	$ROE \rightarrow Growth$
	Granger Cause DY					
	DY does not	38	13	0.15963	0.9987	
	Granger Cause ROE					
4.	DY does not Granger	47	15	4.37246	0.0154	Noninterest
	Cause NONINT					income ← Growth
	NONINT does not	47	15	0.41692	0.9354	
	Granger Cause DY					
5.	OVERHD does not	35	16	3.43506	0.2487	No causality
	Granger Cause DY					
	DY does not	35	16	0.44762	0.8606	
	Granger Cause					
	OVERHD					

*At 10% significance level

In my point of view, developed financial sector means better financial services and stable environment. In this regard, CAR and banking sector liquidity measures lead to economic growth in unidirectional way while bidirectional relationship exists between NPL and economic growth. This bidirectional relationship is obvious because when economy shrinks, there is high possibility to increase nonperforming loan, when NPL increases, an economic activity also can slow down.

No.	Null Hypothesis	Observation	Order of	F-Statistic	Probability	Causality		
			the lag					
1.	DY does not	26	1	0.41515	0.5257	$CAR \rightarrow Growth$		
	Granger Cause CAR							
	CAR does not	26	1	7.96272	0.0097			
	Granger Cause DY							
2.	DY does not	62	2	3.14107	0.0508	$NPL \leftrightarrow Growth$		
	Granger Cause NPL							
	NPL does not	62	2	9.13453	0.0004			
	Granger Cause DY							
3.	LIQGDP does not	75	8	6.87872	0.0000	$LIQGDP \rightarrow$		
	Granger Cause DY					Growth		
	DY does not	75	8	0.47708	0.8674			
	Granger Cause							
	LIQGDP							
4.	LIQ1 does not	43	12	3.52669	0.0080	$LIQ1 \rightarrow Growth$		
	Granger Cause DY							
	DY does not	43	12	0.50694	0.8837			
	Granger Cause LIQ1							
5.	DY does not	38	13	0.13763	0.9994	No Causality		
	Granger Cause Z							
	Z does not Granger	38	13	1.30135	0.3348			
	Cause DY							

Table 8. Causal relationship between financial stability and economic growth

V. CONCLUSION

This thesis studied the causal relationship between range of indicators of financial development and economic growth using Granger Causality test in case of Mongolia for the period of 1995-2012. The main interest was analyze if there are causalities between various types of financial development indicators and economic growth and if exist, what the directions will be.

In general, the empirical findings show that financial development indicators drive to economic growth in case of Mongolia, and relationship is unidirectional. Following main causal relationships between financial development indicators and economic growth found:

- Financial deepening indicators ratios of banking sector asset to GDP, banking sector deposit (as a source of credit) to GDP, broad money or M2 to GDP strongly and promptly causes economic growth in short term. In contrast, domestic credit provided by banking sector relative to GDP and market capitalization relative to GDP drive to economic growth in medium term of 2-3 years.
- The causal relationship exists from financial accessibility indicators bank accounts per 1000 adults and bank branches per 100,000 adults to economic growth in short period. However, because of data limitation, financial accessibility indicators did not include the accessibility for enterprises. Therefore, these indicators might not represent the access to finance fully.
- Banking sector efficiency indicators interest rate spread and profitability measures causes economic growth in medium term of 2-4 years.
- There is a causal relationship from banking sector stability indicators capital adequacy ratio, nonperforming loan to total loan, banking sector liquid asset to GDP, banking sector liquid asset to its total asset to economic growth.

Because of the presence of relationship from financial development to economic growth, the study suggests that Mongolian policymakers need to continue to pursue further financial sector development. Since the financial liberalization policies have significant effect on strengthening Mongolian financial sector, the government should continue implementation of policies which dedicated to stabilize macro economy and create suitable macro environment through sound fiscal, monetary, exchange rate and interest rate policies. Therefore, preserving the stability of banking sector is vital for not only sustainable financial sector development but also for economic growth. In doing so, strengthening macro and micro supervision framework for financial institution is a further action to continue. In terms of access to finance, increasing the possibilities to access

financial resources for enterprises, especially small and medium ones, will make benefits for the economy and society in large scale.

In order to improve the efficiency of financial sectors resource allocation function, the further development of capital market is truly important. Legal and supervisory framework and internationally acknowledged practices to support modern securities market is needed and it will encourage the efficiency of capital market operation. The development of capital market will diversify the Mongolian financial sector and reduce the dependence on only banking sector. Furthermore, because current banking sector is highly concentrated on few banks, the policies to encourage competition among the banks should be implemented.

Finally, in current situation of Mongolia, the empirical tests suggest that policies aimed to strengthen and develop the financial sector will lead to economic growth.

REFERENCES

- Arestis, Philip. & Demetriades, Panicos., & Luintel Kul B., 2001, "Financial Development and Economic Growth: The Role of Stock Markets", Journal of Money, Credit and Banking, Vol. 33, No. 1 (Feb., 2001), pp. 16-41.
- [2] Arestis, Philip. & Demetriades, Panicos., 1997, "Financial Development and Economic Growth: Assessing the Evidence", The Economic Journal, Vol. 107, No. 442 (May, 1997), pp. 783-799.
- [3] Asian Development Bank, 2005, "Government Financial Sector Reform Program (2000 2010), Mid-Term Review Report"
- [4] Asian Development Bank, 2008, "Evaluation Study: Financial Sector in Mongolia— Transition to a Market Economy Built on Successful Financial Reforms, Rapid Sector Assessment".
- [5] Bagehot, Walter. 1873, "Lombard Street: A Description of the Money Market. King, London", reprinted Wiley, New York 1999, ISBN 0-471-34499-0
- [6] Bank of Mongolia, 2012, "Annual Report"
- [7] Barro, Robert J., and Xavier Sala-i-Martin, 1992, "Convergence", Journal of Political Economy 100(2): 223-251.
- [8] Berger, Allen N. & Hasan, Iftekhar & Klapper, Leora F., 2004, "Further evidence on the link between finance and growth: An international analysis of community banking and economic performance", Bank of Finland Discussion Papers, Aug, 2004.
- [9] Berthelemy J. C. & Varoudakis A., 1996, "Economic Growth, Convergence Clubs, and the Role of Financial Development", Oxford Economic Papers, New Series, Vol. 48, No. 2, (Apr., 1996), pp. 300-328.
- [10] Bhattacharya, P. C. & M. N. Sivasubramanian, 2003, "Financial Development and Economic Growth in India: 1970-71 to 1998-1999", Applied Financial economics, 13(12).
- [11]Blackburn, K., & Huang, V., 1998, "A theory of growth, financial development and trade", Economica, 65, 107–124.
- [12] Brooks, Chris. 2008, "Introductory Econometrics for Finance" 2nd edition, Cambridge University Press, 648 pages.

- [13] Calderon, Cesar & Liu, Lin, 2003. "The direction of causality between financial development and economic growth," Journal of Development Economics, Elsevier, vol. 72(1), pages 321-334, October.
- [14] Caprio, Gerard, Jr & Levine, Ross, 1994. "Reforming Finance in Transitional Socialist Economies," World Bank Research Observer, World Bank Group, vol. 9(1), pages 1-24, January.
- [15] Chang, T., 2002, "Financial Development and Economic Growth in Mainland China: A Note on Testing Demand-Following or Supply-Leading Hypothesis", Applied Economics Letters, 9, 869-873.
- [16] Cho, Y.J. 1989, "Finance and development: The Korean approach," Oxford Review of Economic Policy, Vol 5, No. 4, Winter, pp. 88-102
- [17] Christopher J. Green, Alun Dwyfor Evans, Victor Murinde, 2002. "Human Capital and Financial Development in Economic Growth: New Evidence Using the Translog Production Function," International Journal of Finance & Economics, John Wiley & Sons, Ltd., vol. 7(2), pages 123-40, April.
- [18] Christopoulos D.K. & Tsionas E.G., 2004, "Financial development and economic growth: evidence from panel unit root and cointegration tests", Journal of Development Economics 73 (2004) 55 – 74
- [19] Cochrane J.H., 2013, "Finance: Function Matters, Not Size", The Journal of Economic Perspectives, Vol. 27, No. 2 (Spring 2013), pp. 29-49.
- [20] Darrat Ali F., Abosedra Salah S. & Hassan Y. Aly, 2005, "Assessing the Role of Financial Deepening in Business Cycles: The Experience of the United Arab Emirates", Applied Financial Economics, Volume 15, Number 7, 1 April 2005, 17 pages.
- [21] Dawson, John W., 2003. "Causality in the freedom-growth relationship," European Journal of Political Economy, Elsevier, vol. 19(3), pages 479-495, September.
- [22] Deidda L., 2001. "Financial Institutions' Expertise and Growth Effects of Financial Liberalisation," Working Paper CRENoS 200105, Centre for North South Economic Research, University of Cagliari and Sassari, Sardinia.

- [23] Demetriades P.O. & Hussein K.A. "Does financial development cause economic growth? Time-series evidence from 16 countries." Journal of Development Economics 51, (1996): 387-411.
- [24] Tsolmon, 2010, "Mongolia Banking Sector", ERINA discussion paper No. 1004e.
- [25] Edison, Hali J. & Levine, Ross & Ricci, Luca & Slok, Torsten, 2002. "International financial integration and economic growth," Journal of International Money and Finance, Elsevier, vol. 21(6), pages 749-776, November.
- [26] Ghirmay, T., 2004. "Financial Development and Economic Growth in Sub-Saharan African Countries: Evidence from Time Series Analysis". African Development Review. 415-432.
- [27] Goldsmith R. W., "Financial Structure and Development", New Haven, CT: Yale University Press.
- [28] Gurley J.G., Shaw E.S, "Financial Structure and Economic Development", The University of Chicago Press, Page 257 of 257-268
- [29] HahIni, Hongjoo & Yenier, Demir, 1998, "Financial Sector Reforms in Mongolia", EDI working papers, World Bank.
- [30] Harb, Nasri & Al-Awad, Mouawiya, 2005. "Financial Development and Economic Growth in the Middle East," MPRA Paper 13605, University Library of Munich, Germany.
- [31] Hassan, M.K. & Bashir A-H.M., 2003, "Determinants of Islamic Banking profitability", Paper presented at the Economic Research Forum (ERF) 10th Annual Conference, Marrakesh, Morocco, 16-18 December.

Chuah H. L & Thai V, 2004, "Financial Development and Economic Growth: Evidence from Causality Tests for the GCC countries", IMF Working Paper, WP/04/XX (Fall).

- [32] Hicks J., 1969, "A Theory of Economic History". Oxford: Clarendon, 181 pages
- [33] IMF, 2011, "Mongolia: Financial System Stability Assessment", Country Report No. 11/107.
- [34] Jung, W. S., 1986. "Financial Development and Economic Growth: International Evidence. Economic Development and Cultural Change", 34(2), 333-346.
 Ghali, K., 1999, "Financial Development and Economic Growth: The Tynisian Experience", Review of Development Economics, 3(3), 310 - 322.
- [35] Jung, Woo S., 1986, "Financial Development and Economic Growth: International Evidence", Economic Development and Cultural Change, Vol. 34, No. 2 pp. 333-346.

- [36] Kaminsky, Graciela & Schmukler Sergio L., 2002. "Emerging Market Instability: Do Sovereign Ratings Affect Country Risk and Stock Returns?," World Bank Economic Review, World Bank Group, vol. 16(2), pages 171-195, August.
- [37] Khan Mohsin S. & Senhadji Abdelhak S, 2001, "Threshold Effects in the Relationship between Inflation and Growth", IMF Staff Papers, Vol. 48, No. 1
- [38] Khan Mohsin S. & Senhadji Abdelhak S., 2000, "Financial Development and Economic Growth: An overview", IMF, Working paper, WP/00/209, 24 pages
- [39] Khan Mohsin S. & Senhadji Abdelhak S., 2003. "Financial Development and Economic Growth: A Review and New Evidence", Journal of African Economies, Centre for the Study of African Economies (CSAE), vol. 12(Supplement), pages 89-110, September.
- [40] Khan, Mohsin S. & Senhadji Abdelhak S., "Financial Development and Economic Growth: An Overview." IMF Working Paper, WP/00/209, (December 2000).
- [41]King, R.G. & Levine R. "Finance and Growth: Schumpeter Might be Right." The Quarterly Journal of Economics 108, no. 3 (August 1993): 717-737.
- [42] Lensink, Robert. 2001, "Financial development, uncertainty and economic growth." De Economist 149, no. 3 (2001): 299-312
- [43] Levine, Ross & Loayza, Norman & Beck, Thorsten, 2000, "Financial intermediation and growth: Causality and causes", Journal of Monetary Economics 46 (2000), pp. 31-77.
- [44] Levine, Ross, "Financial Development and Economic Growth: Views and Agenda." Journal of Economic Literature. Vol. 35, (June 1997): 688-726.
- [45] Loayza Norman V. & Romain Rancière, 2006, "Financial Development, Financial Fragility, and Growth", Journal of Money, Credit and Banking, Vol. 38, No. 4 (Jun., 2006), pp. 1051-1076.
- [46] Luintel, K. B., Khan, M. 1999. "A quantitative reassessment of the finance-growth nexus, Evidence from a multivariate VAR", Journal of Development Economics, 60, 381-405.
 Thangavelu Shandre M. & Jiunn Ang Beng & James, 2004. "Financial development and economic growth in Australia: An empirical analysis", Empirical Economics, Springer, vol. 29(2), pages 247-260, 05.
- [47] Manning, M., 2003. "Finance Causes Growth: Can We Be So Sure?" The BE Journal of Macroeconomics, Contributions 3.

- [48] McKinnon, Ronald I. 1973, "Money and Capital in Economic Development", Washington, DC, Brookings Institution.
- [49] Shaw, Edward 1973, "Financial Deepening in Economic Development", New York: Oxford University Press.
- [50] Mody R. J., 1984, "Financial Mechanism and Economic Growth", Economic and Political Weekly, Vol. 19, No. 49 (Dec. 8, 1984), pp. 2095-2096.
- [51] Nagaishi, Makoto. 1999, "Stock Market Development and Economic Growth: Dubious Relationship", Economic and Political Weekly, Vol. 34, No. 29 (Jul. 17-23, 1999), pp. 2004-2012.
- [52] Odedokun M.O 1998, "Financial Intermediation and Economic Growth in Developing Countries", Journal of Economic Studies, 25(3): 203 – 234.
- [53] Odedokun, M. O. 1996, "Alternative econometric approaches for analyzing the role of the financial sector in economic growth: time-series evidence from LDCs". Journal of Development Economics 50, 119 -146.
- [54] Patrick, H.T. 1966, "Financial Development and Economic Growth in Underdeveloped Countries", Economic Development and Cultural Change 14, 174--89.
 Sinha, Dipendra & Macri, Joseph, 2001. "Financial development and economic growth: The case of eight Asian countries," MPRA Paper 18297, University Library of Munich, Germany.
- [55] Rajan, R.G. & L. Zingales. "Financial Dependence and Growth." The American Economic Review 88, no. 3 (June 1998): 559-586.
- [56] Robinson, Joan, 1952, "The generalization of the General Theory, The rate of interest and other essays", London, Macmillan, 1952, pp 67-142
 Lucas, Robert E., 1988, "On the Mechanics of Economic Development, Journal of Monetary Economics", 1988, 3-42.
- [57] Rousseau, P. L. & Wachtel, P., 2000. "Equity markets and growth: Cross-country evidence on timing and outcomes, 1980-1995,"Journal of Banking & Finance, Elsevier, vol. 24(12), pages 1933-1957, December.
- [58] Savvides, Andreas. 1995, "Economic Growth in Africa", World Development, volume 23, number 3, pp. 449-458.

- [59] Schumpeter J., 1912, "The theory of Economic Development: An inquiry into Profits, Capital, Interest, and business cycle", Cambridge: Harvard University Press, 1934
- [60] Shan, Jordan. & Morris, Allan, 2002, "Does Financial Development 'lead' Economic Growth?" International Review of Applied Economics 16, no. 2, (2002): 153-168.
- [61] Shan, Jordan. & Morris, Allan. & Sun, Fiona., 2001, "Financial Development and Economic Growth: An Egg-and-Chicken Problem", Review of International Economics, 9(3), 443 - 454.
- [62] Shen Chung-Hua & Lee Chien-Chiang, 2006, "Same Financial Development Yet Different Economic Growth: Why?" Journal of Money, Credit and Banking, Vol. 38, No. 7 (Oct., 2006), pp. 1907-1944.
- [63] Townsend Robert M. & Ueda Kenichi, 2006, "Financial Deepening, Inequality, and Growth: A Model-Based Quantitative Evaluation", The Review of Economic Studies, Vol. 73, No. 1 (Jan., 2006), pp. 251-280.
- [64] World Bank, "The making of the East Asia miracle", Policy Research Bulletin, August--October 1993, Volume 4, Number 4.
- [65] World Bank, 1992, "Mongolia: Toward Market Economy", ISSN: 0253-2123, ISBN: 0-8213-2247-8.
- [66] World Bank, 2011, "Financial Sector Assessment in Mongolia".
- [67] World Bank, 2012, Financial sector assessment, "Mongolia Access to Finance", Technical Note.
- [68] World Bank, 2012, Financial sector assessment, "Mongolia Capital Markets", Technical Note.
- [69] World Bank, 2012, Financial sector assessment, "Mongolia"

APPENDIXES

Appendix 1

Table 9 Main economic and financial reforms in 1991-1992

1991:

- Increase in retail prices of most goods
- Lengthened maturity structure of term deposits and increased interest rates
- Substantial reduction of budgetary subsidy for imported goods and to lose-making enterprises
- Devaluation of togrog vis-a-vs US dollar to MNT 40=USD 1
- Adjustments to wages, pension benefits, and private savings deposits to soften impact of price increase.
- Privatization Law passed and program for small privatization initiated.
- Banking Law passed, and bank of Mongolia established as the central bank. Separate commercial banks established.
- Direct export rights granted to selected manufacturers
- Foreign trading rights issued on nondiscriminatory basis
- Stock market regulation established.

1992

- Deregulated all prices (except for public services, utility tariffs, public housing rents, selected medicines, flour, bread, and rationed vodka).
 eliminated mandatory state orders for exports
- Passed bankruptcy law.
- Issue foreign trading licenses on a nondiscriminatory basis (except for copper scrap, cashmere, timber, and elk horns).
- Eliminated budgetary transfer to public enterprises.
- Introduced weekly monitoring of budgetary revenues and expenditures.
- In September 1992 first prudential ratios have been enforced by the Bank of Mongolia
- Established a stock exchange
- Raised central bank lending rate close to inflation level

Source: World Bank, Mongolia toward Market Economy, 1992



Figure 15. GDP contribution by some sectors of Mongolia



Source: National Statistics office of Mongolia





Source: World Bank

Appendix 4





Source: World Bank





Figure 18. Risk Weighted Capital Adequacy Ratio of Mongolian Banks

Figure 19. Number of domestic listed companies



Source: World Bank

	NPL	OVERHD	ROA	ROE	SPREAD	Z	
Mean	-0.006406	-0.020588	0.014314	0.027059	-0.005254	-0.002745	
Median	-0.040000	0.000000	0.000000	0.000000	-0.010000	0.000000	
Maximum	1.590000	0.190000	1.400000	1.670000	0.550000	0.550000	
Minimum	-0.500000	-0.330000	-0.400000	-0.470000	-0.400000	-0.190000	
Std. Dev.	0.269464	0.082642	0.227044	0.278009	0.173119	0.090688	
Skewness	3.283864	-1.752604	4.348358	4.227877	0.653657	4.182259	
Kurtosis	20.59256	8.464303	28.98455	25.98102	3.849089	28.90097	
Jarque-Bera	940.3551	89.55832	1595.513	1274.208	5.973804	1574.254	
Probability	0.000000	0.000000	0.000000	0.000000	0.050443	0.000000	
Sum	-0.410000	-1.050000	0.730000	1.380000	-0.310000	-0.140000	
Sum Sq. Dev.	4.574473	0.341482	2.577451	3.864459	1.738271	0.411216	
Observations	64	51	51	51	59	51	

Table 10. Descreptive Statistics

	LIQ1	LIQGDP	LOAN	M2	MKTCAP	NONINT	
Mean	-0.009091	0.013253	-0.000800	-0.046757	0.062241	0.000364	
Median	0.000000	0.000000	0.010000	0.010000	0.020000	0.000000	
Maximum	0.240000	0.350000	0.450000	0.340000	2.440000	0.520000	
Minimum	-0.330000	-0.520000	-1.000000	-1.000000	-0.500000	-0.320000	
Std. Dev.	0.095457	0.090340	0.205379	0.275438	0.403498	0.120983	
Skewness	-1.192984	-1.242644	-2.825182	-2.752080	4.036553	1.407162	
Kurtosis	7.693366	19.14997	16.05565	10.07346	23.43989	10.73638	
Jarque-Bera	63.52621	923.3684	632.4270	247.6830	1167.163	155.3108	
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	
Sum	-0.500000	1.100000	-0.060000	-3.460000	3.610000	0.020000	
Sum Sq. Dev.	0.492055	0.669222	3.121352	5.538222	9.280209	0.790393	
Observations	55	83	75	74	58	55	

	ACC	ASSET	BRANCH	CAR	DEPOSIT	DY	
Mean	0.010571	0.026667	0.004000	0.016296	0.026087	0.000556	
Median	0.000000	0.030000	0.000000	-0.030000	0.020000	0.000000	
Maximum	0.110000	0.350000	0.050000	1.120000	0.310000	0.030000	
Minimum	0.000000	-0.240000	-0.010000	-0.270000	-0.230000	-0.030000	
Std. Dev.	0.029500	0.089124	0.012175	0.250479	0.101071	0.009405	
Skewness	2.774914	0.367468	2.666667	3.359193	0.408502	-0.191998	
Kurtosis	9.041620	5.244017	9.268519	15.37192	3.714215	6.225635	
Jarque-Bera	98.14841	16.03026	98.78570	222.9763	3.385594	39.57066	
Probability	0.000000	0.000330	0.000000	0.000000	0.184004	0.000000	
Sum	0.370000	1.840000	0.140000	0.440000	1.800000	0.050000	
Sum Sq. Dev.	0.029589	0.540133	0.005040	1.631230	0.694643	0.007872	
Observations	35	69	35	27	69	90	

Table 11. Correlation Matrix

	ACC	ASSET	BRANCH	CAR	DEPOSIT	DY	LIQ1	LIQGDP	LOAN	M2	MKTCAP	NONINT	NPL	OVERHD	ROA	ROE	SPREAD	Z
ACC	1.0000																	
ASSET	-0.2784	1.0000																
BRANCH	0.8992	-0.2909	1.0000															
CAR	-0.1007	0.2350	-0.1244	1.0000)													
DEPOSIT	-0.1792	0.8599	-0.2092	0.2546	1.0000													
DY	0.4117	-0.5437	0.5326	-0.0836	-0.3684	1.0000												
LIQ1	-0.4088	0.3473	-0.2714	-0.1760	0.4038	-0.2858	1.0000											
LIQGDP	0.5176	-0.0077	0.5550	0.1007	0.1225	0.1629	-0.3201	1.0000										
LOAN	0.0525	0.7626	0.0470	-0.0210	0.5606	-0.5318	0.1592	0.1719	1.0000									
M2	-0.2046	0.8909	-0.1797	0.2592	0.9384	-0.3822	0.2784	0.1008	0.5963	1.0000)							
MKTCAP	0.2877	-0.0860	0.3823	-0.0137	0.0139	0.3517	-0.0270	0.2120	0.1763	-0.0396	1.0000							
NONINT	0.1319	0.4390	0.1195	-0.0794	0.5775	-0.2757	0.4542	0.5273	0.3793	0.4421	-0.0128	1.0000						
NPL	-0.1459	0.0486	-0.1709	-0.2686	-0.1506	-0.1806	0.2050	-0.0716	-0.0881	-0.1023	-0.1540	0.1434	1.0000					
OVERHD	-0.7125	-0.0164	-0.5191	0.2363	-0.1120	-0.0713	-0.1351	-0.0454	-0.1661	0.0065	-0.0932	-0.3755	-0.0155	1.0000				
ROA	0.5415	0.0816	0.5905	-0.0126	0.1282	0.1749	-0.3669	0.7530	0.2358	0.1850	0.1084	0.5319	-0.0964	-0.2573	1.0000			
ROE	0.5675	0.0268	0.5786	0.0312	0.0711	0.1902	-0.5047	0.7908	0.1982	0.1332	0.1042	0.4470	-0.1161	-0.2045	0.9854	1.0000		
SPREAD	0.0086	-0.0739	-0.2111	-0.1118	-0.1449	-0.0849	-0.0925	-0.4742	-0.0133	-0.2074	-0.3538	-0.2566	-0.0982	-0.2816	-0.2727	-0.2543	1.0000	
Z	-0.1765	-0.2948	-0.1494	-0.0754	-0.3524	0.1418	0.2190	-0.7294	-0.2910	-0.3533	0.0628	-0.7107	-0.0109	0.0427	-0.8584	-0.8544	0.2750	1.0000

ACKNOWLEDGEMENTS

Foremost, I would like to express my sincere gratitude to my advisor, Professor Joo-Hoon Kim, for his continuous and excellent guidance, caring, patience, and providing me with precious advises based on his immense knowledge and experience. I would never have been able to finish my research paper without the guidance of my advisor. Besides my advisor, I would also like to thank Professor Hoe Kyung Lee and Professor Ji Soo Kim for giving me valuable comments and suggestions and helping me to develop my research paper.

Therefore, I would like to thank to my colleagues and friends from the Bank of Mongolia who helped me to find data set for empirical study. My deep gratitude goes to KAIST-KOICA 2012 fellows for encouraging and helping each other every time.

Finally, I would like to thank my family and friends who encouraged me to do this research paper.