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The Role of Nonbank Intermediation in a Financially Repressed Economy

(Theory and Evidence Based on the Korean Economy 1972-1994)

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Ву

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By

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#### ABSTRACT

In existing economic literature on finance and economy, it is argued and generally accepted that financial intermediation contributes to economic growth though the contending argument is that financial development is simply a result of economic growth. However, studies on the contribution of financial intermediation of nonbanks (as opposed to banks) to economic growth are relatively scant and too general to clarify the mechanism through which nonbank financial intermediation might help economy to expand and develop.

The focus of this study is on whether nonbank financial intermediation contributed to economic growth in the case of Korea where the share of nonbank financial intermediation increased from around 20% in 1970 to more than 60% in the early 1990's. This study is particularly interesting in light of the fact that rapid economic growth in Korea was accompanied by a concomitant increase in the share of nonbank financial intermediation.

As a precursor to the empirical analysis, this study shows theoretically that financial intermediation of nonbanks subject to lesser liquidity control is complementary to, rather substitutional for, that of banks. Further, it is shown by optimizing a two-period dynamic model that under certain conditions nonbank intermediation increases an economy's savings mobilization and contributes to the economic growth.

For empirical analysis, we used the annual data from 1972 to 1994 which can be considered as a financially repressed period. The empirical results are all consistent with the theoretically expected: nonbanks are complementary to banks in financial intermediation, increased the savings mobilization, and in the end contributed to the economic growth of the Korean economy during the sample period. Further, the estimated allocative efficiencies of nonbanks are almost in phase with business cycles, which may well be interpreted as consistent with the proposition that nonbanks financial intermediation made a significant contribution to Korea's economic growth.

# **TABLE OF CONTENTS**

ACKNOWLEDGMENTiv
ABSTRACTvi
LIST OF TABLESxii
LIST OF FIGURES
CHAPTER I: INTRODUCTION
1.1 Background of the Study1
1.2 Objectives of the Study5
1.3 Structure of the Study7
CHAPTER II: REVIEW OF PREVIOUS STUDIES
2.1 Finance and Economy9
2.2 Views on Nonbank Intermediation12
2.2.1 Pioneers' View13
2.2.2 Financial Instrument Approach14
2.2.3 Financial Structure and Intermediation Pattern16
2.3 Some Empirical Studies
CHAPTER III: RELATIONSHIP BETWEEN BANKS AND NONBANKS21
3.1 A Brief History of Korean Financial System21
3.2 Type of Nonbank Financial Institution

3.2.1 Development Institutions	27
3.2.2 Investment Institutions	28
3.2.3 Savings Institutions	29
3.2.4 Life Insurance System	30
3.3 Growing Significance of Nonbank Intermediation (1970-1994)	31
3.4 Differences between Banks and Nonbanks	33
3.4.1 Greater Degree of Autonomy for Nonbanks	33
3.4.2 Higher Interest Allowed	35
3.4.3 Product Variation: Love of Variety	35
3.4.4 Allocative Efficiency	39
3.5 Relationship between Banks and Nonbanks: Complements or Substitutes4	40
3.5.1 Argument for Complementarity or Substitution4	40
3.5.2 A Simple Illustration	43
3.6 Empirical Evidence	47
3.7 Summary	52
CHAPTER IV: NONBANKS, SAVINGS, and ECONOMIC GROWTH5	53
4.1 Determinants of Savings Level5	;3
4.2 Regulatory Differences and Savings Mobilization	55
4.3 Allocative Efficiency and Savings Mobilization5	58

4.3.1 Two-Period Dynamic Model
4.3.2 Efficiency and Relationship between Banks and Nonbanks64
4.4 Summary: Channels of Impact on Economic Growth66
CHAPTER V: EMPIRICAL EVIDENCE
5.1 Test of Impact on Economic Growth68
5.1.1 Granger Causality Model69
5.1.2 Modified Two-Gap Model73
5.1.3 Interest Sensitivity Test75
5.1.4 Interpretation of Test Results
5.2 Test of Effect from Allocative Efficiency
5.2.1 Definition of Allocative Efficiency82
5.2.2 Measurement of Allocative Efficiency
5.2.3 Interpretation of Test Results
5.2.4 Allocative Efficiency and Business Cycle
CHAPTER VI: CONCLUSION
Endnotes
Appendices114
Appendix A: Bank Deposits and Nonbank Deposits114
Appendix B: Credit Allocation by Industry

Bibliography	
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# LIST OF TABLES

<u>Table</u>	Page
2.1	Growth Rate and Other Economic Indicators for Country Groups by Sign of Real Interest Rates
3.1	Share of Financial Institutions in Terms of Deposits and Loans
3.2	Rates on One-Year Time Deposits
3.3	List of Financial Instruments
3.4	Unit Root Test Results49
3.5	Granger's Causality Test Results (Level & Differenced Data)50
3.6	Error Correction Models Estimated Estimation Results
5.1	Causal Relations between Financial and Economic Growth72
5.2	GLS-Estimated Coefficients for Alternative Savings Functions77
5.3	Estimated VAR Coefficients
5.4	Allocative Efficiency by Productivity Contribution

# LIST OF FIGURES

<u>Figure</u>		Page
4.1	Impact Channels on Economic Growth	.67
5.1	Response of Real Financial Savings to one s.d. Impulse of Real CBY	.81
5.2	Business Cycle and Allocative Efficiency	.92

### **CHAPTER I**

# INTRODUCTION

### 1.1 Background of the Study

Korea's<sup>1</sup> rapid, successful transformation from a poor agricultural economy to a highly industrialized one is well-known. Yet, despite numerous studies, no one has succeeded in precisely isolating the reasons for its impressive economic development. The neoclassical view attributes Korea's success to the adoption of an outward-oriented development strategy, assuming the existence of well-developed markets and a small government. An opposing school attributes the same success to deliberate but pervasive government intervention; that is, government decisions were often substituted for the market mechanism in resource allocation.

In most developing countries, the activities of financial institutions and household behavior are heavily affected by the authorities, which influence the activities of financial institutions through supervision and regulation, and thus define the possible range and characteristics of financial instruments.<sup>2</sup> Household decision making is also affected directly or indirectly by government policies. The public pension system is a good example of a government policy which may directly affect the intertemporal distribution of a household's resources. Financial policies also define the liquidity constraints faced by the household, and control the level of risk to which depositors are exposed through the deposit insurance system. There is much debate over the role of government economic policy in the development process. Some economists argue that the successful intervention of the government underlies the high growth of some Asian countries such as Korea, Taiwan, and Singapore. Amsden (1994) also points out that strong governments and their prudent intervention in resource allocation may have played an important role in the economic development of Japan and Germany.<sup>3</sup>

Even the World Bank, which has consistently sided with the free market mechanism, and maintained that government should be as small as possible, once sent different signals. Before the Asian crisis, it even gave the nod to the relatively active government intervention in some East Asian countries in light of their superior economic performance. In other words, the World Bank (1993) seemed to be in favor of "deliberate government intervention if necessary" and even mentioned the positive aspects of repressed interest rates and credit rationing, which had been common in the rapidly-growing East Asian economies of the pre-crisis era.<sup>4</sup> Krugman (1993) holds a skeptical view on government intervention, however.

The Korean economy is often characterized as having strong government-led export-driven economic policies that act as a locomotive for the country's high-speed growth. While such efforts by the government have been widely discussed, its aggressive financial policies, devised and implemented to mobilize and allocate savings, have not been sufficiently addressed. An assessment of the policies, especially from the institutional point of view, would be meaningful to both development economists and policymakers in the field. It is a fair assessment that all Newly Industrialized Economies (NIEs) in Asia have seen sustained high levels of investment because they have all enacted policies to encourage high rates of domestic savings and maintained a stable macroeconomic performance through sound economic policy. In particular, the Korean economy has had a unique experience concerning the formation of financial markets because almost every nonbank financial institution has been established under the direct guidance of the authorities. In other words, almost no financial institutions, with the exception of banks, have been independently created.

The close relationship between financial and economic development has been a strongly supported hypothesis ever since Joseph Schumpeter (1912) argued that services provided by financial intermediaries are essential for technical innovation and economic development. Empirical studies by Goldsmith (1969) and McKinnon (1973) found a close relationship between financial and economic development in the case of a few countries. However, Robinson (1952) contends that financial development is simply a result of economic growth, and Lucas (1988) describes the relationship between financial and economic development is service that financial economics even assert that financial innovation can carry with it serious danger of destabilization.

In examining the history of Korea's economic development, a historical event serves as a good example of deliberate government intervention; that is, government initiative in the creation of nonbank financial institutions in the mid-1970s. Since that time, the importance of nonbank financial institutions (NBFIs) in the financial intermediation structure has grown rapidly, coinciding with rapid economic growth initiated in the 1970s. For example, in 1970, the NBFIs constituted only about 20 percent of the total financial intermediation activities, but this share had risen to around 60 percent by the early 1990s. The dramatic growth of nonbanks in the short span of 20 years would seem to warrant more attention, but researchers have not sufficiently addressed the role of nonbank financial intermediation in economic development.

It should be pointed out that there exist substantial differences between nonbank financial institutions and depositary money banks. One main difference is that nonbank institutions enjoy greater freedom in terms of the central bank's control over their money supply. Once the central bank decides to absorb funds through open market operations, depositary money banks must either stop additional lending, collect on loans, or at the very least, be more conservative in their lending. Nonbank financial institutions, on the other hand, have relatively fewer constraints because their intermediation is not directly regulated for the purpose of monetary targeting. Another important difference is that, despite widespread financial repression in Korea, nonbank financial institutions have been allowed to provide a greater variety of instruments at higher interest rates to induce more funds into the financial system.<sup>5</sup>

In analyzing the impact of nonbank financial institutions on economic growth, Korean financial markets warrant investigation. The establishment of nonbank financial institutions initiated by the government was clearly an external shock to the financial system that has affected the real and financial sectors. The establishment of the nonbank financial institutions offers a useful experimental situation by which to empirically test the impact of development of nonbank financial institutions on savings mobilization and economic growth.

## 1.2 Objectives of the Study

Some economists such as Goldsmith (1969), Shaw (1973) and Gertler and Rose (1994) suggest that the share of nonbanks in the financial intermediation structure rises along with economic development. Their ideas are too general however, and they fail to clarify the exact mechanism through which nonbank financial intermediation helps the economy to expand and develop. Goldsmith and Shaw suggest that the importance of nonbank financial intermediation grows with the deepening of the financial market. Gertler and Rose (1994) explain in more detail: "Financialization appears to accompany growth in the real sector. As economies develop, nonbank intermediaries crop up, offering borrowers and lenders a greater range of options." (p.18)

The purpose of this study is to evaluate, both theoretically and empirically, the role of nonbank financial institutions under the condition of financial repression in the process of economic development, with particular focus on the experience of Korea. For this purpose, the characteristics of nonbank intermediaries and their potential effects on resource mobilization will be examined. As Burkner (1980) points out, financial intermediation has multifarious aspects, and nonbank financial institutions are thought to enhance the variety of financial instruments provided to the economy based primarily on less stringent regulations and consumer choices. This study presents the theoretical framework explaining how these regulatory differences could contribute to economic growth through savings mobilization. The hypothesis that nonbank financial institutions contribute to economic growth through savings mobilization will be empirically tested using data on Korea for the years 1972-1994.<sup>6</sup> Nonbank intermediaries will be examined from the perspective of their relative distance from the central bank's monetary policy, and in terms of the differing regulations binding financial institutions.

The theoretical framework to explain the role of nonbank financial intermediaries in economic growth is based on two basic concepts of savings: savings for transfer and additional savings created. The first concept contributes to increased investment efficiency, the second contributes to formation of additional capital and both lead to GDP increase. This study presents a theoretical framework to explain the possible channels of the nonbank financial institutions' contribution to economic growth. The objective is to build a theoretical correlation that will allow inference about the contribution of nonbank financial intermediaries, and discover the empirical evidence supporting the hypothesis that nonbank financial institutions can contribute to economic growth through savings mobilization. This study is based on annual data of economic performance and financial intermediation in Korea, where nonbank intermediation was initiated by the government under conditions of financial repression.

Given that background, the study may provide valuable information about nonbank financial intermediation to policymakers, some of whom do not perceive the differences between bank and nonbank intermediation.<sup>7</sup> Moreover, it may illustrate the positive aspects of nonbank financial intermediation under financial repression.

## 1.3 Structure of the Study

Three untrodden areas will be explored in this study. The first deals with identifying differences between banks and nonbanks, and confirming whether or not their relationship is complementary. The second task will be to clarify whether the identified differences lead to economic growth. In the final area, the relative efficiency of resource allocation by nonbanks will be measured.

Chapter 2 reviews the literature related with the role of nonbank financial institutions in savings mobilization and economic development. It includes a brief discussion of the literature on the relationship between finance and economy.

Chapter 3 will analyze the relationship between banks and nonbanks both theoretically and empirically. The key question here is whether the relationship is substitutional or complementary. Chapter 3 also provides a thorough examination of the Korean financial system with a focus on the growing significance of nonbank intermediation and the exact nature of Korean financial institutions.

Chapter 4 will examine the theoretical framework to explain possible channels of nonbank financial institutions' contribution to economic growth.

To this end, Chapter 4 introduces ability function(for savings mobilization) and a two-period dynamic model to build up the theoretical framework.

Chapter 5 will provide empirical evidence confirming the potentially positive role of nonbank financial institutions. The hypothesis of this study will be tested empirically using data on the Korean economy for the period 1972–1994, when the Korean financial system was operating under conditions of financial repression. The study is limited to the period of 1972-1994 for two basic reasons: In 1972, the government introduced new types of nonbanks, and in 1994 repression came to an end (interest rate liberalization was completed in 1995). If nonbank financial institutions succeeded in mobilizing greater savings, but failed to efficiently allocate the funds they raised, performance of nonbank intermediaries in terms of contribution to economic growth may not have been entirely successful. To clarify this important issue, Chapter 5 will measure allocation efficiency of nonbank intermediation.

The final chapter, Chapter 6 summarizes the progress of the study and provides policy implications which can be induced from the study results. The thesis concludes with possible directions of future studies in the relevant fields.

#### **CHAPTER II**

## **REVIEW OF PREVIOUS STUDIES**

### 2.1 Finance and Economy

While the role of finance in economic development has long been a topic of debate, the relationship between finance and development remains somewhat unclear. Schumpeter's original notion of the role of financial development on economic growth has evolved, producing various derivative ideas; some of which are extensions of Schumpeter's thoughts, while others stand in opposition or remain neutral. Viewpoints on the relationship between financial and economic development can be broadly classified into three categories:

- The supply-leading role of financial intermediation supported by Patrick (1965), Goldsmith (1969), McKinnon (1973), Shaw (1973), Burkner (1980), Greenwood and Jovanovic (1990), and Bencivenga and Smith (1991).
- 2. The demand-following approach supported by Robinson (1952) and Lucas (1988).
- The eclectic approach, standing somewhere between the first two, suggesting double causality. Proponents include Townsend (1983), Gertler (1988), and Gertler and Rose (1994).

Of these three approaches, the supply-leading group can be further divided into two sub-groups with different mechanisms through which financial intermediation contributes to economic growth.

The first sub-group emphasizes improvement in the economy's investment efficiency through 'optimal placement of savings' by financial intermediaries. Proponents include Patrick (1965), Goldsmith (1969), Greenwood and Jovanovic (1990), and Bencivenga and Smith (1991). The work of Greenwood and Jovanovic (1990) and Bencivenga and Smith (1991) advances complex mathematical extensions of Goldsmith (1969) based on an overlapping generations model, which introduces academic achievements by Diamond (1984), Boyd and Prescott (1986) to identify the role of intermediation under the conditions of information asymmetry and incomplete contract enforcement. Greenwood and Jovanovic's view of the intermediary's role (1990) is different from that of Bencivenga and Smith (1991). While Greenwood and Jovanovic see its role as providing customers with information on the distribution of returns on their investments, Bencivenga and Smith (1991) consider the role to encourage risk-averse agents to switch their savings from unproductive, liquid assets to productive, illiquid assets by servicing the liquidity needs of the agents. In short, the former approach stresses the information processing ability of financial intermediaries, while the latter focuses on the intermediaries' risk-pooling function.

The second sub-group in the supply-leading approach, which emphasizes the role of intermediation for savings mobilization, includes McKinnon (1973), Shaw (1973), and Burkner (1980). Economists in this group have set their sights on the established relationship between the savings rate and economic growth, believing that more savings can be mobilized by the vital activities of financial intermediation. McKinnon and Shaw assert that the repressed rates of interest hinder the full ability of intermediaries to

mobilize savings, and thus, recommend a financial liberalization policy for developing countries.<sup>8</sup> Burkner highlights the multiple features of financial intermediation and emphasizes the importance of an inclusive approach to enhance the efficiency of savings mobilization.

It is commonly believed that intermediaries improve investment efficiency through the optimal allocation of funds, and they increase the size of savings mobilization through promotional activities. However, we cannot say that the causality between financial and economic developments only occurs in one way. If rough integration is allowed, we can say that finance and the economy stimulate each other, and that intermediaries contribute to both efficient mobilization and allocation of savings. In a similar vein, Deaton (1990) points out the dual aspects of savings, criticizing the literature on economic development wherein much of the interest in savings has been focused on the relationship between savings and growth. According to Deaton, savings is not only about accumulation, but also about smoothing consumption in the face of volatile and unpredictable income. Savings related with capital accumulation is the macroeconomic aspect of savings mobilization, while savings as a buffer to smooth consumption streams is closely connected with the intertemporal choice theory in microeconomics. At a more analytical level, efforts have been made to identify the impacts of financial liberalization (Bayoumi, 1993), development of a social security system, and other institutional changes (Gravelle, 1991) on the intertemporal choice of consumption streams over time. Levine (1997) reviews almost every major academic study conducted in the field of development finance, and summarizes well the flow of thought on roles of finance for economic

growth. He also looks at the various studies on financing structure and the relationship between banking and corporate direct finance. As a result he has shown that the empirical evidence demonstrates a strong positive relation between financial development and longrun economic growth.

If we accept the supply-leading role of financial intermediation, however, a question arises: Through which channel can financial intermediaries affect economic growth? Levine (1997) argues that market frictions such as information and transaction costs justify the *raison d'être* of financial intermediation, and that financial intermediaries contribute to economic growth through two channels: capital accumulation and technological innovation. Based on the results of an extensive survey of the literature, he breaks down financial intermediaries into five basic functions.<sup>9</sup> The channel of capital accumulation is represented mainly by the function of mobilizing and allocating resources, while the channel of technological innovation is characterized by the function of corporate control and risk management.<sup>10</sup> Ram (1999) suggests that, contrary to empirical evidence provided in many studies, there is a negligible or even negative association between financial development and economic growth based upon data for 95 individual countries.<sup>11</sup>

## 2.2 Views on Nonbank Intermediation

To date, academic efforts to discover the differences between banking and nonbanking intermediation, and the differing impacts thereof on economic growth have not been effective, mainly due to the difficulty of generalization. Each country has its own financial regime uniquely formed by history and customs, and the differences among financial institutions are determined largely by laws and regulations. For example, while commercial banks can run securities businesses under a universal banking system, they are forbidden to do so under a sound banking system. Moreover, the functions of nonbanks are defined differently across countries, making it difficult to provide a generalized description of a nonbank's role.

Although the line between banks and nonbanks depends on factors that vary from one financial regime to another, it is meaningful to review the literature analyzing the multifarious aspects of financial intermediation. Thorough knowledge of these features will provide the basic framework for identifying and evaluating the differences.

Goldsmith (1969) and Shaw (1973) provide pioneering insights into the nonbank's proliferation with financial deepening, while Burkner (1980) establishes a theory illuminating the diverse features of financial intermediation. Last, Gertler and Rose (1994) suggest a historical background of corporate direct finance in the capital market and money market where most nonbanks do their business.

## 2.2.1 The Pioneers' View

Pioneer researchers like Goldsmith and Shaw argue that nonbank intermediaries prosper as finance deepens. Goldsmith (1969, pp. 49-50) suggests eight statistical characteristics of financial structure, and also states that the share or relative size of nonbank's intermediation can serve as proxies for financial deepening.<sup>12</sup>

Shaw (1973, pp. 7-9) explains that the menu of financial assets diversifies as finance deepens to provide a wide variety of portfolios to savers. Shaw also suggests that "deepening involves specialization in financial functions and institutions, generating opportunities for the profitable operation of other institutions".<sup>13</sup> Shaw suggests four proxies for financial development.<sup>14</sup> Typically, the variables representing financial deepening adopted in the empirical studies are the financial interrelation ratio, mark-up or intermediation cost, and the real interest rate.<sup>15</sup> Although Goldsmith and Shaw noted that the diversification of instruments could be considered as a sign of deepening, development economists had not paid sufficient attention to the multifarious aspects of financial intermediation *per se* until Burkner strongly emphasized diversification. However, even Burkner concentrates on the diversification of bank instruments without taking into account the distinct possibility that a wider range of variety can be provided by nonbank intermediaries.

# 2.2.2 Financial Instrument Approach

Having said this, Burkner suggests an inclusive, multi-dimensional approach, arguing that former studies by Patrick, McKinnon and Shaw only emphasized one aspect of financial instruments while, in fact, they possess multiple characteristics. In criticizing McKinnon and Shaw, Burkner points out that the two deal only with the rate of return to financial assets. Yet, when a household makes a decision concerning intertemporal choice of consumption streams, it takes every aspect of its asset-holdings into account, including yield, maturity of the financial assets, risk or uncertainty of the assets, and so on. Burkner

also criticizes Patrick's work on the proliferation of banking offices in the economy as incomplete. Patrick's argument for simply increasing the number of banking institutions without changing other aspects of financial instruments is clearly limited. A case in point: In the 1970s, the Philippines introduced new savings instruments and implemented interest rate reform, which spurred faster growth.

Burkner's work makes a significant contribution: first, by describing the multiple features of financial instruments and second, by emphasizing efforts by the authorities to mobilize savings. In other words, financial authorities and financial institutions are able to mobilize more savings in a number of ways including increasing regional banking offices, changing interest-rate structure, diversifying maturity of assets, campaigning heavily, and so forth.

More specifically, Burkner uses the concept of "savings potential" which is measured by general economic variables such as income level and investment opportunities.<sup>16</sup> He identifies six features of financial instruments: yield, risk, liquidity, accessibility, product variation, and information.<sup>17</sup> He then argues that the features inherent in financial instruments are the main channels through which the authorities and financial institutions can jointly exert their influence upon the shape of savings mobilization. He also emphasizes that the lack of attractive instruments will have an impact on the prosperity of the informal money market and other tangible asset markets by slowing down the speed of the intersectoral flow of funds. Burkner explains that the aforementioned six characteristics are jointly determined by financial institutions and government authorities, since the government sets the boundaries of financial activities through regulations and supervision.

Related to this dissertation, Burkner's work provides justification for the recent proliferation of nonbank financial intermediation. Nonbanks diversify the menu of financial instruments by offering more combinations of various features than banks do, thus fully realizing the savings potential of the economy and satisfying a wide range of needs for potential savers. Burkner also stresses the government's role in fostering and regulating financial activities, which is in line with the decision by Korean policymakers to foster the development of nonbanks for the purpose of mobilizing savings in the 1970s.

### 2.2.3 Financial Structure and Intermediation Pattern

Researchers, including Townsend (1983) and Gertler and Rose (1994), have analyzed the relationship between the evolution of the financial structure and economic development. Townsend compares competitive equilibria in autarkic, decentralized, and centralized economies to identify the role of finance for economic growth.<sup>18</sup> Townsend predicts an increase in the extent of intermediation with an increase in the extent of centralization and, hence, with an increase in per-capita income. In other words, one would expect output of the produced commodity to increase as one moves from autarky, to a decentralized regime and then to a centralized regime. The concept of financial structure as pointed out by Townsend is different from that in a more recent study by Gertler and Rose. Townsend's concept is concerned with the role of money and the extent of financial deepening. In Gertler and Rose, however, financial structure refers to the pattern of business finance, whether it is self or external finance, or direct or indirect finance.

According to Gertler and Rose, there exists a symbiotic and simultaneous relationship between finance and growth. That is, "development of the real sector tends to reduce the premium attached to external finance, which in turn serves to stimulate further development. Therefore, the pattern of finance evolves with broad empirical regularity: it evolves from self-finance to external finance" (p. 33). Underlying the above evolutionary process is economic development: the average net worth of borrowers increases with the growth of the economy, and the rise in net worth makes obtaining external finance feasible. The size of net worth can indicate the ability of a firm to provide collateral and the quality of the safety buffer to absorb business risk. It is not difficult to imagine that once the size of net worth reaches a certain level, the firm becomes capable of mobilizing funds on its own credit without resorting to intermediation channels. As the economy further develops, the borrower's growing net worth and evolution of monitoring technologies are expected to contribute to reducing the premium involved in external finance.<sup>19</sup>

Gertler and Rose sets up a theoretical background of corporate direct finance that entails the circulation of papers such as shares, bonds, and commercial papers issued by business firms. Gertler and Rose provide a theoretical explanation or, at least a logical assumption of the causal relationship between deepening of nonbank intermediation and resource mobilization: The capital market and money market, where papers issued by business firms are actively traded, provide the main business stage for nonbank intermediation. Then, nonbank intermediation gains momentum as direct finance becomes a feasible option with accumulated net worth.

#### 2.3 Some Empirical Studies

Before 1990, nonbank intermediation was practically excluded from the scope of empirical analysis. Researchers did not explicitly take into account the diversity of financial instruments, but simplified the concept of intermediation into a single integrated function using banking activities as a representative variable. Harris (1979) analyzed data from five Asian countries to test the supply-leading hypothesis that financial deepening functions as a locomotive of the economy. He adopted a financial interrelations ratio as the index of financial deepening. More specifically, he used the  $M^*$  concept, which is generated by the addition of deposits with development banks to the normally defined  $M_2$  concept which comprises bank deposits ( $M_2$  = currency + bank deposits). His approach stands apart from other contemporaneous studies in that it focuses on financial institutions other than commercial banks. In the same vein, Li & Skully (1991) redefined  $M^*$  in broader terms to include postal savings.<sup>20</sup>

Approaching the 1990s, the  $M_3$  concept that comprised bank and nonbank instruments was adopted by several studies as representing the overall liquidity level. The World Bank (1990) yielded interesting study results concerning the representativeness of the  $M_3$  concept: The  $M_3/GDP$  ratio of countries with low growth rates are nearly the same as those of rapidly-growing countries during the period of 1965-1973. However, the  $M_3/GDP$  ratio shows a positive relationship with the GDP growth rate during the period of 1974-1985. One possible reason, according to the World Bank, is that the growing portion of nonbank intermediation in the latter period played some role. It should be noted that the  $M_2$  concept may not be free from endogeneity, especially if the  $M_2$  supply target is being set according to the nominal growth rate.<sup>21</sup>

McKinnon (1993) emphasizes the importance of  $M_3/GDP$  based on the empirical results by Gelb (1989), which showed that both the increase in real interest rate and the increase in  $M_3/GDP$  lead to higher real growth in the long run. Gelb's following equation shows this neatly.

$$D\hat{Y}Y = const + .180_{(5.22)}RR + .032_{(2.13)}M_3 / GDP - .021_{(-3.91)}SHIFT$$
(2.1)

DYY: real growth rate.

#### RR: real interest rate

SHIFT: dummy variable which is 0 for 1965-1973, and 1 for 1974-1086<sup>22</sup>

A more important implication of using the  $M_3$  concept, as presented in recent development-economics literature, is that nonbank intermediation is finally being recognized for its role in spurring faster economic growth through increased mobilization of savings.

Vittas (1997) investigates the nonbank financial industries of Egypt and other MENA countries (Middle East and North Africa), and concludes that nonbank financial institutions not only complement the services provided by banking institutions but also

represent a countervailing force to their dominant role, forcing them to be more competitive and efficient.

Vittas argues that nonbank financial institutions provide a strong stimulus to the development of capital markets, generating large amounts of long-term financial resources, and creating new sources of supply and demand for marketable securities.<sup>23</sup>

Table 2.1: Growth Rate and Other Economic Indicators for Country Groups by Sign of Real Interest Rate (%)

	Real Interst Rate					
	1965-1973		1974-1985			
lindicator	Positivo Negat		gative		Negative	
	rositive	Moderately	Strongly	- roshive	Moderately	Strongly
	3.7	-1.7	-13.7	3.0	-2.4	-13.0
GDP growth rate	7.3	5.5	4.6	5.6	3.8	1.9
Investment/GDP	21.4	19.7	21.4	26.9	23.2	23.0
M3/GDP	28.9	27.0	29.1	40.3	34.0	30.5
Inflation rate	22.2	7.1	40.2	20.8	23.9	

Source : Financial Systems and Development (1990), The World Bank

### **CHAPTER III**

### **RELATIONSHIP BETWEEN BANKS AND NONBANKS**

#### 3.1 A Brief History of Korean Financial System

From a historical standpoint, the Korean financial system can be viewed from various perspectives, based on both time period and the researcher's viewpoint. One such historical view, that of Kim Pyung-Joo (1992), involves the years 1961 to 1986 from the perspective of the government's deregulation policy. Kim divides the years into three periods<sup>24</sup>:

First, he covers the period of 1961-1971 in terms of financial experiments and reversals. Second, the years 1972-1973 are addressed in terms of financial repression reinforced, and third, 1980-1986, he treats the attempts at financial liberalization

Kim's view of the period is based primarily on three major events which are seen as major influences on the nation's financial system: 1) the 1961 military *coup d'état* and subsequent changes/revisions in government-central bank relations; 2) the 1972 Presidential Emergency Decree freezing all informal debts borne by businesses, and the reshaping of financial intermediation channels of mobilization and allocation; and 3) the 1980 privatization of commercial banks which had been nationalized just after the military coup.

From another perspective, the entire history of Korea's modern financial system, including the period before 1961, can be categorized under the various intermediation regimes used during each period. This historical view, deviating somewhat from Kim's

approach, features four eras: (1) The dormant stage (until 1950), (2) Dominance of commercial banking (1950-1972), (3) Diversification (1973-1987), and (4) Deregulation and Internationalization (1988-present).

#### (1) The dormant stage (until 1950)

The year 1950 became a watershed in the history of the modern financial system with the promulgation of the Bank of Korea Act. Before the law was enacted, Korea's colonial system, part of a 36-year-old legacy of Japanese rule, still exerted influence. During the colonial period, the Korean financial market had been simply a provincial market that was strongly influenced by activity in the Japanese market. Between the 1945 liberation and the 1950 legislation of the Bank of Korea Act, the Korean market was nominally independent, but the old system of the colonial period still played the role.

## (2) The dominance of commercial banking: Dual structure (1950-1972)

Before the Presidential Emergency Decree, nonbanks occupied a small portion of the financial intermediation pie, while the curb loan market (informal credit market) was so active that it threatened the financial soundness of business. As of August 1972, the total amount of curb loans reported to the government by business firms was more than 80% of the outstanding balance of  $M_i$ , which was the intermediate target of monetary policy. The period of 1950-1961 marks Korea's infant economy, during which the Korean War (1950-1953) devastated every corner of the peninsula. Also, during this period, the Korean economy was heavily dependent on foreign aid. Between 1962 and 1971, however, the economy grew at a rate of 9.2% per annum, an impressive performance attributed mostly to substantial inflow of foreign loans to finance growing investments in the country's manufacturing sector. Then, in 1972 (the beginning of the third Five-Year Economic Plan) the Korean economy encountered its first stumbling block: inflation spurred by rapid growth; financial weakness of business firms (especially, a high dependence on curb loans); and sluggish growth of business investments due to low rates of return. As a result of these factors, the real growth rate fell to 5.1% in 1972, the lowest during the period spanning 1965-1979.

Financial intermediation leading up to 1972 can be characterized as a dual structure. The government took over ownership of commercial banks and controlled their credit allocations, keeping the interest rates below market level. Favorable credit allocations were directed to strategically selected industries (such as petrochemicals, steel, and machinery), expecting them to function as the locomotive of economic growth. In the wake of financial repression, there were potential investors who saw vast investment opportunities, yet could not gain access to scarce financial resources provided by the banks. The result was an increased demand for informal finance, since there was no capital market in a real sense. In short, controlled commercial banking and an active curb-loan market coexisted under financial repression. The abnormally heavy dependence on curb loans, and high lending rates thereof threatened the soundness of business activities. This economic environment led to the Decree of 1972, aimed at reducing financial costs borne by business firms, which would mitigate the pressure of cost-push inflation and thus enhance international competitiveness.

## (3) Diversification (1973-1987)

This period is characterized by a three-tier intermediation structure formed by banks, nonbanks, and informal finance. The 1972 Decree did succeed in frustrating the curb loan market, although it managed to survive for some time after. Its longevity was due to the ongoing discrepancy between official rates of interest and market-clearing rates under financial repression. Since 1973, however, the portion taken by nonbanks in the intermediation structure has grown rapidly. That expansion has been guided by the government's policy drive to foster the capital and money markets. Following the Decree, the Korean government proposed three important laws for the establishment of three new types of financial institutions: investment and finance companies; mutual savings and finance companies; and credit unions, all of which became major nonbanks in the financial market. Together with these laws, the Korean government legislated the "Public Corporation Inducement Act", which empowered the Minister of Finance with the authority to order large companies to go public and to raise funds in the capital market. In addition, three securities investment trust companies were established during this period, which contributed to the development of a deeper capital market, especially the corporate bond market.

These serial measures taken by the government were based on the recognition that channels of savings mobilization should be diversified in order to meet the business sector's burgeoning need for funds, as well as the consumer's need for savings instruments. Throughout this period, various types of financial instruments were
introduced to the financial markets by the nonbanks: CMAs (Cash Management Accounts); CPs (Commercial Papers); RPs (Repurchase Agreements); Securities Saving Accounts; Share Trust Funds and so on. The maturity and interest payment methods of bank instruments were also diversified to meet the divergent needs of potential savers. A good example was the household savings account, which not only allowed the issuance of household checks, but also paid interest. Yet another example of diversification was the introduction of CDs (Certificates of Deposits) by the banks.

## (4) Deregulation and Internationalization (since 1988)

The Summer Olympics were held in Korea's capital of Seoul in 1988, an epochmaking year for the nation. This symbolic event propelled Korea into the global arena, and the government stepped up efforts toward deregulation and internationalization of the financial market. The first such measure taken was the full-fledged liberalization of interest rates, with the exception of short-term instruments with a one-year maximum maturity. In a move that differed dramatically from prior superficial efforts, the government, for the first time fully relinquished direct control of interest rates. However, the 1990 economic recession triggered a reversal of that policy, and once more a regulated interest-rate policy took effect. Since the 1993 inauguration of a civil government, which ended a 30-year succession of military dictatorships, deregulation and internationalization have been pursued as a policy priority. In order to demonstrate tangible performance, as of the end of 1995, a major portion of interest rates had been liberalized except for short-term deposits with maturities of three months or less (six months in the case of nonbanks). As a result, the portion of instruments for which interest rates were liberalized was 83.2% as of the end of 1995.<sup>25</sup>

Other important measures were taken during the same period. First, the Bank of Korea started to adopt indirect measures to control the liquidity level by lifting its direct control over domestic credit provided by banks. The government allowed foreign investors to purchase directly stocks listed in the Korea Stock Exchange, and also adopted a more flexible exchange rate regime, known as the market average exchange rate system, to resist pressure from the United States, which was anxious about possible foreign direct investments by increasing the number of cases in which AAS (Automatic Approval System) could be applied. Finally, in order to enhance the capacity of financial intermediation, a number of financial institutions were established and existing ones overhauled. For example, five provincial investment trust companies were established in each of the five major provincial cities. Eight investment and finance companies were transformed into two banks and five securities companies.

In overcoming the 1997 crisis, the authorities took several bold steps in line with free market principles:

- 1) Adopting a free-floating exchange rate system.
- 2) Allowing the hostile M & A of listed companies by foreigners.
- 3) Permitting foreign investors to purchase any type of bond.
- 4) Permitting foreign investors to establish any type of financial institution.

## **3.2 Types of Nonbank Financial Institutions**

Nonbank financial intermediaries can be classified under four categories according to

their business activities.<sup>26</sup>

- Development institutions comprising the Korea Development Bank, the Export-Import Bank of Korea (EXIM Bank), and the Korea Long Term Credit Bank (KLTCB).<sup>27</sup>
- Investment institutions comprising investment and finance companies, merchant banking corporations, investment trust companies (ITCs), and the Korea Securities Finance Corporation.
- Savings institutions including trust accounts of banks, mutual savings and finance companies (MSFCs), credit unions, mutual credit facilities, community credit cooperatives, and postal savings.
- 4) Life insurance institutions.

# **3.2.1 Development Institutions**

Development institutions were founded to finance economic development projects that could not be financed by commercial financial institutions due to their large scale and long gestation periods. During the initial stage of economic development, the main sources of investment funds for large-scale projects were the government, the central bank, and state-run banks. However, entering the 1990s, funds came mainly from issuance of debentures in both the domestic and international financial markets. During the post-1980 environment of financial liberalization and deregulation, development institutions tested the limits of their business boundaries. Those institutions were allowed to handle deposits from the public, and to run investment banking through subsidiary companies. At the present time, the major activities of the Korea Development Bank are extension of medium- and long-term credit, investment in the form of underwriting securities issued by business firms, and payment guarantees to help finance industrial projects. Core activities of the EXIM Bank comprise medium and long-term financing to enable capital goods exports, such as the construction of industrial plants and ships, and the support of overseas investments and major natural resource development projects. The Korea Long Term Credit Bank (KLTCB) provides medium- and long-term credit to business firms in the form of loans, discounts, equity participation, and guarantees, for both equipment purchases and long-term working capital. The KLTCB has been allowed to offer short-term credit within the limit of deposits received from the public.

#### **3.2.2 Investment Institutions**

The capital and money markets provide a business arena for investment institutions, which deal with short- and long-term papers issued by business firms. In the 1970s the government introduced investment institutions (with the exception of the Korea Securities Finance Corporation) because the existing banking system could not meet the surging need for investment funds to sustain economic growth.<sup>28</sup>

Investment and finance companies' principal business was short-term business financing. They raised funds by issuing their own papers, offering CMAs, and dealing in commercial papers issued by business firms.<sup>29</sup>

Merchant banking corporations have provided a wide range of financial services, such as lending funds for operations and equipment, dealing with papers issued by business firms, and underwriting securities in the primary market. They also handle securities investment trust, leasing, and foreign exchange business with the approval of the government.

The investment trust companies (ITCs) were introduced to support corporate financing and to foster sound development of the capital market. Before the 1997 crisis, ITCs similar to the contractual-type British unit trusts prevailed. American-style mutual funds were introduced during the crisis period in order to expand demand in the capital market. Traditionally, ITCs have been the Primary investors in both the shares and the corporate bond markets.

The Korea Securities Finance Corporation is the source of financing to securities houses.

#### **3.2.3 Savings Institutions**

Savings institutions are non-monetary depositary institutions whose main business is to receive deposits from, and to provide loans to the public. Savings institutions are functionally very similar to commercial banks (depositary money banks) except that they are exempt from accumulating required reserves at the central bank. Such institutions include trust accounts of banks, mutual savings and finance companies (MSFCs), credit unions, and postal savings.

Banks engaged in the trust business must keep those accounts separate from banking business, and that includes maintaining separate books and records. Until the mid-1980s, trust accounts of banks fell under two categories, non-specific trust and development trust.<sup>30</sup> These two are very similar to time deposits because the dividend rates for the contract term are fixed by banks. However, new types of trusts, with dividend rates determined by the actual performance of fund portfolio management, have been introduced since 1985. They include the household trust, company trust, personal pension trust and so on.

The main business of mutual savings and finance companies (MSFCs) consists of the receipt of mutual installment savings, which entitles people to borrow funds, and of mutual time deposits, whose funds are used primarily for the extension of small unsecured loans and the discount of bills for mutual installment savers. Credit unions have been organized in small regions, offices, churches, and other private groups in order to facilitate financing for their members and to promote mutual economic benefits. The Credit Union Act also applies to mutual credit facilities operated by agricultural, fishery, and forestry cooperatives. Community credit cooperatives are another credit-union type savings institution. Postal savings are classified into demand deposits and time and savings deposits, similar to bank deposits.

#### 3.2.4 Life Insurance System

Life insurance products fall under two categories: savings and hedging. Savings type products are very similar to the installment savings handled by banks. At the end of the contract term, the premium's principal and interest accrued are paid back to policy buyers. Hedging-type products are designed not to return the premium's principal and interest accrued at the expiration of the contract term. Instead, a stipulated amount of money is paid to policy buyers in case of accident during the contract term. Life insurance companies are included in the wide category of savings institutions because they handle savings type products.

#### 3.3 Growing Significance of Nonbank Intermediation (1970-1994)

In Korea, the relative share of nonbank intermediation has grown dramatically since the early 1970s. In 1970, the share of nonbank intermediation in terms of deposit collection was only 18.4%. By 1994, the share of nonbank intermediation had reached an amazing 66.7%.<sup>31</sup> Just as surprising, the absolute amount of financial intermediation has snowballed

since 1972. During the period from 1972 to 1994, the amount of  $M_3$  (Currency in circulation + Deposits at all financial institutions, which shows the total amount of financial intermediation) increased by 263 times, showing a 28.8% growth per annum. Outstanding  $M_3$  at the end of 1994 reached 443 trillion won, in contrast to the paltry 1.7 trillion won seen at the end of 1972.

To further demonstrate the pattern of growth, the amount of nonbank deposits at the end of 1972 was only 232 billion won, which grew to 309 trillion won by the end of 1994. The annual growth rate of nonbank deposits during the period from 1972 to 1994 was 40.9%, while the corresponding number of bank deposits was only 24.0%. The nominal GNP growth per annum during the period was 22.6%. The national savings rate for the year 1972 was 17.3%, and that had doubled to 35.2% by 1994. Nonbank proliferation stems mainly from the fact that they have operated under different regulations, with nonbank intermediation taking the place of informal finance as financial deregulation takes place.<sup>32</sup>

	1970	1975	1980	1985	1990	1993	1994
DEPOSITS							
Banks	81.6	78.5	69.1	52.7	40.5	33.7	32.3
Commercial Banks	52.1	52.7	41.8	30.8	25.1	19.7	20.0
Specialized banks	29.6	25.8	27.3	21.9	15.4	14.1	12.2
Nonbanks	18.4	21.5	30.9	47.3	59.5	66.3	66.7
• Development institutions	5.9	2.6	3.8	4.0	3.5	5.0	0.4
Savings institutions	9.4	10.5	13.0	17.8	27.1	34.4	39.3
• Investment companies	0.0	5.7	9.2	15.9	16.4	14.8	16.4
• Life insurance companies	3.1	2.8	4.9	11.4	12.5	12.2	11.7
LOAN & DISCOUNTS							
Banks	78.2	74.6	63.8	58.2	49.7	44.3	41.2
Commercial Banks	47.8	48.2	39.1	34.1	30.1	25.1	25.2
• Specialized banks*	30.4	26.4	24.7	24.1	19.6	19.2	16.0
Nonbanks	21.8	25.4	36.2	41.8	50.3	55.7	58.8
• Development institutions	14.0	13.0	15.3	10.8	8.7	8.2	9.3
Savings institutions	7.3	6.7	11.0	14.5	22.8	31.3	34.4
• Investment companies	0.0	4.9	6.8	8.3	8.6	6.7	7.1
• Life insurance companies	0.6	0.7	3.1	6.9	10.2	9.5	8.0

Table 3.1: Share of Financial Institut	ions in Terms of	f Deposits and	Loans (%)
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\* Specialized banks include Housing Bank, Kookmin Bank, Agricultural Cooperative Bank, etc. Source : Lee (1995), BOK (various issues)

# 3.4 Differences between Banks and Nonbanks

Nonbanks have had greater opportunities to raise funds for business due to their relative freedom from the influence of financial authorities. A primary example is that nonbanks are not required to accumulate reserves at the central bank. In a financially repressed economy where bank interest rates are tightly controlled by the government, nonbanks can be more competitive if they are allowed to apply higher interest rates to the financial instruments they provide. From the viewpoint of risk-return tradeoff, high-return fund-type products like CMAs provided by nonbanks have been more versatile in meeting the various needs of potential savers. As a result, the relative share of banks in total financial intermediation has declined sharply, fomenting debate over equalizing the regulations in order to level the playing field.<sup>33</sup>

In a similar case during the 1970s and 1980s, American banks experienced disintermediation, a phenomenon that attracted major attention. That dis-intermediation was caused by the divergent regulations among different domestic financial institutions and was accelerated by a prospering Euro-money market that was totally free from regulations.<sup>34</sup>

## 3.4.1 A Greater Degree of Autonomy for Nonbanks

Nonbanks hold a major advantage in that they are not required to hold reserves. Except in certain countries, the required reserves accumulated at the central bank are usually non-remunerated assets. In other words, the central bank is not obliged to pay any interest on legal reserves. Furthermore, financial institutions lose control over their legal reserves once they go to the central bank, which means lower efficiency and higher cost of intermediation in the savings-investment linkage process. In contrast, nonbanks are not required to accumulate legal reserves at the central bank. However, as Cho (1990) points out, they do have some responsibility to keep reserves in case of sudden withdrawals. To prevent an unforeseeable insolvency crisis, nonbanks must maintain a certain level of liquidity similar to required reserves. Notwithstanding this similarity, the following two differences stand out: Reserves held by nonbanks are interest-bearing assets like bank deposits and treasury bills. Nonbanks do not lose control over reserves as long as they can be used as collateral to guarantee redemption of loans taken out at other institutions.

Another distinct advantage is their freedom from monetary targeting. The first oil shock of 1973-74 caused unprecedented stagflation in Korea and much of the world. To cope with stagflation, and to avoid a depreciation-inflation spiral, countries desperately needed a stabilization policy, and thus, they adopted a policy of strict monetary targeting. In essence, monetary targeting sets a target growth rate for the leading monetary indicator, usually a target band of money supply growth. The leading monetary indicator usually comprises currency in circulation and bank deposits, although the coverage of bank deposits is not uniform across countries. Since most financial instruments issued by nonbanks are not included among the leading monetary indicator, the nonbanks are relatively free from the constraints on central banks to keep money growth within the target band.<sup>35</sup> Such relative freedom may lead to rapid growth of nonbank intermediation through the following mechanism: Once the growth rate of money is set by the

authorities, the growth rate of bank instruments as a whole, which is included in the concept of the leading monetary indicator, cannot exceed the target growth rate. As a result, loans extended by depositary money banks are limited. If the maximum limit on bank loans is reached, and the demand for financial intermediation is still not satisfied, nonbank intermediation can step in. Thus, the growth of nonbank intermediation can be faster than that of banks.

#### 3.4.2 Higher Interest Allowed

Another key contributing factor to the rapid expansion of nonbank intermediation is the fact that nonbanks have been allowed to apply higher interest rates to their instruments. The agent with surplus money in his bank account is inclined to trust that money to nonbank intermediaries if nonbank rates are higher than those of banks, especially when there is no other substantial risk. Detailed evidence supporting this two-tier interest policy can be gathered from the movements of rates on one-year term deposits in Korea during the period of 1975-1982. Table 3.2 indicates a gap ranging from 0.5%p to 5.4%p between one-year time deposits in banks and those in nonbanks.

## 3.4.3 Product Variation: Love of Variety

Compared to those of other banks, instruments offered by nonbanks provide much greater diversity in meeting the various needs of financial intermediation. It is clear that, in Korea, that diversity has contributed to the rapid growth of nonbank intermediaries. One possible theory involves love of variety, which explains the demand for

Effective From				Mutual Credit Cooperatives	
Year	Month	Day	Deposit Money Banks	Mutual Credit Cooperatives	
1975	1	1	15.0	15.5	
4		anta in a la na	15.0	15.5	
	7	1	15.0	15.5	
1976	3	2	15.0	16.0	
	8	2	16.2	16.0	
	9	16	16.2	17.2	
1977	4	22	16.2	17.2	
	6	16	16.2	17.2	
	10	1	16.2	16.2	
	10	4	14.4	16.2	
1978	1	6	14.4	16.2	
	6	13	18.6	19.8	
1979	4	20	18.6	19.8	
	5	11	18.6	19.8·	
	9	7	18.6	19.8	
1980	1	12	24.0	24.9	
	4	18	24.0	24.9	
	9	16	21.9	24.9	
	9	22	21.9	24.9	
	11	Marcine 8	19.5	24.9	
	11	13	19.5	22.5	
1981	2	20	19.5	22.5	
	7	1	19.5	22.5	
11	11	9	18.6	22.5	
	11	18	18.6	19.5	
	11	30	17.4	19.5	
	12	14	17.4	18.3	
	12	29	16.2	18.3	
	1	14	15.0	18.3	
1982	1	25	15.0	15.9	
	3	29	12.6	15.9	
	4	1	12.6	13.9	
	6	28	8.0	13.9	
	7	1	8.0	9.5	

Table 3.2: Rates on One-Year Time Deposits

Source: Dowling (1984)

differentiated products using consumer theory. The basic idea of this approach posits that individuals will normally choose to consume a greater variety of goods, provided the prices of those goods do not differ considerably. This key idea can also be interpreted in financial terms: Savers will prefer to include a newly developed instrument in their portfolio as long as the expected profitability and risk profile of the instrument does not differ appreciably from other instruments in the portfolio. In the event that all varieties of a product are equally priced, an individual will choose to consume all of the available varieties in equal quantities. If such a case is applied directly to the financial market without modification, the relative significance of bank intermediation is destined to decline in line with the increasing diversity of nonbank instruments. The list of financial instruments available to the Korean financial consumers during the period from 1972 to 1994 is illustrated in Table 3.3 for reference. If we take a close look at Table 3.3, it is clear that nonbanks provide a wider variety of instruments. The biggest difference is seen when we compare fund-type instruments with a floating rate of return and deposittype instruments with a fixed rate of return. As rate of return floats, risk level also varies. In other words, almost every type of portfolio mix or risk-return trade-off is allowed in nonbank intermediation. However, the risk-return trade-off profile of bank instruments is far from versatile because the rate of return to bank instruments is fixed *a priori*. Thus, the versatile profile of nonbank instruments could meet various needs of potential savers. Of course, that versatility could also induce customers with bank savings accounts to transfer to nonbanks for a more appropriate risk-return trade-off.

		Item	Contents		Year of Introduction	
	Dema	nd Deposit	Interest payment is not allowed.	Bank	(Already	
		Time	Equal to or over 3 months	11	before 1945)	
	Savings	Installment	Monthly deposit for certain period	18	]	
Bank	Deposit	Free	Hybrid of Demand&Savings	N	1985	
		withdrawal	Deposit			
	Repurchase	Agreement(RP's)	Opposite transaction after a certain period	łt	1982	
	Certificates	of Deposit(CD)	Transferable deposit	0	1984	
	Savings	Time	Similar to above but higher interest	Mutual savings;	1973*	
	arc	Installment	Similar to above but higher interes	Credit Union		
	Tr	ust a/c	Portfolios are composed of loan, securities, money market vehicles	Bank	1960	
Nonbank	Securities Trust	Share Type	Portfolios are composed of Bonds and shares or shares only.	Securities Trust Company	1970	
		Bond Type	Portfolios are composed of Bonds only.	1	1970	
	Cash Management a/c(CMA)		Portfolio are composed of money market vehicles (CD,CP, RP's)	Investment & Finance Company	1984**	
	Life Insurance	ce(Savings Type)	Similar to Installment savings a/c	11	1962	
Secu		s Savings a/c	Similar to Investment club (tax deduction is allowed)	Securities Company	1988	
	Repurchase Agreement(RP's)		Short-term Savings	I)	1976	
	Postal Savings		Similar to Savings a/c	Post Office	Abolished in 1977, reinstated in 1983.	
	Shares		Corporate equities	te equities Securities Comany		
Marketable	I	Bonds	Corporate bonds, Public bonds	11	11	
Securities	Short-term paper		Commercial paper	Investment & Fianace	1973	

Table 3.3: List of Financial Instruments

Commercial Banks allowed to handle trust business in 1983.
 \*\* Actually from 1973, Legally from 1984

#### 3.4.4 Allocative Efficiency

Since nonbanks are relatively free from credit rationing by authorities, they hold a comparative advantage in allocating financial resources. Traditionally, the financial authorities of developing countries such as Korea have intervened in the allocation and redirection of financial resources to strategic industries. Usually, such industries need a sizable amount of facilities investment and have a long gestation period. In this context, large banks have been the main targets of credit rationing.

Nonbanks, on the other hand, are allowed to allocate financial resources as they wish, to more productive industries. The proliferation of nonbank intermediation can be interpreted as the increased efficiency of the total financial intermediation system in terms of value added through financial intermediation. The main reason for the credit rationing of

bank's financial resources lies in the central bank's capacity to supply high-powered money into the banking system according to government instructions. Less independence of the central bank means easier credit rationing by the financial authorities. An approach fraught with numerous implications, it has been criticized by some economists, and praised by others.

Managers of banks have been allowed to use the central bank's discount window at low rates to compensate for future or realized loss from directed lending to new strategic industries with long gestation periods. This compensation has worked as the driving force behind credit rationing of bank resources by the financial authorities.

#### 3.5 The Relationship between Banks and Nonbanks: Complements or Substitutes?

#### 3.5.1 Arguments for Complementarity and Substitution

The development of sound arguments for whether bank and nonbank intermediation are complements or substitutes is key to defining the relationship between banks and nonbanks. In order to build a solid argument, the characteristics of financial products, monetary policy environment, and other regulatory frameworks must be compared.

#### A. Arguments for Complementarity

## (1) Room for Intermediation under Liquidity Control

The leading monetary indicator targeted by the central bank comprises currency and bank deposits. Since nonbank products are excluded, nonbank intermediation remains out of the central bank's direct control, a clear indication that nonbank intermediation has greater autonomy in terms of increasing the amount of intermediation. When money control is loose enough, the need for nonbank intermediation will diminish, and vice versa. Tight money control, on the other hand, will drive businessmen to nonbanks because banks tend to be conservative about extending loans. And once the  $M_2$ target is determined, bank deposits cannot exceed that target level. As for the Bank of Korea, it has traditionally maintained a monetarist approach, placing a higher priority on subduing inflationary pressures, a policy that has contributed to robust nonbank intermediation since the 1970's.

## (2) Different Customer Groups

High-risk borrowers suffer most from bank credit rationing, and as a matter of course, they turn to nonbanks for loans. Also, those with no prior credit history with a bank or those without collateral for a loan will be served more readily by nonbanks. In some countries, (e.g., Australia in the 1980s) female borrowers have gained significantly from the proliferation of nonbanks and the greater availability of credit.<sup>36</sup>

## (3) Different Characteristics of Products

Nonbank intermediation grows with the versatile profile of products it provides. Nonbank products include the deposit-type and capital-market-based type. Deposit-type products are similar to bank deposits<sup>37</sup> while the capital-market-based type includes CMAs (Cash Management Account), securities investment trust funds, and trust accounts. With such products returns are paid according to floating rates (based on the performance of investment activities by agent institutions), not according to fixed interest rates. In terms of risk-return tradeoff, versatile nonbank products meet the various needs of potential savers and encourage savings.

# B. Arguments for Substitution

## (1) Risk-lovers/Risk-averters

The versatile profile of nonbank products induces risk-lovers who have deposit

accounts in banks to transfer their accounts to nonbanks for higher profitability. However, this transfer effect has clear limits because risk-averters and risk-neutrals, judging that risk-adjusted returns are not that attractive, will remain at the banks. Moreover, this transfer effect is considerable only when nonbank intermediation is a new concept. Once nonbank intermediation is introduced and flourishes to a certain extent, the above-mentioned transfer effect dwindles.

# (2) Risk-sharing by the Government

The cozy relationship between the government and industry in Korea, often referred to as Korea Incorporated, is characterized by investment risk that is shared by both government and industry. Chung H. Lee (1992) proposes that the Korean government and large business groups should be viewed as an internal organization, while the Korean financial system should be viewed as an internal capital market. Indeed, Koreans believed that financial institutions, whether banks or nonbanks, could not fail with the government standing firmly behind them (This was true until the onset of the 1997 financial crisis, although the government has never admitted, explicitly or unexplicitly, that the financial institutions are free from failure).

Because of government-industry relations, Korea maintained a fairly stable financial system until 1996, even without the presence of clear-cut deposit insurance arrangements for financial institutions that accepted deposits. It was expected that as long as savers did not have to take any additional risks by depositing at nonbanks, they would transfer their money from banks into nonbank accounts in quest of higher profitability.

#### 3.5.2 A Simple Illustration

To further discuss the role of nonbank intermediation, the relationship between banks and nonbanks needs to be clearly defined. If the relationship is a perfect substitute, the increase of nonbank intermediation cannot be seen as contributing to economic growth because the total amount of intermediation may remain unchanged. Furthermore, efficiency gain created from new nonbank intermediation is smaller than efficiency loss suffered from substituted bank intermediation unless the allocative efficiency of nonbank intermediation is higher than that of the bank. If the relationship is complementary, growth of nonbank intermediation can be taken as a sign of robust financial intermediation, which results in faster economic growth.<sup>38</sup> The greater degree of autonomy renders the actual relationship more complementary than substitutional. A simple illustration is introduced to reinforce the argument of complementarity.

Suppose that we have two hypothetical economies: Economy I in which banks are only financial intermediaries and Economy II in which both banks and nonbanks operate under different conditions in terms of regulations and efficiencies and etc. Let D denote the initial total deposits at banks in each economy. Then, the theoretical maxima of financial intermediation in Economy Economy II, and I respectively, will be:

$$M_{I} = \frac{D}{r_{B}}; \quad M_{II} = \frac{D}{r_{B}}$$
 (3.1)

However, in the case of Economy II, if a fraction ( $\alpha$ ) of D is transferred from banks to nonbanks so that  $\alpha D$  held with nonbanks and  $(1-\alpha) D$  remains with banks and, then the maximum financial intermediation in Economy II ( $M_{II}$ ) will be

$$M_{II} = M_{B} + M_{N} = \frac{(1 - \alpha)D}{r_{B}} + \frac{\alpha D}{r_{N}}$$
(3.2)

where  $M_B$  and  $M_N$  are maximum intermediation of banks and nonbanks, respectively. (However, nonbanks also reserve certain amount of liquidity for sudden withdrawal out of their precaution though nonbanks are not required to accumulate reserves at the central bank.)

Suppose that the reserve ratio for banks  $(r_B)$  is higher than that for nonbanks  $(r_N)$ :

$$r_B > r_N. \tag{3.3}$$

Then, in light of (3.3)

$$\Delta = M_{II} - M_{I} = \alpha \left[ \frac{1}{r_{N}} - \frac{1}{r_{B}} \right] D = \alpha \left[ \frac{r_{B} - r_{N}}{r_{N} r_{B}} \right] D > 0.$$
(3.4)

Realistically,  $\alpha$  cannot be either 0 or 1 for the following reasons. If nonbanks offer higher

interest rates, which were indeed the case during the period in Korea observed for this study, at least some depositors will transfer their funds out of banks to nonbanks being attracted by the higher interest rates and other differentials in favor of nonbanks. Therefore, it would extremely unrealistic to assume that 100% of *D* stays with banks ( $\alpha = 0$ ). If bank deposits are completely diverted to nonbanks or equivalently  $\alpha = 1$ , then nonbanks are *perfect substitutes* for banks in every sense of the word for having completely substituted banks out of financial intermediation. This assumption also is extremely unrealistic as well since relatively risk-averse depositors will still stay with banks after some point. Nevertheless, major determinants of  $\alpha$  will be the official position of the monetary authority and the relative efficiency of nonbanks vis-à-vis banks.

Of course, in reality, the theoretical maximum expansion multipliers will not fully work themselves out due to various leakages and excess reserves held out of precautions of financial intermediaries. Therefore, we can safely represent the actual multipliers as some fractions of their respective theoretical maximum multipliers:

$$\theta_B \frac{1}{r_B}; \quad \theta_N \frac{1}{r_N} \tag{3.5}$$

where  $0 < \theta_B$ ,  $\theta_N < 1$ .

Let's assume that

$$\theta_N \ge \theta_B$$
 (3.6)

implication of which is that nonbanks are at least as aggressive as banks in financial intermediation.

Then, in light of (3.3) and (3.6),

$$\Delta^{*} \equiv M_{II} - M_{I} = \theta_{B} \frac{(1-\alpha)D}{r_{B}} + \theta_{N} \frac{\alpha D}{r_{N}} - \theta_{B} \frac{D}{r_{B}}$$

$$\geq \theta_{B} \frac{(1-\alpha)D}{r_{B}} + \theta_{B} \frac{\alpha D}{r_{N}} - \theta_{B} \frac{D}{r_{B}}$$

$$= \theta_{B} \alpha \left[ \frac{1}{r_{N}} - \frac{1}{r_{B}} \right] D = \theta_{B} \alpha \left[ \frac{r_{B} - r_{N}}{r_{N} r_{B}} \right] D > 0 . \qquad (3.7)$$

 $\Delta^*$  in (3.7) measures the net gain in financial intermediation of Economy II over Economy I attributable to nonblank financial institutions. The fact that the net gain of nonbanks in financial intermediation along with the fact that  $\alpha D$  (deposits transferred out from banks to nonbanks) flows back into banks is clearly shows that nonbanks do not substitute out banks in financial intermediation, therefore we may define this phenomenon as nonbanks being complementary to banks rather than substitutional.

## **3.6 Empirical Evidence**

Under financial repression, nonbanks are theoretically expected to be more of complements to banks than substitutes, and we can assume that nonbank intermediation is presumed to be endogenous in view of the fact that nonbanks are much freer from the monetary policy and regulations than banks. Therefore, the hypothesis to be tested against can be stated as:

# *H*<sub>1</sub>: The relationship between bank and Nonbank intermediation is substitutional with the causality from banks to nonbanks.

To empirically establish the above hypothesis, or equivalently, "Bank deposits (X) positively causes Nonbank deposit (Y)," we should reject the null hypothesis that "X does not cause Y" and at the same time fail to reject the null hypothesis that "Y does not cause X." Following Granger causality test procedure, the following four equations need to be estimated for testing:

$$Y_{t} = \sum_{i=1}^{p} \alpha_{i} \cdot Y_{t-i} + \sum_{i=1}^{p} \beta_{i} \cdot X_{t-i} + \varepsilon_{t}$$
(3.8)

$$Y_{t} = \sum_{i=1}^{p} \alpha_{i} \cdot Y_{t-i} + \varepsilon_{i}$$
(3.9)

$$X_{i} = \sum_{i=1}^{p} \gamma_{i} \cdot X_{i-i} + \sum_{i=1}^{p} \theta_{i} \cdot Y_{i-i} + \varepsilon_{i}$$
(3.10)

$$X_{i} = \sum_{i=1}^{p} \gamma_{i} \cdot X_{i-i} + \varepsilon_{i}$$
(3.11)

## where

 $X_t = ln$  (Bank Deposits)

$$Y_t = ln$$
 (Nonbank Deposits)

p = number of lags.

However, the estimated test statistics may well be spurious if the times series in levels are non-stationary without cointegration. If that is the case, the test statistics for Granger causality will be severely biased against the null hypotheses, and the causality tests should be conducted on the basis of the difference equations to avoid the biases:

$$\Delta Y_{t} = \sum_{i=1}^{p} \alpha_{i} \cdot \Delta Y_{t-i} + \sum_{i=1}^{p} \beta_{i} \cdot \Delta X_{t-i} + \varepsilon_{t}$$
(3.12)

$$\Delta Y_t = \sum_{i=1}^{p} \alpha_i \cdot \Delta Y_{t-i} + \varepsilon_t$$
(3.13)

$$\Delta X_{t} = \sum_{i=1}^{p} \gamma_{i} \cdot \Delta X_{t-i} + \sum_{i=1}^{p} \Theta_{i} \cdot \Delta Y_{t-i} + \varepsilon_{t}$$
(3.14)

$$\Delta X_{i} = \sum_{i=1}^{p} \gamma_{i} \cdot \Delta X_{i-i} + \varepsilon_{i} \,. \tag{3.15}$$

Therefore, as a preliminary step prior to Granger causality test, we carried the unit root test on each of the two times series, the null hypothesis being that unit root exists.

	Table 3.4:	Unit Root	Test Results
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	ADF Test Statistic	5% Critical value
NBD	-2.9863	-3.02
BD	-1.8941	-3.02

Both Augmented Dickey-Fuller test statistics reported in Table 3.4 fall within the 95% confidence interval, failing to reject the null hypothesis that each of the time series is a random-walk process.

Subsequently, we tested whether or not the two time series are cointegrated using Jorgenson approach. The null hypothesis that the cointegrating vector does not exist is rejected on the basis of the estimated log Likelihood Ratio (36.74) that exceeds the 5% critical value (15.41) with the cointegrating regression results as follows.

$$N\hat{B}D_{t} = -5.3193 + 1.5589 BD_{t}$$
(3.16)

with *t*-statistics parentheses.

Estimated regression equation (3.16) shows that there exists a statistically significant long-term positive relationship between bank deposits and nonbank deposits.

Having identified that the time series are cointegrated, we have carried out Granger's causality tests on  $BD_t$  and  $NBD_t$  in both levels and differences. The causality test statistics reported in Table 3.5 provides rather strong empirical evidence that the causality flows from the bank deposits to nonblank deposits with the estimated regressions reported as an endnote.<sup>39</sup> In light of our empirical findings that that the direction of the Granger causality is from  $NBD_t$  to  $BD_t$  and the both time series are integrated as tested, we can specify an error correction model for  $\Delta NBD_t$  that shows a short-term dynamic adjustment process leading to long-run equilibrium relation tying the two variables together.

H <sub>ot</sub> No Granger Causality	Lags	F-statistic	P-value	Statistical Inference $(\alpha = .1)$
NBD does not Granger cause	1	.0375	.848506	Fail to reject Ho
BD	2	0.98832	0.39381	Fail to reject Ho
BD does not Granger cause	1	3.3.7906	.065722	Reject H <sub>o</sub>
NBD	2	6.07797	0.01087	Reject H <sub>o</sub>
$\Delta NBD$ does not Granger cause	1	.1310344	.721357	Fail to reject Ho
$\Delta BD$	2	0.61282	0.55484	Fail to reject Ho
	1	11.35165	.003221	Reject H <sub>o</sub>
$\Delta BD$ does not Granger cause $\Delta NBD$	2	4.39155	0.03153	Reject H <sub>o</sub>

Table. 3.5: Granger Causality Test Results (Level & Differenced Data) with Lag 1 and 2:

NBD: In (Nonbank deposit); BD: In (Bank deposit);

As reported in Table 3.6, we estimated error correction models with three different lag structures. Model I includes only lag one variables along with the error

correction term and constant, and the subsequent models consecutively include one additional lag variables. Table 3.6 clearly shows that  $\Delta BD_{t-1}$  is the only variable consistent in having a positive impact on  $\Delta NBD_t$  with a statistical significance, whereas none of the other lag variables has a statistically significance either positive or negative. This appears to indicates a rather robust empirical results that that there is a complementary relationship between series  $NBD_t$  and  $BD_t$ .<sup>40</sup> Further, the error correction model results appear to be consistent with those of cointegration regression and Granger's causality test in supporting the hypothesis that the relationship between banks and nonbanks is more complementary than substitutional.

Dependent Variable	Model 1	Model 2	Model 3
	ΔNBD <sub>t</sub>	ΔNBD <sub>t</sub>	$\Delta NBD_t$
Constant	0.1666	0.1710	0.1610
	(3.7645*)	(2.4721**)	(1.3690)
Error Correction Term	-0.1331	-0.1421	-0.2118
	(-2.0505**)	(-1.6866)	(-1.4395)
$\Delta NBD_{t-1}$	0.9046	0.1863	0.2320
	(0.7123)	(0.7708)	(0.9358)
$\Delta NBD_{t-2}$		-0.0302 (-0.1772)	-0.2127 (-0.6186)
$\Delta NBD_{t-3}$			0.2712 (1.5358)
$\Delta BD_{t-1}$	0.5307	0.6188	0.7182
	(2.7107*)	(2.4762**)	(2.2886**)
$\Delta BD_{t-2}$		-0.1793 (-0.5759)	-0.3538 (-0.7961)
$\Delta BD_{l-3}$			-0.1122 (-0.3469)

Table 3.6: Error Correction Models Estimated.

A single asterisk indicates statistical significance at the 1% level, while double asterisks indicate statistical significance at the 5% level. The shaded cells indicate that coefficients are zeros by restriction.

## 3.7 Summary

Nonbank intermediation has flourished since the introduction of nonbanks in the early 1970s. Active nonbank intermediation has mainly resulted from a difference in regulations, which granted nonbanks a greater degree of freedom. In particular, under a financially repressed regime, the higher interest rates allowed to nonbanks have been instrumental in mobilizing savings. However, the growth of nonbank intermediation does not necessarily mean that it has contributed to savings mobilization. Where nonbank intermediation has been a substitute for bank intermediation, the total amount of intermediation has remained unchanged. Therefore, the question of whether or not the relationship between banks and nonbanks is complementary needs to be answered, both theoretically and empirically. Section 3.6 shows that the relationship can be defined as complementary in the sense that  $\Delta BD_{t-1}$  strongly affects  $\Delta NBD_t$  over time, which leads to long-term positive relationship as shown in the cointegrating regression. More specifically, the relationship is shown to be more complementary than substitutional.

#### **CHAPTER IV**

## NONBANKS, SAVINGS, AND ECONOMIC GROWTH

#### 4.1 Determinants of Savings Level

The main function of financial intermediation is to receive savings for transfer that will acquire a higher rate of return, and thereby improve the efficiency of investments. As Goldsmith (1969) points out, savings for transfer is contingent upon skillful entrepreneurs. Financial authorities and institutions are expected to provide a favorable environment that enables the full realization of potential savings for transfer, and at the same time, mobilizes more savings by influencing the household's spending behavior in terms of its intertemporal allocation of resources. The theories of Patrick (1965), Goldsmith (1969), McKinnon and Shaw (1973), and Burkner (1980) can be combined into a single inclusive theory since each sheds some light on one or more characteristics of financial intermediation. Patrick (1965) and Goldsmith (1969) emphasize the spatial accessibility to financial intermediation, while McKinnon and Shaw (1973) pay attention to the artificially distorted financial market under repression. McKinnon and Shaw criticize the use of a low interest rate policy often found in developing countries, noting that the amount of savings mobilized in a repressed financial market typically falls short of the maximum attainable amount. Burkner (1980) suggests that the variation in financial instruments is a critical factor, but he does not try to link former studies with his theory within a single context. Neither does he identify the factors justifying the existence of various financial intermediaries.

In traditional financial development theories, behavioral aspects of savings were neglected while the intertemporal allocation of consumption streams were seen as determining the level of national savings. Studies on determining factors of savings are well summarized in Sturm (1983), Gersovitz (1988), Smith (1990), and Masson, Bayoumi & Samiei (1995). A number of papers presented at the meeting(Bergamo, 1983) of International Economic Association, fifteen in all, are also very useful in grasping related ideas, and a special edition of the *Scandinavian Journal of Economics* (1992) provides various empirical studies and new perspective on practical problems encountered in such studies. The major determinants of savings are classified into four groups : (1) macro-variables such as income, interest rates and inflation, (2) demographics (dependency ratio), (3) individual behavior such as bequest motives, and (4) institutional factors such as financial intermediation structure and social security system.

Samuelson (1958) notes the important role of money in enabling people to save under specific conditions. Samuelson makes a drastic simplification to show that institution-building can significantly affect economic decision-making. He supposes a simple economy in which people produce perishable goods when they are young, and then stop working when they reach old age. If a Confucian ethical system is inherent in this economy, young people will share their products with the older generation. If no Confucian tradition exists, however, the young will not provide for them. At that point, the government must step in to provide care. One form of government intervention would be to enact a regulation requiring the young to share their products with the old. Another alternative would be to issue legal tender to elderly members. They would buy what they needed from the young, and in the process, money would be transferred between generations. The result would be "saving" by the younger generation in preparation for their own twilight years. In other words, the introduction of money could establish a market economy in which the level of social welfare can be improved with a built-in social welfare system. This model implies two crucial points. First, the model indicates that institution-building may change the pattern of economic life and second, it clearly shows how resources have been allocated in the past.<sup>41</sup> From Samuelson, it can be inferred that financial intermediaries that provide liquidity (a broader concept of money) are expected to affect intertemporal or contemporaneous transfer of income. In other words, financial intermediaries exert influence on savings mobilization.

#### 4.2 Regulatory Differences and Savings Mobilization

The financial intermediation structure is an important institutional factor determining the level of savings. Based upon the six features of financial instruments suggested by Burkner (1980) and findings in Chapter 3, the ability of financial institutions to mobilize savings can be measured by the following function:

$$A = f(c, i, r, a) \tag{4.1}$$

where, c = liquidity control by the central bank, i = interest rate, r = risk level, a = accessibility (branch network, promotion, etc).

The ability function of banks  $(A_B)$  and Nonbanks  $(A_N)$  are as follows:

$$A_{B} = f(c_{B}, i_{B}, r_{B}, a_{B});$$

$$A_{N} = f(c_{N}, i_{N}, r_{N}, a_{N}).$$
(4.2)

In an economy in which banks and nonbanks coexist, the combined ability function (Ac) is as follows:

$$A_{C} = \alpha A_{B} + (1 - \alpha) A_{N}$$
  
=  $\alpha f(c_{B}, i_{B}, r_{B}, a_{B}) + (1 - \alpha) f(c_{N}, i_{N}, r_{N}, a_{N})$  (4.3)

where,  $\alpha$  = relative share of bank intermediation ( $0 \le \alpha \le 1$ ).

The comparison of the ability to mobilize savings between financial systems with nonbanks and those without nonbanks is made possible by judging whether  $A_C$  is bigger than  $A_B$ .

$$A_{C} - A_{B} = \alpha f(c_{B}, i_{B}, r_{B}, a_{B}) + (1 - \alpha) f(c_{N}, i_{N}, r_{N}, a_{N}) - f(c_{B}, i_{B}, r_{B}, a_{B})$$
  
=  $(1 - \alpha) (f(c_{B}, i_{B}, r_{B}, a_{B}) - f(c_{N}, i_{N}, r_{N}, a_{N}))$  (4.4)

There is no difference in risk level between banks and nonbanks if the government provides a *de facto* guarantee, implicit or explicit, that financial institutions will not fail. Before the 1997 crisis, Korea's general public believed that the government stood behind

all financial institutions, and, in fact, it did. The difference between banks and nonbanks in terms of degree of accessibility can be regarded as negligible because the level of accessibility is determined largely by exogenous factors like transportation and communication technologies. Also, the extensive branch networks of Korean banks and the sufficiently large number of nonbanks made the two types of financial institutions equally accessible to consumers of financial services.  $(A_C - A_B)$  becomes positive when the following two conditions are met, on the assumption that risk level and accessibility are not significantly different between banks and nonbanks.

1. 
$$\frac{\partial A}{\partial c} < 0, \quad c_N < c_B$$
 (4.5)

2. 
$$\frac{\partial A}{\partial i} > 0, \quad i_N > i_B$$
 (4.6)

As shown in Chapter 3, condition 1 is met because relatively greater freedom from liquidity control provides nonbanks with more opportunities to intermediate. Condition 2 is positive interest-rate sensitivity and higher interest of nonbanks. It can be said that financial system with nonbanks can mobilize more savings and contribute to economic growth if positive interest-rate sensitivity is confirmed. Positive sensitivity in the case of Korea is confirmed by several previous studies, including Dowling (1984), Yusuf and Peters (1984), and Moser (1989).<sup>42</sup>

# 4.3 Allocative Efficiency and Savings Mobilization

## 4.3.1 Two-Period Dynamic Model

If nonbank intermediation is more efficient, it can increase both savings and savings ratio, contributing more to economic growth than the banking sector. To set the stage for analytical discussions, we assume the standard Cobb-Douglas production function:

$$Y = AK^{\alpha_B} L^{\beta} \tag{4.7}$$

The equation (4.7) denotes the case in which there exists only bank intermediation. When nonbank intermediation is introduced, the equation (4.7) is transformed as follows:

$$Y = AK_B^{\alpha_B} K_N^{\alpha_N} L^{\beta}$$
(4.8)

 $K_N$  denotes the capital stock financed by non-bank financial intermediaries, whereas  $K_{B_1}$  the capital stock financed by banks, and L denotes the labor input.

We assume nonbank intermediation is a perfect substitute for bank intermediation.

$$K = K_B + K_N \tag{4.9}$$

As is the usual practice in macroeconomic theory, we retain the assumption of constant returns to scale:

$$\alpha_B + \alpha_N + \beta = 1 \tag{4.10}$$

Thus, reflecting (4.10) on the production function on (4.8), we have a standard per capita production function:

$$y = Ak_B^{\alpha_B} k_N^{\alpha_N} \tag{4.11}$$

Also, let us assume the per capita utility function:

$$u = u(c) \tag{4.12}$$

for which

$$u(c)' > 0$$
  
 $u(c)'' < 0$ 

Now consider a two-period dynamic model. Then the objective function to optimize can be written as

$$u(c_1, c_2) = u(c_1) + \frac{1}{1+\rho}u(c_2)$$
(4.13)

with the following constraints:

$$y_{1} = Ak_{B,1}^{\alpha_{B}}k_{N,1}^{\alpha_{N}}$$
$$y_{l} = c_{l} + s_{l}$$
$$s_{1} = s_{B,1} + s_{N,1}$$

$$y_{2} = A(k_{B,1} + i_{B,2})^{\alpha_{B}} (k_{N,1} + i_{N,2})^{\alpha_{N}}$$
$$i_{B,2} = s_{B,1}$$
$$i_{N,2} = s_{N,1}$$
$$y_{2} = c_{2}$$

where

- $y_1$  = per capita output in period 1
- $k_{B,I}$  = per capita bank financed capital stock in period 1
- $k_{N,I}$  = per capita nonbank financed capital stock in period 1
- $c_1$  = per capita consumption in period 1
- $s_1$  = per capita savings in period 1
- $s_{B,l}$  = per capita bank savings in period 1
- $s_{N,I}$  = per capita nonbank savings in period 1
- $i_{B,2}$  = per capita bank financed investment in period 2
- $i_{N,2}$  = per capita nonbank financed investment in period 2
- $y_2 = \text{per capita output in period 2}$
- $c_2 = \text{per capita consumption in period } 2$
- $\rho$  = time preference rate.

In this framework,  $y_1$ ,  $k_B$ , and  $k_N$  are assumed to be given, and no foreign borrowing is assumed here. Consequently, funds available for investment come solely from household savings in the financial system. Finally,  $y_2 = c_2$  merely reflects the fact that the model under consideration is a two-period model, i.e., there is no savings in period 2. Then, we can write (4.13) as a Lagrangian function:
$$u(c_{1},c_{2}) = u(c_{1}) + \frac{1}{1+\rho}u(c_{2}) + \lambda_{1}(y_{1} - Ak_{B,1}^{\alpha_{s}}k_{N,1}^{\alpha_{N}}) + \lambda_{2}(y_{2} - Ak_{B,2}^{\alpha_{s}}k_{N,2}^{\alpha_{N}}) + \lambda_{3}(y_{1} - c_{1} - s_{1}) + \lambda_{4}(s_{1} - s_{B,1} - s_{N,1}) + \lambda_{5}(i_{B,2} - s_{B,1}) + \lambda_{5}(i_{N,2} - s_{B,1}) + \lambda_{7}(c_{2} - y_{2})$$

$$(4.14)$$

Substituting out some of the constraints, the Lagrangian function (4.14) is drastically reduced to

$$u^{*}(s_{B,1}, s_{N,1}, c_{2}) = u(y_{1} - s_{N,1} - s_{B,1}) + \frac{1}{1 + \rho}u(c_{2}) + \lambda_{1}(y_{1} - k_{B,1}^{\alpha_{B}}k_{N,1}^{\alpha_{N}}) + \lambda_{2}[c_{2} - A(k_{B,1} + s_{B,1})^{\alpha_{B}}(k_{N,1} + s_{N,1})^{\alpha_{N}}]$$

$$(4.15)$$

Setting to zero the partial derivatives of (4.15) with respect to three control variables ( $s_{B,1}$ ,  $s_{N,1}$ ,  $c_2$ ), we obtain three first order conditions (FOCs) for maximizing the Lagrangian function

$$\frac{\partial u^{*}}{\partial s_{B,1}} = -u^{'} - \lambda_{2} a_{B} A(k_{B,1} + s_{B,1})^{a_{B}-1} (k_{N,1} + s_{N,1})^{a_{N}} = 0$$

$$\frac{\partial u^{*}}{\partial s_{N,1}} = -u^{'} - \lambda_{2} a_{N} A(k_{B,1} + s_{B,1})^{a_{B}} (k_{N,1} + s_{N,1})^{a_{N}-1} = 0$$

$$\frac{\partial u^{*}}{\partial c_{2}} = \frac{1}{1+\rho} u^{'} + \lambda_{2} = 0.$$
(4.16)

Reflecting the third FOC on the first two, we derive

$$-(1+\rho) + \alpha_{B}A(k_{B,1} + s_{B,1})^{a_{B}-1}(k_{N,1} + s_{N,1})^{\alpha_{N}} = 0$$
  
-(1+\rho) + \alpha\_{N}A(k\_{B,1} + s\_{B,1})^{a\_{B}}(k\_{N,1} + s\_{N,1})^{\alpha\_{N}-1} = 0. (4.17)

Now we define the relative efficiency (in terms of  $\alpha$ ) of the nonbank intermediation:

$$\gamma = \frac{\alpha_N}{\alpha_B}.$$
(4.18)

Then, from (4.17) and (4.18) follows:

$$\frac{k_{N,1} + s_{N,1}}{k_{B,1} + s_{B,1}} = \gamma .$$
(4.19)

# From (4.19) derives

$$\frac{\partial s_{N,1}}{\partial \gamma} = k_{B,1} + s_{B,1} \ (>0); \frac{\partial s_{B,1}}{\partial \gamma} = -\frac{k_{N,1} + s_{N,1}}{\gamma^2} \ (<0).$$
(4.20)

Based on (4.20),

$$\frac{\partial s}{\partial \gamma} = \frac{\partial (s_{N,1} + s_{B,1})}{\partial \gamma}$$

$$= \frac{\partial s_{N,1}}{\partial \gamma} + \frac{\partial s_{B,1}}{\partial \gamma}$$
  
=  $k_{B,1} + s_{B,1} - \frac{k_{N,1} + s_{N,1}}{\gamma^2}$   
>  $\frac{\gamma^2 - 1}{\gamma^2} (k_{B,1} + s_{B,1}) > 0$  (4.21)

noting that  $(k_{B,1} + s_{B,1})$  is larger than  $(k_{N,1} + s_{N,1})$  when nonbank intermediation is newly introduced, and assuming  $\gamma > 1$  (nonbanks are more efficient than banks).

### From (4.21) follows

$$\frac{\partial(s_1/y_1)}{\partial \gamma} = \frac{1}{y_1} \frac{\partial s}{\partial \gamma} > 0$$
(4.22)

noting that  $y_1$  is given as assumed at the outset.

The implication of (4.21) is obvious: Given that nonbank intermediation is more efficient than that of banks ( $\gamma > 1$ ), an increase in the relative efficiency of nonbanks increases the savings of the economy. Implication of (4.22) is that the increase in relative efficiency of nonbanks also increases the saving-to-income ratio of the economy. Of course, the two-period dynamic model is not identical by definition with the general *n*-period dynamic model. However, the FOCs for optimizing the two-period dynamic model carry over as part of the FOC's (necessary conditions) for optimizing the *n*-period model (Carter, p.168). Therefore, the conclusion herein derived in the context of our two-period model will remain invariant even in the context of the general model.

### 4.3.2 Efficiency and Relationship between Banks and Nonbanks

If nonbanks are judged to raise the savings of the economy, it implies that nonbanks contribute to economic growth irrespective of the comparative level of allocative efficiency of nonbanks. Even if nonbanks do not contribute to additional mobilization of savings, they can have a positive effect on growth if their allocation of funds is more growth-promoting than the allocation by banks. In other words, if greater resources are directed to the more productive sectors, it is evident that resource allocation is more efficient. If the pattern and cost of fund allocation by nonbanks is not different from that by banks, one can conclude that the efficiency of fund allocation by nonbanks is similar to that However, we cannot conclude that allocative efficiency of nonbank by banks. intermediation is disparate from that of the bank even if the patterns and cost of fund allocation are different. The reason: efficiency losses from relatively less productive industries can be offset by gains from other relatively more productive industries, and vice versa. We need to consider the different productivity level among industries to get a picture of allocative efficiency. In other words, analysis of the fund allocation patterns alone does not provide enough evidence to lead to a well-established conclusion.

The importance of efficiency measurement as a base to infer the contribution of nonbanks to economic growth varies according to the characteristics of the relationship between nonbank and bank intermediation. Given that the relationship is a perfect substitute, nonbanks can contribute to faster growth only when they are more efficient. If the relationship is a perfect complement, however, nonbanks always contribute regardless of the efficiency level. If the relationship is a partial substitute, the decisive contributing factor would be the degree of substitutability and the extent of the efficiency gap. Suppose that s is a portion of the substituted intermediation from bank and efficiency is denoted by e ( $e_N$  for nonbanks and  $e_B$  for banks). In the case where  $e_B$  is bigger than  $e_N$ , nonbank intermediation would become neutral in terms of efficiency gain when the following equation is satisfied, (In the case where  $e_N$  is bigger than  $e_B$ , nonbanks always contribute).

$$s e_B = 1 e_N \tag{4.23}$$

where s denotes the portion of substituted intermediation defined as

$$s =$$
nonbank intermediation substituting for bank  
total nonbank intermediation

( if s = 1, perfect substitutes; if s = 0, perfect complements)

e: allocative efficiency defined as productivity increase from one unit of intermediation (see page 100)

The left side stands for the expected efficiency loss from the replacement of bank intermediation with nonbank intermediation while the right side shows efficiency add-up from additional nonbank intermediation. Where  $e_N$  is equal to or bigger than  $s e_B$ , nonbanks are expected to contribute to growth even if the relationship is a partial substitute. Equation (4.23) shows that the efficiency of nonbanks should be greater than that of banks to make contribution to economic growth when the relationship is a perfect substitute. Equation (4.23) also confirms the argument that nonbanks can always contribute regardless of the efficiency level when the relationship is a perfect complement.

### 4.4 Summary: Chanels of Imapct on Economic Growth

As we have seen in Chapter 3 and sections 4.2 and 4.3, nonbank channels of contribution to economic growth originate from regulatory differences and allocative efficiency. Greater operational autonomy enables nonbanks to be more active in financial intermediation, which can be interpreted as a major savings mobilizing process.<sup>43</sup> An increase of mobilized savings contributes to economic growth in two ways. One is the enhancement of total investment efficiency by increased savings for transfer. The other is new capital formation coming from additional savings (consumption reduction). Where nonbanks are adequately efficient in allocating mobilized financial resources, nonbank intermediation will contribute to economic growth. There are three channels of impact. The first channel originates from the liquidity control policy of the central bank (channel from liquidity control), which is focused only on deposit money banks' balance sheets. The second stems from the allowance of higher interest rates (channel from higher return) for instruments offered by nonbanks. Figure 4-1 shows how regulatory differences give impact on economic growth, either by improving investment efficiency or by increasing the amount of investment. This figure also shows the third channel originating from allocative efficiency. The channel from higher return is reinforced by an improved risk-return profile through government risk-sharing, either *de facto* or legislated.





### **CHAPTER V**

## **EMPIRICAL EVIDENCE**

### 5.1 Test of Impact on Economic Growth

It was shown previously, rather analytically, that nonbank financial intermediaries can make significant contributions to faster economic growth.

To identify the role of nonbank intermediation under financial repression, the hypothesis to be tested is as follows:

Economic Nonbank intermediation contributed to Korea's growth during 1972-1994

To test the hypothesis, the Granger causality test and the Two-Gap Model will be used. Regarding Granger causality test, one can judge whether nonbank intermediation contributed to economic growth by looking at causality flows between real income and financial interrelations ratio (FIR = M/Y) for nonbanks vis-a-vis banks. To serve our purpose, we used four specific definitions of money supply:  $M_1$  (currency in circulation + demand deposits),  $M_2$  ( $M_1$  + savings deposit),  $M_3$  ( $M_2$  + nonbank deposits), and  $M_N$ (nonbank deposits). In light of the fact that nonbanks were relatively freer of liquity control by the monetary authorities during the sample period, it is suspected that nonbanks made a significant contribution to invesment activities. To test for the significance, we use the Two-Gap Model (Harris, 1979) with a slight modification. Further, to empirically establish the suspected importance of the role played by the higher interest rates offered by nonbanks, we also test interest sensitivity of savings mobilization.

# 5.1.1 Granger Causality <sup>44</sup> Model

Jung (1986) tests the following causal relationships for annual data on 56 countries.

$$c \rightarrow y \left( c = \frac{C}{M} \right)$$
  

$$y \rightarrow c$$
  

$$m \rightarrow y \left( m = \frac{M}{Y} \right)$$
  

$$y \rightarrow m$$
(5.1)

where

c = currency ratio; C = Currency (nominal) Y = nominal GNP; y = real GNP.

Jung finds some evidence which indicates a supply-leading causality pattern in LDCs. To identify the role of nonbank intermediation, we will use separate monetary indicators for banks and nonbanks.

To test whether or not the nonbank financial intermediation has significantly contributed to Korea's economic growth during the sample period under our investigation, we used four different monetary indicators. For each indicator, we ran a pair of regressions for Granger causality tests as follows:

$$\begin{pmatrix} \frac{M_1}{Y} \end{pmatrix} \rightarrow y, \quad y \rightarrow \left( \frac{M_1}{Y} \right)$$

$$\begin{pmatrix} \frac{M_2}{Y} \end{pmatrix} \rightarrow y, \quad y \rightarrow \left( \frac{M_2}{Y} \right)$$

$$\begin{pmatrix} \frac{M_3}{Y} \end{pmatrix} \rightarrow y, \quad y \rightarrow \left( \frac{M_3}{Y} \right)$$

$$\begin{pmatrix} \frac{M_N}{Y} \end{pmatrix} \rightarrow y, \quad y \rightarrow \left( \frac{M_N}{Y} \right)$$

$$(5.2)$$

where  $M_N$  is the difference between  $M_3$  and  $M_2$  ( $M_N = M_3 - M_2$ ), y and Y are real and nominal incomes respectively.

For rigorous confirmation of the causal relationship "financial deepening (M/Y) causes real GDP (y)", we should reject the null hypothesis that "(M/Y) does not cause y", but fail to reject that "y does not cause (M/Y)". Following four regression equations are required to be estimated for Granger causality test:

$$y_{t} = \sum_{i=1}^{p} \alpha_{i} \cdot y_{t-i} + \sum_{i=1}^{p} \beta_{i} \cdot \left(\frac{M_{j}}{Y}\right)_{t-i} + \varepsilon_{t}$$
(5.3)

$$y_{t} = \sum_{i=1}^{p} \alpha_{i} \cdot y_{t-i} + \varepsilon_{t}$$
(5.4)

$$\left(\frac{M_{j}}{Y}\right)_{t} = \sum_{i=1}^{p} \gamma_{i} \cdot \left(\frac{M_{j}}{Y}\right)_{t-i} + \sum_{i=1}^{p} \theta_{i} \cdot y_{t-i} + \varepsilon_{t}$$
(5.5)

$$\left(\frac{M_j}{Y}\right)_t = \sum_{i=1}^p \gamma_i \cdot \left(\frac{M_j}{Y}\right)_{t-i} + \varepsilon_t$$
(5.6)

where

 $y_t$  = real *GNP*  $M_j$  = money indicator (j = 1, 2, 3, N) Y = nominal *GNP* 

p = number of lags

### Test results

Due to a limited number of annual observations, we do not have a luxury of determining the optimal lag length purely based on statistical criteria such as AIC. Instead, following Jung (1986), we limit the maximum time lags to two years. The estimated F-ratios as test statistics extend a rather strong empirical evidence in support of the hypothesis that the growth of nonbank intermediation has contributed significantly to economic growth in Korea. The test results show that  $M_1$  (currency in circulation + demand deposits) does not Granger cause the real income regardless of the number of time lags. In other words, any information on dynamic behavior of  $M_1$  does not help to predict the path of economic growth. When we define money more broadly as  $M_2$  ( $M_1$  + savings deposits), the results show that income Granger causes financial deepening. The results reflect well-established policy practices regarding monetary targeting of the EC method adopted by the Bank of Korea. In the EC method, the target growth rate of leading monetary indicator ( $M_2$ ) has been set in accordance with the expected growth rate of

income<sup>45</sup>; that is, if the expectation formation process of income is adaptive, it is not surprising that income (y) Granger causes financial deepening measured by leading monetary indicator  $(M_2)$ .

On the other hand, our test results indicate that financial deepening Granger causes income (y) when we use monetary indicator defined as  $M_3$  ( $M_2$  + Nonbank instruments) and  $M_N$ . More importantly, the direction of causality becomes clearer for  $M_N$ . These results could serve as evidence which supports the hypothesis that nonbank intermediation has contributed to economic growth in Korea. This econometrically verified hypothesis further justifies the argument that the Korean government's initiative to introduce and promote nonbank intermediation is a successful case of deliberate government intervention in the financial markets.

	F-Statistic	
	$H_0: m_i \not\rightarrow y$	$H_0: y \not\rightarrow m_i$
1. Number of lags = 1		
$m_i = m_I$	0.191430	0.255021
$m_2$	3.408127	6.874176 <sup>*</sup>
<i>m</i> <sub>3</sub>	7.805309*	2.611710
$m_N$	7.642961*	1.270830
2. Number of lags = 2		
$m_i = m_I$	0.597514	0.081077
<i>m</i> <sub>2</sub>	1.396511	6.461121*
<i>m</i> <sub>3</sub>	5.208005*	3.126881
m <sub>N</sub>	5.633976*	1.180674

Table 5.1: Causal Relations between FIR and Economic Growth

1)  $X \rightarrow Y : X$  Granger causes Y.

2) \*: Null hypothesis of no Granger causality is rejected at the significance level of 5% or less.

3) 
$$m_i = \frac{M_i}{Y}$$
,  $i = 1, 2, 3, N$  (Y = nominal GNP).

4) y = Real GNP (in 1990 price).

5) The estimated regression equations are shown in the endnotes.<sup>46</sup>

### 5.1.2 Modified Two-Gap Model

# **Original Model**

The original model of a descriptive equation for investment ratio is as follows<sup>47</sup>:

$$\frac{\Delta I_{t}}{\Delta Y_{t}} = \alpha + \gamma \frac{\Delta F_{t}}{\Delta Y_{t}} + \delta \frac{\Delta M_{t}}{\Delta Y_{t}} + \varepsilon_{t}$$
(5.7)

where

I = Investments, (nominal)

M = Money stock (nominal)

F = Foreign savings (nominal)

Y = Income. (nominal)

This Two-Gap model is based on the important fact that developing countries usually borrow money from abroad to bridge the gap between domestic fund supply (savings) and demand (investments).

# Modified Model

To separate the impacts of nonbanks and banks on the investment process, we

included both  $\frac{\Delta M_{2,t}}{\Delta Y_t}$  and  $\frac{\Delta M_{N,t}}{\Delta Y_t}$  in place of  $\frac{\Delta M_t}{\Delta Y_t}$  in the original Two-Gap model:

$$\frac{\Delta I_{t}}{\Delta Y_{t}} = \alpha + \gamma \frac{\Delta F_{t}}{\Delta Y_{t}} + \delta_{1} \frac{\Delta M_{2,t}}{\Delta Y_{t}} + \delta_{2} \frac{\Delta M_{N,t}}{\Delta Y_{t}} + \varepsilon_{t}$$
(5.8)

In spite of its rudimentary character, the OLS estimation results highlight an important driving force behind growth in the investment ratio: The estimate of  $\delta_2$  is positive and statistically significant at the 5% level. On the other hand, the estimate of  $\delta_1$  is negative and statistically significant at the 5% level (with *t*-ratios within the parentheses).

$$\frac{\Delta \hat{I}_{i}}{\Delta Y_{i}} = 0.4921 + 0.3549 \frac{\Delta F_{i}}{\Delta Y_{i}} - 0.5775 \frac{\Delta M_{2,i}}{\Delta Y_{i}} + 0.1076 \frac{\Delta M_{N,i}}{\Delta Y_{i}}$$
(5.9)

 $R^2 = 0.5048; DW = 1.666$ 

The OLS estimation results of the modified model show that the propensity to invest is positively sensitive to the growth of nonbank intermediation relative to income, while it is negatively effected by the growth of  $M_2$  relative to income. The reason why  $\hat{\delta}_1$  is negative

as opposed to negative  $\hat{\delta}_2$  can be attributed to policy behavior of the Korean monetary authorities. The monetary authorities, adopting a forward-looking strategy, tended to squeeze the leading monetary indicator ( $M_2$ ) whenever the economy showed signs of booming with higher investments in order to fend off emerging inflation. Such actions resulted in negative  $\hat{\delta}_1$ . The  $\hat{\delta}_2$  is positive as anticipated in view of the fact that financial savings intermediated by nonbanks are relatively free from the central bank's liquidity control for monetary policy purposes.<sup>48</sup> In other words, nonbanks could finance investment activities subject to a much less constraint even when the economy was booming, thereby easing out banks which were under constant pressure from the central bank to restrain themselves in their lending practices.

### 5.1.3 Interest Sensitivity Test

During the our study period, financial instruments offered by nonbanks had borne higher interest rates while the risk factors were more or less about the same as banks because the government stood behind nonbanks. This implies that nonbank intermediation must have made a significant contribution to savings mobilization if the saving has a positive sensitivity to interest rate. This section in fact readdress the issue of interest sensitivity of the savings in the previous studies<sup>49</sup>.

# (1) Simple OLS Estimation

To test for the sensitivity of financial saving to interest rate, we specify the saving as a semi-logarithmic function of output growth and interest rate:

$$S_t = \beta_o + \beta_1 g_t + \beta_2 r_t + \varepsilon_t$$

(5.10)

where

$$S_{t} = \log(\text{real financial savings})$$

 $g_t$  = real GDP growth rate

 $r_t$  = real interest rate

In estimating the savings function above, we ran a regression for each of bank time deposit rate (*TDR*) and nonblank corporate bond rate (*CBY*). Both regressions showed two econometric problems: (1) extremely low  $R^2$ s; (2) a strong positive autocorrelation in the residuals as evidenced by DW statistics close to zero. The first problem mainly stemmed from a severe heteroscedasticity problem with the residual variance highly correlated with  $TDR^2$ , therefore was resolved by generalizing the linear model (10) by dividing by  $\sqrt{TDR^2}$ :

$$\frac{S_{t}}{\sqrt{TDR_{t}^{2}}} = \beta_{o} \frac{1}{\sqrt{TDR_{t}^{2}}} + \beta_{1} \frac{g_{t}}{\sqrt{TDR_{t}^{2}}} + \beta_{2} \frac{r_{t}}{\sqrt{TDR_{t}^{2}}} + \frac{u_{t}}{\sqrt{TDR_{t}^{2}}}$$
(5.11)

or simply

$$S_{t}^{*} = \beta_{o}h_{t} + \beta_{1}g_{t}^{*} + \beta_{2}r_{t}^{*} + u_{t}^{*}.$$
(5.12)

where  $h_t$  denotes  $1/\sqrt{TDR_t^2}$ .

GLS estimation of (5.10), or alternatively OLS estimation of (5.12), increased  $R^2$ s from less than .01 to more than .9 (a rather dramatic increase), but the autocorrelation problem still remained serious. Subsequently, we re-estimated the model with the residuals specified as having a first-order autocorrelation. The final estimation results with the two econometric problems resolved as explained above are as reported in Table 5.2 (henceforth all variables without the asterisks will denote the transformed variables):

Variable	Model I	Model II	Model III	Model IV
Constant	.10395	.14509	.19861	.16534
g	.79250 <sup>*</sup> (14.64)	.24097* (4.694)	.24526* (4.589)	.18316 <sup>*</sup> (3.511)
TDR	088947 (4133)		.0049223 (.1884)	23524 (-1.612)
CBY		.46375 <sup>*</sup> (10.64)	.45783 <sup>*</sup> (10.37)	.50817 <sup>*</sup> (11.72)
TDR×CBY				.028123 <sup>*</sup> (2.325)
Df	20	20	19	18
Adjusted R <sup>2</sup>	.9490	.9919	.9909	.9926
DW	2.0060	1.8134	1.8207	1.8828

Table 5.2: GLS-Estimated Coefficients for Alternative Savings Functions.

1. The asterisks indicate the statistical significance at 1% significance level.

2. Each shaded cell indicates that the coefficient is zero by restriction.

3. All DW statistics either fail to reject or is indecisive about the null of no autocorrelated residuals.

Estimated savings functions reported in Table 5.2 show that CBY has a positive

effect on saving with a strong statistical significance (Model II) whereas *TDR* has an insignificant, negative, effect on saving (Model I).

However, the savings data used for regressions is in fact the aggregate of the time deposits at the financial institutions and funds raised through sales of corporate bonds, therefore both TDR and CBY are both relevant to the aggregate financial savings. By excluding either TDR or CBY from the model, therefore, we would commit an under-specification which may well cause serious underspecification biases. Also, in order to accommodate the possible interaction between the two interest rates we include the interaction term ( $TDR \times CBY$ ).

These two additional regression results are all consistent with those of Model I and Model II: the savings are sensitive to CBY with a statistical significance, which is not the case for TDR. The most likely reason for this observation lies in the fact that CBY reflects more of supply-demand dynamics in the financial market than TDR is basically a rate regulated by the financial authorities. It is also noteworthy that the interaction term has a positive coefficient estimate with a statistical significance, which implies that the higher the TDR, the greater the sensitivity of the savings to CBY. For all four models estimated, the Durbin-Watson statistics are either well within the ranges of no autocorrelation or within the indecisive range, therefore the test statistics are presumed to be free of any significant biases.

#### (2). Impulse Response Function

Having a rather robust empirical results discussed above, namely, the savings are sensitive to the *CBY* but insensitive to *TDR*, we reformulate the relationship between the three variables (*S*, *g*, and *CBY*) as a VAR (vector auto-regression) system to take a glimpse of the time path of the impact of CBY on the savings. By nature of VAR model, all of the three variables contained in our  $(3\times1)$  VAR are treated as endogenous variables. Formally, the VAR model may be written as:

$$y_{i} = A_{1} y_{i-1} + A_{2} y_{i-2} + \dots + A_{n} y_{i-n} + \varepsilon_{i}$$
(5.13)

where A's are coefficient matrices  $(3\times3)$  and

.

$$y_t = (S_t \ g_t \ CBY_t)$$

Our preliminary estimations with different lags all showed that coefficients for the VAR vectors beyond two lags were all invariably insignificant. Further, the AIC (Akaike Information Criteria) value did not improve as we increased the number of lags, indicating that optimal number of lags is two: AIC value for VAR model with two lags is approximately 7.6 (as shown in Table 5.3) which compares with 7.73 for VAR with three lags, showing virtually no change. Therefore, following the practical rule of parsimony, we have chosen VAR with the lag of order 2 as the final model.

	St	CBY,	gt
Constant	.477512	.828588	.501348
Constant	(.79358)	.67197)	(.68740)
S	6.521655	8.353438	8.287296
3 <sub>t-1</sub>	(2.93800)	(3.45089)	(3.08020)
CRV	-2530766	-3.080238	-3.384891
CD I t-J	(-2.14453)	(-1.67900)	(1.43037)
a	-1.669282	-2.134895	-1.931204
St-1	(2.35431)	(-1.93892)	(-2.24718)
C.	-6.742395	-10.41627	-8.629416
5 <sub>t-2</sub>	(-2.20045)	(-2.18680)	(-2.32354)
CRV	2.250266	3.421097	2.883123
CB1 <sub>t-2</sub>	(1.57342)	(1.53878)	(1.66320)
	2.719334	4.199701	3.417471
gt-2	(2.76863)	(2.74062)	(2.86027)
Adjusted R-squares	.367853	.339596	.387572
F-statistic	2.840539	2.714086	2.937357
Log Likelihood	-39.75127	-49.01595	-43.79022
AIC	4.452502	5.334852	4.837164
System Log Likelihood		-62.58228	h.
System AIC		7.858312	

Table 5.3: Estimated VAR Coefficients.

1) Numbers within the parentheses are *t*-ratios.

 The light and dark shaded blocks of coefficients, respectively, are estimated coefficient matrices A<sub>1</sub> and A<sub>2</sub> in Equation (5.17).

Figure 5.1 shows the 10-year time path of the savings response to one standard error impulse of CBY based on the estimated coefficients reported in Table 5.3. It shows rather clearly that the real interest rate as measured by CBY has a positive impact on the growth rate of real financial savings for about five or six periods and afterwards rapidly tapers off to zero, with a positive cumulative effect of 3.565 (billion won) over ten year period. This appears to be consistent with our conclusion in the interest sensitivity analysis of the savings function.



Figure 5.1: Response of Real Financial Savings to one s.d. Impulse of Real CBY



### **5.1.4 Interpretation of Test Results**

Empirical evidence obtained from the test results can be summarized as follows:

- From the Granger Causality Test results, supporting evidence was found for the hypothesis that nonbank intermediation contributes to economic growth. However, there was an absence of Granger causality running from the bank deposits to economic growth;
- From the test results of the modified Two-Gap Model, we could also confirm strong supporting evidence in favor of the hypothesis;
- 3) From the estimation results of OLS estimation and impulse-response function, we were able to obtain the evidence on positive interest sensitivity of financial savings. The above test results demonstrate sufficient evidence to support the hypothesis

that nonbank intermediation contributes to higher economic growth.

### 5.2 Test of Effects Created by Allocative Efficiency

### 5.2.1 Definition of Allocative Efficiency

The traditional definition of efficiency refers to productivity(output/input). Specifically, net benefit increase (benefit-cost) per unit of input increase is used here as an operational definition of efficiency. Therefore, the efficiency of financial intermediation can be defined as the net benefit increase per unit of increase in lending. Benefit is defined as the value added created by financial intermediation in line with the purpose of this study, which is to identify the role of nonbanks in economic growth.

$$E_{F} = \frac{\sum_{i} M_{F} p_{i} y_{i} - IC_{F}}{M_{F}} = \sum_{i} p_{i} y_{i} - \frac{IC_{F}}{M_{F}}$$
(5.14)

 $E_F$ : efficiency of financial intermediation

 $M_F$ : loan

- $p_i$ : Share of loan directed to industry *i*
- $y_i$ : productivity of industry *i*
- $IC_F$ : total financial intermediation cost

In the case where average unit cost of financial intermediation  $(IC_F/M_F)$  is the same across different types of financial institutions, efficiency can be compared using the proxy of  $\sum_{i} p_{i} y_{i}$ . Then the proxy for total efficiency of intermediation by each group of financial institutions can be defined as follows: Total efficiency of bank's intermediation (*TE<sub>B</sub>*) is,

$$TE_{B} = \sum_{i} p_{i}^{B} y_{i}, \sum_{i} p_{i}^{B} = 1$$
(5.15)

where  $P_i^B$  is the share of bank loans to the *i*-th manufacturing industry.

Total efficiency of nonbank intermediation  $(TE_N)$ 

$$TE_{N} = \sum_{i} p_{i,N} y_{i}, \sum_{i} p_{i,N} = 1$$
(5.16)

where  $P_i^N$  is the share of nonbank loans to the *i*-th manufacuring industryindustry. It is apparent that nonbank intermediation is more efficient than that of banks, if

$$\sum_{i} p_i^{N} y_i > \sum_{i} p_i^{B} y_i \tag{5.17}$$

It is not difficult to fix the elements in the sets of  $\{p_i^B\}$  and  $\{p_i^N\}$ . However, given the lack of reliable data, it is certainly difficult to calculate the size of the productivity increase by adding one unit of credit to a certain industry. As an alternative, we could consider the

introduction of a proxy, the capital productivity of each industry, that is,  $\left(\frac{Y}{K} = k\right)$ . With

the introduction of capital productivity, one more modification is given to the proxies of allocative efficiency, that is, we consider the portion of loan extended to a certain industry sector to meet facilities investments. Then, the new efficiency proxies for bank and nonbank intermediations, respectively, will be:

$$TE_{B} = \sum_{i} p_{i}^{B} e_{i}^{B} k_{i}$$
(5.18)

$$TE_N = \sum_i p_i^N e_i^N k_i$$
(5.19)

where

 $e_i^B$  = Share of banks equipment loan to industry *i*;  $e_i^N$  = Share of nonbank equipment loan to industry *i*;  $k_i$  = Capital productivity of the *i*-th industry.

Finally, we can compare the dynamic performances of banks and nonbanks as financial intermediaries ovre a certain period [1, T] using the metrics defined as:

$$E_{B} = \sum_{i} \sum_{i} p_{ii}^{B} e_{ii}^{B} k_{ii};$$

$$E_{N} = \sum_{i} \sum_{i} p_{ii}^{N} e_{ii}^{N} k_{ii}$$
(5.20)

where

 $p_i e_i k_i =$  Value added generated by  $p_i e_i$  unit of fincial resources (bank or 84

nonbank) financed to the *i-th* industry;

 $\sum_{i}^{N} p_{i} e_{i} k_{i} =$ Total value added generated by a specific distribution of one unit input of financial resources cross N industries;

 $\sum_{i}^{T} \sum_{i}^{N} p_{ii} e_{ii} k_{ii} = \text{Total value added generated by a specific inter-industry distribution of one}$ unit of financial resources cross N industries over T periods of time.

The above capital performance measurements may provide useful information on allocative efficiency. It does have several deficiencies, however:

- Assumption of linearity is not realistic. This approach implicitly assumes constant returns to scale on the efficiency of financial intermediation. Diminishing returns to scale beyond a certain level is more realistic.
- The above approach is static. It does not reflect technology development. When new, more productive equipment is introduced, past data on capital productivity are no longer valid.
- 3) Concentration on a few industries with higher productivity cannot always be regarded as a hopeful case. Yet, the above approach fails to address this problem.<sup>50</sup>

# Data

The period from 1981 to 1991 will be under study. The BOK started maintaining statistics of loan portfolios by industry from 1981, and then changed its data series from 1992 due to the reorganization of industry classification criteria. Since there are only 11 observations, it would be difficult to expect regression techniques to produce statistically meaningful results. For that reason, a unique methodology to measure productivity contribution is devised as explained above.

### 5.2.2 Measurement of Allocative Efficiency

Changing industrial classifications over time lead to practical difficulties in data collection. An example is the industrial classification criteria adopted in loan statistics, which are different from those in the financial statement analysis by the BOK, where productivity data are available. Considering the importance of manufacturing in the process of development, the best compromise would be to analyze the manufacturing sector, classified into eight sub-categories, by comparing the below statistics :

$$EF_{81-91}^{B} = \sum_{t=81}^{91} \sum_{i=1}^{8} m_{t}^{B} p_{it}^{B} e_{it}^{B} k_{it}^{B};$$

$$EF_{81-91}^{N} = \sum_{t=81}^{91} \sum_{i=1}^{8} m_{t}^{N} p_{it}^{N} e_{it}^{N} k_{it}^{N}$$
(5.21)

where

- $m_t^B$  = Share of bank loans to all manufacturing industries in period *t*.  $m_t^N$  = Share of nonbank loans to all manufacturing industries in period *t*.
- $p_{it}^{B}$  = Share of bank loans to the *i-th* manufacturing industry in period t.
- $p_{it}^{N}$  = Share of nonbank loans to the *i*-th manufacturing industry in period t.
- $e_{ii}^{B}$  = Share of bank loans for equipment purchases to the *i-th* manufacturing industry during the period *t*.

- $e_{it}^{N}$  = Share of nonbank loans for equipment purchases to the *i*-th manufacturing industry in period t.
- $k_{\mu}$  = Capital productivity of the *i*-th manufacturing indusry in period t.

According to the calculation results, allocative efficiency of bank intermediation appears higher than that of the nonbank during the period from 1981 to 1991:

$$EF_{8I-91}^B = 80.1150 > EF_{8I-92}^N = 69.6925$$
 (5.22)

Taking a careful look at the performance of each year, however, neither the evidence in favor of bank efficiency, nor the evidence to support the higher efficiency of the nonbank can be confirmed. If we drop from the sample two outlier years, say 1982 and 1986, when there was an extraordinarily large efficiency gap between banks and nonbanks, the total allocative efficiency of nonbank intermediation during the period looks the same as, or even slightly better than that of bank intermediation ( with the asterisks denoting 1982 and 1986 excluded ):

$${}^{*}EF^{B}_{81-91} = 53.537 \quad < {}^{*}EF^{N}_{81-91} = 54.631 \tag{5.23}$$

Out of nine years with a normal efficiency gap, bank intermediation is more efficient in five of those years, and nonbank intermediation in four years. Thus, the evidence for the relatively higher efficiency of bank intermediation remains inconclusive.

In the real world, the assumption adopted in the present study to induce the proxy to measure allocation efficiency - that average unit cost of intermediation (IC/M) is the same across all types of intermediaries - does not hold. In Korea, merchant banking corporations, investment and finance companies, and other nonbanks have been operating with a lower average unit-cost of intermediation than banks. This again reinforces the argument that, in general, banks' allocative efficiency is not greater than nonbanks.

### 5.2.3 Interpretation of Test Results

According to Equation 1 of  $e_N = s e_B$  from the section 4.3.2, introduction of nonbank intermediation contributes to economic growth through allocative efficiency gain on condition that  $e_N$  is larger than  $s e_B (e_N > s e_B)$ . The empirical test results on allocative efficiency, though the number of observations used was somewhat limited, shows that there exists no significant efficiency gap between bank and nonbank intermediation ( $e_N = e_B$ ). According to the empirical test results shown in Chapter 3, there exists complementarity between bank and nonbank intermediation, which means s is smaller than 1 (0 < s < 1).

	Annual Allocative Efficiency = $\sum_{i=1}^{8} m_i p_i e_i k_i$		Year
	Nonbanks	Banks	
	5.0463	5.4496	1981
V	8.4752	4.4527	1982*
V	5.5476	4.1240	1983
V	3.5644	2.1264	1984
	5.2896	6.2986	1985
	6.5863	22.1253	1986*
	11.2204	12.9363	1987
V	10.3608	8.5565	1988
V	3.9185	3.7728	1989
	3.9897	4.3144	1990
	5.6937	5.9584	1991
	69.6925	80.1150	Total

 Table 5.4 Allocative Efficiency by Productivity Contribution

1)  $p_i$ ,  $e_i$  and  $k_i$  are calculated based on various issues of the *Economic Statistics Yearbook* by the BOK.

2)  $y_i$  is gross value added to 100 won value of property, plant and equipment in *i*-th industry.

3) The numbers in table measure annual relative efficiencies of fund allocation.

4) Sub-classifications of manufacturing industry are as follows.

1. Food & beverages,

- 2. Textiles, Apparel & leather,
- 3. Wood & furniture,
- 4. Paper, printing & publishing
- 5. Chemicals, petroleum, coal, rubber & plastics,
- 6. Non-metallic mineral products,
- 7. Basic metals,
- 8. Fabricated metal products, machinery & equipment.

5)  $\sqrt{}$ : Nonbanks are more efficient.

6) \*: Outlier year.

7) In 1992, the time series data used have been replaced by new series, therefore consistent data series are unavailable thereafter.

Combining empirical test results from this Chapter with those of Chapter 3, the above-mentioned condition for efficiency gain is satisfied. This allows us to conclude that nonbank intermediation contributes to economic growth through allocation efficiency gain  $(e_N = e_B, 0 < s < 1 \rightarrow e_N > s \cdot e_B).$ 

### 5.2.4 Allocative Efficiency and Business Cycle

This section will analyze whether the difference in the allocative efficiency structure across time periods correlates with other macroeconomic activities such as business cycle.

If we look at Table 5.2, we find that there are years when nonbanks had a relatively higher efficiency cluster. Three consecutive years, 1982, 1983, and 1984, as well as two consecutive years, 1988 and 1989 register relatively higher efficiency for nonbanks. Interestingly, there are also years when banks showed a relatively higher efficiency cluster. We can observe from the above comparison a cyclical nature in terms of allocative efficiency. The business cycle of the Korean economy shows two peaks during the 1980's: February 1984 and January 1988. It is interesting that during the 1980s, the years when nonbanks showed a higher efficiency clustered around the peak of the business cycle except for 1989. It would be worthwhile to investigate the reasons for nonbanks' relatively higher efficiency around the peak of a business cycle as it could shed light on the role of nonbanks on economic growth from a different angle. For one, new business opportunities arise when the economy expands. The growing economy, especially in its early stages of development, provides new, and more profitable business opportunities. If the bank fails to finance promising new business opportunities, the ball will fall in the court of the nonbank.

In other words, nonbanks will have the chance to finance new business opportunities instead. In particular, when there is a change in monetary policy in response to emerging inflationary pressures, small businesses and household firms without credit histories are by and large edged out of the formal bank-loan market. As was previously discussed, banks cannot extend every loan requested due to the monetary targeting of the central bank, which is responsible for inflation control. Generally, the central bank is expected to adopt a tight monetary policy when the economy grows beyond its potential. And when the bank window closes due to pressure from the central bank, entrepreneurs will seek nonbank intermediation to finance their business projects. This would explain the relatively more active role of nonbank around the peak of a business cycle.

The only exception to this correlation, the year 1989, shows that allocative efficiency of nonbanks can be relatively high even during a trough period. Despite the real economic slowdown, the year 1989 registered an extraordinarily bullish stock market, pushing the KOSPI (Korean Stock Price Index) above the 1,000 level for the first time in history. An active capital market with a sharp increase in asset prices provided more business opportunities to nonbanks that were issuing money-market instruments and underwriting corporate securities, especially to investment trust companies. Greater business opportunity *per se* does not necessarily mean higher efficiency. However, such chances are usually associated with innovation in rapidly growing economies that guarantees better performance. The reason for this inconsistency might originate from a sharp export-driven upturn that came earlier than usual. (The solid line in Figure 5.2 shows a trajectory that would have prevailed without the export drive.<sup>51</sup>)

Figure 5.2: Business Cycle and Allocative Efficiency



#### **CHAPTER VI**

### CONCLUSION

The important conclusion to be drawn from this study is that nonbank intermediation contributes to economic growth in a financially repressed economy. A nonbank contributes to economic growth through three main channels: those being liquidity control on bank intermediation, higher return on nonbank instruments, and allocative efficiency gain associated with the expansion of nonbank intermediation in the economy. The relative independence from the central bank enables nonbanks to provide credit availability rather freely. Moreover, less stringent regulations on nonbank intermediaries enables them to offer more diverse instruments with higher returns. This, in turn, allows them to meet the various needs of customers. These two distinct qualities shown by nonbanks are not solely the products of government policy. They also originate from the inherent characteristics of nonbanks; that is, nonbank intermediation closely relates to the development of capital markets. Mutual funds and investment trust companies, which function as both institutional investors and 'alter egos' for individual investors in the capital market, cannot be regulated as rigorously as banks. The unique experience of the Korean financial market since the 1972 Presidential Emergency Decree provides a series of useful annual data with which we can support the hypothesis that nonbank intermediation can contributes to economic growth in a financially repressed economy. Chapter 5 provides supporting empirical evidence by testing the Granger causality, the Modified Two-Gap model, and interest sensitivity. Further bolstering that support, the empirical test results using cointegrating regression and error correction techniques in Chapter 3 show that the relationship between banks and nonbanks is complementary. A theoretical model is constructed in chapter 4 to incorporate the fact that the degree of substitutability and the extent of the efficiency gap between the banks and nonbanks determine the contribution by nonbanks. The empirical test results of Chapter 5, which shows that no efficiency gap exists between bank and nonbank intermediation, together with the test results showing that the relationship is complementary, allow us to conclude that nonbank intermediation contributes to economic growth through allocative efficiency gain.

An important implication can be drawn from this study: The Korean Ministry of Finance assumed the initiative when it introduced new types of nonbanks into the financial market. In that sense, it was a clear example of deliberate government intervention intended to expedite economic growth through guided structural changes in the financial sector. As an alternative source of finance, nonbanks have had a profound influence. Moreover, the intermediary activities that they pioneered have led to a significant increase in domestic savings. The same type of rigorous institution building could take place in other developing countries. In particular, the South Korean experience can be a valuable model when the two Koreas agree upon a loose confederacy, which in time will develop into a more advanced form of unification. The North could initiate establishment of nonbanks to accelerate financial deepening and eventually economic growth, following the example set by the South in the 1970s and 1980s. Former Soviet Union (FSU) countries as well as developing African countries could also benefit from studying the various initiatives taken by the Korean government in building the financial intermediation structure, enriched further by the introduction of new types of nonbanks.

The most notable aspect of this study is that nonbank intermediation is different from that of banks, and should be treated as such. In other words, if uniform regulations are applied across all types of financial intermediaries, the total efficiency of the intermediation system could be seriously undermined. Some economists have warned against the rapidly growing portion of nonbank intermediation, stating that the proliferation of nonbanks may reduce the effectiveness of the monetary policy. Such a warning, however, depends on the assumption that the relationship between banks and nonbanks is one of perfect substitute. If the relationship is one of complement or partial substitute, the proliferation of nonbanks will increase the effectiveness of the monetary policy as well as the efficiency of financial intermediation, since proliferation will lead to greater financial assets. In the case where the authorities take drastic measures to suppress informal moneylenders, at the same time discouraging nonbank intermediation, a recess of economic activities and a stock market crash could occur simultaneously as lower financial availability may put financial markets under stress. To illustrate this, let us recall the well-known equation of exchange by Irving Fisher, MV = PY. Regulation of the size of total intermediation means regulation of both the left-hand side of the equation MV and the right-hand side PY simultaneously. In an ideal world, where the nature of every future event is revealed *a priori*, this kind of aggressive policy experiment makes sense. However, in a real world full of uncertainties, one of the two variables on the left-hand side should be left free functioning as an adjustment factor. The long-standing practice based on tacit

agreements among economists has allowed the choice of V as an adjustment factor. That is, the central bank controls the size of a bank credit supply through management of the reserve base, while V varies according to the size of the amount of demand for credit availability from the real sector *PY*. Although this example is stylized, it indicates an important aspect of monetary policy transmission mechanism and its consequences regarding allocative efficiency. The point is that V changes more efficiently with the help of nonbank intermediation. Without this help, the adjustment of V will be less successful in the presence of widespread informal financing, or real economic activities may be negatively affected.

Further empirical evidence supporting or rejecting the hypothesis of the nonbank contribution to economic growth must be searched extensively using the data from various countries in order to generalize the role of nonbank intermediation. Accumulation and analysis of cross-sectional data of household savings to reinforce empirical evidence should also be pursued.

As the final point, although the development of nonbank intermediation through government stimulus is justified, adequate prudential regulation and supervision are crucial, for without such checks the issue of moral hazard could emerge. In Korea, both the banking and nonbanking sectors were placed under severe restructuring after the floating of the Thai baht triggered the 1997 Korean crisis. Ten banks and twenty-five merchant banking corporations either had their licenses revoked, or were forced to merge. The revocation of licenses was one of the most difficult decisions made by financial authorities in recent history. The government's risk-sharing policy and some of the support measures
designed for robust nonblank intermediation undoubtedly posed a moral hazard. A typical example of subsidized credit and mismanagement of nonbanks in Korea: Some nonbank intermediaries (e.g., merchant banking corporations) borrowed low-rate short-term funds in the international markets and lent it to business firms on a long-term basis. They knew the risk of a term mismatch, but they were passive due to the longstanding custom of government intervention. Nonbank intermediaries settled for government protection and hence, did not sharpen their competitive edge. This moral hazard was a contributing factor to the 1997 Korean crisis. Having learned a valuable lesson from the crisis, the Korean government has adopted a new policy package which includes minimization of government intervention in the financial sector, proper amounts of financial supervisory oversight armed with well-organized monitoring and an early warning system, and sound macroeconomic management with an emphasis on external equilibrium.

### Endnotes

<sup>1</sup> In this study, "Korea" refers to the Republic of Korea.

<sup>2</sup> Burkner 1980, p. 458.

<sup>3</sup> See, for example, Chapter 4 of *Korea's Political Economy*, Cho and Kim (1994).

<sup>4</sup> For more on this, see *The East Asian Miracle: Economic Growth and Public Policy* (World Bank 1993, pp. 353-68).

<sup>5</sup> For example, the average interest rate on time deposits (3 month to 1 year) at depository money banks was 6% in the 1980s, while time deposits at mutual credit cooperatives commanded an 11% interest rate. Moreover, the yield on bills issued by investment and finance companies was 10% for 60-day or 90-day maturity.

<sup>6</sup> The reason that year 1972 was chosen as the first data point for the annual time series for analysis is that new types of nonbank financial institutions were officially promulgated in the Presidential Decree of 1972. The year 1994 was chosen as the last data point due to a regime change: a dramatic shift in 1995 in the degree of financial liberalization. Interest rate was virtually liberalized in 1995, in light of which the sample period (1972 to 1994) may be called expediently as a 'financially repressed' period.

<sup>7</sup> In the early 1990's, the Korean government had tried to maintain a balance between bank and nonbank intermediation. The major concern of the government was that an over-expanded nonbank intermediation may frustrate the effectiveness of monetary policy. It was out of this concern, for example, that the government intended to transform entire investment and finance companies, which had been most robust, into other forms of financial institutions such as securities companies, banks and universal merchant banks.

<sup>8</sup> The neo-structuralists oppose the financial liberalization policy, pointing out

that informal finance can be more efficient if it is unfettered from the required reserves.

- <sup>9</sup> 1. mobilize savings
  - 2. allocate resources
  - 3. exert corporate control
  - 4. facilitate risk management
  - 5. ease trading of goods, services, and contracts (Levine (1997), p. 691).

<sup>10</sup> Levine (1997), pp. 691-700.

<sup>11</sup> Ram (1999) argues that regression results in the previous studies using the typical cross-country average data suffer a heteroscedasticity problem.

<sup>12</sup> Proxies for financial deepening may be listed as follows:

- 1. The financial interrelations ratio defined as the ratio of the total value of all financial assets to that of all tangible assets;
- 2. The distribution of total value of financial assets (instruments) over their major components, especially short-term claims, long-term claims, and equity securities;
- 3. The ratio of financial instruments issued by financial institutions to those issued by non-financial institution;
- 4. The share of all financial intermediaries and the principal groups in the total amounts outstanding, of the major types of financial instruments issued by non-financial institution;
- 5. The relative size of the leading components of financial intermediation, particularly the central bank, check-issuing commercial banks, thrift institutions, and insurance organizations.
- 6. The degree of interrelations among financial institutions, which can be measured by the share of the combined to the consolidated total assets of financial institutions.
- 7. The relative size of both internal and external financing by the major nonfinancial sectors;
- 8. Within external financing, the share of the different financial instruments and the share of the main domestic sectors and foreign lenders.

<sup>13</sup> Shaw (1973, p. 8).

14

- 1. Stocks of financial assets. Stocks of financial assets grow as an aggregate relative to income or in proportion to tangible wealth.
- 2. Financial flow. With shallow financial sector, an economy heavily depends for its savings on its government fiscal budget and its international capital account. In a financially shallow economy, the formal financial intermediation is dominated by the banking system and other financial flows are through the foreign exchange or/and curb market.
- 3. Specialization in financial functions and institutions. The financial deepening broadens the sphere of the monetary system and have accessible the opportunities of the profitable operations to other institutions as well, from bill dealers to industrial banks and insurance companies.
- 4. Financial costs. With financial deepening, interest rates reflect more accurately the opportunity costs of current consumption or the time preference rate, and the real interest rates tend to be are higher. Shallow financial intermediation usually results in overvalued domestic currency in the spot foreign exchange market.

<sup>15</sup> Graff (1999) introduces a new proxy for financial development: the share of resources a society devotes to running its financial system. Graff argues that a significant share of resources devoted to the financial system does not mean that the economic activities are subject to an exorbitantly high friction (transaction costs), but rather that, from a macroeconomic perspective, the economy is devoting substantial amount of resources to keeping the friction under control.

<sup>16</sup> In the short run, the financial institutions and the government, which largely shape up the process of savings mobilization, have to operate within the limits set by the economic conditions. In the long run, efficient resource mobilization and allocation lead to an improvement in the economic conditions and a subsequent growth of the savings potential (p. 458).

17

1. Yield: The return to holding financial instruments, which is determined

by inflation rate, transaction costs, taxes, nominal interest rate, dividend as well as the risk which reflects the level of uncertainty associated with a financial instrument transacted.

- Liquidity: The cash convertibility without financial loss of the financial instruments when investors wish to resell their financial instruments or withdraw time deposits.
- 3. Accessibility: The degree of ease with which potential buyers can purchase a financial instrument. Spatial accessibility means the regional spread of financial institutions.
- 4. Product variation: This refers to variability of financial instruments in terms of maturity, amount, and other respects.
- 5. Information: For mobilization of optimal savings, it is an important factor to keep accessible to potential savers the information on the availability and distinct features of financial instruments, through formal and informal channels. The importance of the information motivates savings campaigns led by the authorities and financial institutions alike.

18

- 1. The autarkic economy is a Robinson Crusoe-type economy in which each household makes a straightforward, period-by-period, production-consumption decision.
- 2. An outstanding feature of the decentralized exchange economy is the use of the fiat money. There is no lending and borrowing.
- 3. In a centralized exchange economy, one can trade credit for within-period purchases, with accounts cleared at the end of the period.

<sup>19</sup> Gertler and Rose (1994), pp. 32-33. Externality effects are possible in the context of increasing returns to scale. Sussman (1993) shows that the intermediation costs decrease as financial development, using a spatial model where intermediation costs is an increasing linear function of the distance between the bank and the borrowing firm.

An expedient example of a nonbank's contribution to savings mobilization may be found in the substantial increase in Japanese postal savings during the Second World War: In 1945, the relative share of the postal savings increased up to 33% from 7% in 1937. The state-run postal savings accounts absorbed what otherwise would have been consumed away or buried in the backyards. Also the records show that deposits withdrawn from local banks were deposited in postal savings accounts largely attributable to the creditworthiness of postal savings accounts guaranteed by the government. (Source: the textbook prepared by the Bureau of Postal Savings for officials from developing countries in October 1989).

<sup>21</sup> This is the so-called EC method based on Fisher's equation.

<sup>22</sup> With the breakdown of the Bretton Woods system of fixed exchange rate after 1973.

<sup>23</sup> The conclusion by Vittas is intuitive, neither without an econometric analysis nor even by simple descriptive statistics. Vittas focused on pension fund, life insurance companies, and leasing companies.

<sup>24</sup> Kim, Pyung Joo, "Evolution of Financial System in Korea", in [Economic Development and Institutional Evolution of China and South Korea], A Report submitted to the Korea Institute for International Economic Policy, by the Asia-Pacific Institute, Seoul Korea, Dec. 1992, pp. 150-169.

<sup>25</sup> Data released by the Ministry of Finance & Economy.

<sup>26</sup> Financial System in Korea, The Bank of Korea, 1995, p. 56.

<sup>27</sup> KLTCB was merged into Kookmin Bank just after the 1997 crisis.

<sup>28</sup> The Korea Securities Finance Corporation was established in 1955.

<sup>29</sup> Investment and finance companies were transformed into merchant banking corporations without exception during the early 1990s on recommendation from the authorities. The transformation allowed easy expansion of business scope and the diversification of financial products, but at the same time invigorated the competition, which is largely accounted for the almost complete collapse of the merchant banking corporations during the Korean financial crisis.

<sup>30</sup> The development trust was abolished in 1996.

<sup>31</sup> The share of nonbanks started to decrease after 1997 (53.3% in 2000), when

investment trust companies and merchant banking corporations suffered in the wake of massive bankruptcies of customer firms. The intermediary functions of nonbanks were also seriously damaged.

32 The increasing share of nonbanks in the financial intermediation may also be explained in terms of substitution of nonbank for informal financial sector. It is impossible to estimate the extent of the substitution due to dirth of related statistics. Nonetheless, a number of related facts may be cited as institutional evidence. First, the three new types of financial institutions instituted with the effect of the 1972 Presidential Decree had the prime lenders installed as CEOs. Second, hybrid type of informal financing through bank accounts became formal. An informal lender deposits money in a bank trust account, and the bank manager extends a loan to a borrower designated by the informal lender (This type of informal financing is reported in Financial Systems and Development - World Bank, World Development Report 1989, p. 49). This finance route reduces the default risk virtually to zero, and the informal lender could earn additional interest income (probably the difference between official and effective market rates) by collecting unofficial premium from the borrower. It should be noted that the trust account balance, which had been counted as part of nonbank intermediation prior to the 1972 Presidetial Decree, was now counted as a formal account balance, hence substituting for the informal intermediation. The shifts from informal to formal balances are a bit too complex to be easily tracable.

As the informal balances are counted as formal, the share of nonbankfinancial intremediation grows as illustrated by the following simple example:

		Under repression	After liberalization
•	Banks	Α	А
٠	Non Banks	В	B+C
٠	Lenders	(C)	
	Total (Official)	<u>A + B</u>	A + B + C

#### \* A, B, C: amounts of intermediation

Suppose that informal finance is completely substituted out by nonbank intermediation. Then the total amount of official intermediation which comprises nonbanks' will increase by C. The share of nonbank intermediation will increase:

$$\frac{B}{A+B} < \frac{B+C}{A+B+C}$$

<Proof>

$$\frac{B+C}{A+B+C} - \frac{B}{A+B} = \frac{(B+C)(A+B) - (A+B+C)B}{(A+B+C)(A+B)}$$
$$= \frac{AB+AC+BB+BC-AB-BB-BC}{(A+B+C)(A+B)}$$
$$= \frac{AC}{(A+B+C)(A+B)} > 0$$

(A, B, and C are positive)

<sup>33</sup> See, for example, OECD (1989), pp. 84-91.

<sup>34</sup> The main issue with regard to disintermediation was competitiveness of U.S. depository institutions and stability of the leading monetary indicator, which was  $M_1$  at that time.

<sup>35</sup> The Bank of Korea had been using  $M_2$  as the leading monetary indicator until 1997, but it was replaced by  $M_3$ , which includes nonbank deposits, after the Korean financial crisis to monitor the total amount of financial intermediation. The dramatic collapse during the financial crisis of nonbank financial institutions such as merchant banks and investment trusts has discredited  $M_2$  as a dependable indicator of the total liquidity condition.

<sup>36</sup> See K. Gupta (1997) for details.

<sup>37</sup> Savings accounts at Mutual Savings, Credit Unions, and Postal Savings are all of deposit type. The major difference between bank and nonbank deposits is in interest rates.

<sup>38</sup> See 4.3.2 for detail.

<sup>39</sup> Estimated regressions for Granger causality test using level variables:

Unrestricted regression with lag 1:

$$N\hat{B}D_{t} = -0.1881 + 0.8270 \cdot NBD_{t-1} + 0.2263 \cdot BD_{t-1}$$
  
ESS<sub>U</sub> = 0.0671, R<sup>2</sup> = 0.9992

Restricted regression with lag 1:

$$N\hat{B}D_{t} = 0.5924_{(9.8247)} + 0.9713 \cdot NBD_{t-1}$$
  
ESS<sub>R</sub> = 0.0801, R<sup>2</sup> = 0.9991

Unrestricted regression with lag 2:

$$N\hat{B}D_{t} = -\underbrace{0.4351}_{(-1.3269)} + \underbrace{0.8224}_{(4.6411)} \cdot NBD_{t-1} + \underbrace{0.0134}_{(0.0852)} \cdot NBD_{t-2} + \underbrace{0.5684}_{(2.7211)} \cdot BD_{t-1} - \underbrace{0.3326}_{(1.4900)} \cdot BD_{t-2}$$

 $ESS_U = 0.0325, R^2 = 0.9995$ 

Restricted regression with lag 2:

$$N\hat{B}D_{t} = 0.4747 + 1.0649 \cdot NBD_{t-1} - 0.0847 \cdot NBD_{t-2}$$
  
ESS<sub>R</sub> = 0.0572, R<sup>2</sup> = 0.9992

Unrestricted regression with lag 1:

$$B\hat{D}_{t} = 0.4451 + 0.9907 \cdot BD_{t-1} - 0.0157 \cdot NBD_{t-1}$$
  
ESS<sub>U</sub> = 0.0506, R<sup>2</sup> = 0.9986

Restricted regression with lag 1:

$$B\hat{D}_{t} = 0.5289 + 0.9662 \cdot BD_{t-1}$$

$$ESS_R = 0.0507, R^2 = 0.9986$$

Unrestricted regression with lag 2:

$$B\hat{D}_{t} = 0.6009 + 1.5106 \cdot BD_{t-1} - 0.6103 \cdot BD_{t-2} - 0.1265 \cdot NBD_{t-1} + 0.1774 \cdot NBD_{t-2}$$
  
+ 0.1774 \cdot NBD\_{t-2}  
ESS<sub>U</sub> = 0.0344, R<sup>2</sup> = 0.9989

Restricted regression with lag 2:

$$B\hat{D}_{t} = \underbrace{0.2647}_{(1.9432)} + \underbrace{1.4640}_{(6.9496)} \cdot BD_{t-1} - \underbrace{0.4808}_{(-2.3666)} \cdot BD_{t-2}$$
  
ESS<sub>R</sub> = 0.0387, R<sup>2</sup> = 0.9987

Estimated regressions for Granger causality tests in differences:

 $\Delta BD_t$  versus  $\Delta NBD_t$ 

Unrestricted regression with lag 1:

 $\Delta N\hat{B}D_{t} = \underbrace{0.1427}_{(3.0804)} + \underbrace{0.0954}_{(0.5991)} \cdot \Delta NBD_{t-1} + \underbrace{0.6596}_{(3.2770)} \cdot \Delta BD_{t-1}$ ESS<sub>U</sub> = 0.0472, R<sup>2</sup> = 0.5258

Restricted regression with lag 1:

 $\Delta N \hat{B} D_i = 0.1844 + 0.3958 \cdot \Delta N B D_{i-1}$ 

 $ESS_R = 0.0754$ ,  $R^2 = 0.2429$ 

Unrestricted regression with lag 2:

$$\Delta NBD_{t} = \underbrace{0.1222}_{(1.8355)} + \underbrace{0.2692}_{(1.0734)} \cdot \Delta NBD_{t-1} - \underbrace{0.0632}_{(-0.3519)} \cdot \Delta NBD_{t-2} + \underbrace{0.6783}_{(2.5874)} \cdot \Delta BD_{t-1} - \underbrace{0.0718}_{(-0.2224)} \cdot \Delta BD_{t-2}$$
  
ESS = 0.0440, R<sup>2</sup> = 0.5513

Restricted regression with lag 2:

 $\Delta N\hat{B}D_{t} = \underbrace{0.1369}_{(1.8035)} + \underbrace{0.5434}_{(2.3252)} \cdot \Delta NBD_{t-1} + \underbrace{0.0095}_{(0.0482)} \cdot \Delta NBD_{t-2}$ ESS = 0.0698, R<sup>2</sup> = 0.2886

Unrestricted regression with lag 1:

 $\Delta B\hat{D}_{t} = \underbrace{0.0695}_{(1.5631)} + \underbrace{0.7319}_{(3.7864)} \cdot \Delta BD_{t-1} - \underbrace{0.0518}_{(-0.3385)} \cdot \Delta NBD_{t-1}$ ESS<sub>U</sub> = 0.0435, R<sup>2</sup> = 0.5186

Restricted regression with lag 1:

$$\Delta B\hat{D}_{r} = 0.0604 + 0.6943 \cdot \Delta BD_{r-1}$$
  
ESS<sub>R</sub> = 0.0438, R<sup>2</sup> = 0.5155

Unrestricted regression with lag 2:

$$\Delta BD_{i} = \underbrace{0.0184}_{(0.3121)} + \underbrace{0.7790}_{(3.3519)} \cdot \Delta BD_{i-1} - \underbrace{0.1936}_{(-0.6760)} \cdot \Delta BD_{i-2} + \underbrace{0.2461}_{(1.1065)} \cdot \Delta NBD_{i-1} - \underbrace{0.0251}_{(-0.1577)} \cdot \Delta NBD_{i-2}$$
  
ESS<sub>U</sub> = 0.0346, R<sup>2</sup> = 0.6159

Restricted regression with lag 2:

$$\Delta B\hat{D}_{t} = \underbrace{0.0529}_{(1.4202)} + \underbrace{0.8002}_{(3.5384)} \cdot \Delta BD_{t-1} - \underbrace{0.0502}_{(-0.2249)} \cdot \Delta BD_{t-2}$$
  
ESS<sub>R</sub> = 0.0374, R<sup>2</sup> = 0.5845

<sup>40</sup> The nonbank deposits (NBD) is OLS regressed on the first ordere of bank deposits (BD), both the first order differences. This simple regression also shows a result consistent with that of the level regression: the bank deposits have a positive effect on with nonbank deposits with a statistical significance.

$$\Delta N\hat{B}D = -3797.197 + 3.976390 \Delta BD$$
  
$$R^{2} = 0.973877; \quad DW = 1.495283$$

<sup>41</sup> There have been three forms of allocation:(1) tradition, (2) command, and (3) the market (Heilbroner 1985, pp.7-14). In Confucian society, the resources are allocated by tradition, whereas in command economies the resources are allocated by legislation. The introduction of money animates the market economy.

<sup>42</sup> Positive sensitivity is questioned both in theory and also in terms of empirical evidence. According to McKinnon (1973), the conduit effect dominates the competing asset effect in the early stage of economic development. This can be interpreted as the substitution effect overriding the sum of income and wealth effects in terms of consumer theory. McKinnon's argument has not been strongly supported by empirical evidence. Giovannini (1983) shows that the relationship between interest rate and savings cannot be defined uniformly. However, several studies including those of Gupta (1984, 1987) suggest that interest-rate elasticity of Asian countries is positive.

The strong bequest motive based on family ties, which is prevalent in Asian countries, could be a factor in explaining the positive interest-rate elasticity of savings. Hayashi (1986) concludes that Japan's savings rate is affected by the Japanese desire to accumulate wealth for the next generation.

<sup>43</sup> There are two sources of gains from nonblank financial intermediation with regard to savings: (a) savings redistribution: funds flows from less efficient (less productive) entrepreneurs to more efficient (more productive) entrepreneurs; (b) additional savings: reduction of present consumption by affecting inter-temporal choice.

<sup>44</sup> The basic idea of the Granger causality test may be summarized as follows: If X causes  $Y(X \rightarrow Y)$ , then changes in X should precede changes in Y. To evaluate causal relationship, four regressions must be run. For example, to confirm the causal relationship "X causes Y", the null hypothesis that "X does not cause Y" should be rejected and another null hypothesis that "Y does not cause X" should not be rejected. To test the null hypothesis that "X does not cause Y", Y is regressed against lagged values of Y and of X (the "unrestricted" regression), and then Y is regressed on lagged Y variables only (the "restricted" regression). We can use F-test statistics to determine whether the lagged X variables contribute significantly to the explanatory power of the first "unrestricted regression". The null hypothesis that "Y does not cause X" is then tested in the same manner.

Unrestricted regressions: 
$$Y = \sum_{i=1}^{p} \alpha_{i} \cdot Y_{t-i} + \sum_{i=1}^{p} \beta_{i} \cdot X_{t-i} + \varepsilon_{\tau}$$
  
Restricted regression:  $Y = \sum_{i=1}^{p} \alpha_{i} \cdot Y_{t-i} + \varepsilon_{\tau}$   
F-statistics:  $F = (N-k) \frac{(ESS_{R} - ESS_{UR})}{q \cdot (ESS_{UR})}$ 

p: number of lags;

N: number of observations;

k: number of estimated parameters in the unrestricted regression;

q: the number of parameter restrictions.

<sup>45</sup> 
$$\frac{dM}{dt} \cdot \frac{1}{M} = \frac{dy}{dt} \cdot \frac{1}{y} + \frac{dP}{dt} \cdot \frac{1}{P} - \frac{dV}{dt} \cdot \frac{1}{V}$$

(*P* = Price level; *V* = Income Velocity of Money)

46 Numbers within the parentheses are *t*-ratios.

(a). 
$$m_1 = \frac{M_1}{Y}$$
 versus y

Unrestricted regression with lag 1:

$$\hat{m}_{1,t} = \underbrace{0.0443}_{(1.9017)} + \underbrace{0.5995}_{(3.1624)} \cdot \underbrace{m_{1,t-1}}_{(-0.5047)} + \underbrace{2.21E - 08}_{(-0.5047)} \cdot y_{t-1}$$
  

$$ESS_U = 0.001572, \qquad R^2 = 0.482335$$

Restricted regression with lag 1:

$$\hat{m}_{1,t} = 0.0362 + 0.6536 \cdot m_{1,t-1}$$
  
 $ESS_R = 0.001593, \qquad R^2 = 0.4753$ 

Unrestricted regression with lag 2:

$$\hat{m}_{1,t} = \underbrace{0.0506}_{(1.8566)} + \underbrace{0.5136}_{(2.3366)} \cdot m_{1,t-1} + \underbrace{0.0006}_{(0.0269)} \cdot m_{1,t-2} + 1.64E - 07 \cdot y_{t-1} - 1.88E - 07 \cdot y_{t-2} - 1.08E - 07 \cdot y_{t-2} - 1.08E$$

 $ESS_U = 0.001209, \qquad R^2 = 0.4281$ 

Restricted regression with lag 2:

 $\hat{m}_{1,t} = \underset{(2.7323)}{0.0464} + \underset{(2.5332)}{0.5227} \cdot m_{1,t-1} + \underset{(0.1360)}{0.0226} \cdot m_{1,t-2}$ ESS<sub>R</sub> = 0.008235,  $R^2 = 0.4224$ 

Unrestricted regression with lag 1:

$$\hat{y}_{i} = \underset{(0.5179)}{4810.3} + \underset{(61.402)}{1.0696} \cdot y_{i-1} - \underset{(-0.4366)}{32945} \cdot m_{1,i-1}$$

$$ESS_{U} = 2.49E + 08, \qquad R^{2} = 0.9966$$

Restricted regression with lag 1:

 $\hat{y}_{t} = \underset{(0.4878)}{825.80} + \underset{(76.256)}{1.0739} \cdot y_{t-1}$  $ESS_{R} = 2.51E + 08, \qquad R^{2} = 0.9965$ 

Unrestricted regression with lag 2:

$$\hat{y}_{i} = \underbrace{11450}_{(0.9988)} + \underbrace{1.3141}_{(5.6097)} \cdot y_{i-1} - \underbrace{0.2720}_{(-1.0891)} \cdot y_{i-2} + \underbrace{10953}_{(0.1185)} \cdot m_{1,i-1} - \underbrace{99153}_{(-0.9970)} \cdot m_{1,i-2}$$

$$ESS_{U} = 2.14\text{E} + 08, \qquad R^{2} = 0.9968$$

Restricted regression with lag 2:

$$\hat{y}_t = 422.73 + 1.3538 \cdot y_{t-1} - 0.2993 \cdot y_{t-2}$$
  
 $ESS_R = 2.30E + 08, \quad R^2 = 0.9966$ 

(b). 
$$m_2 = \frac{M_2}{Y}$$
 versus y:

Unrestricted regression with lag 1:

$$\hat{m}_{2,t} = \underbrace{0.1329}_{(2.2433)} + \underbrace{0.5520}_{(2.8969)} \cdot m_{2,t-1} + \underbrace{3.05E}_{(2.6213)} \cdot 07 \cdot y_{t-1}$$
  

$$ESS_U = 0.005721, \qquad R^2 = 0.8053$$

Restricted regression with lag 1:

$$\hat{m}_{2,t} = 0.0204 + 0.9547 \cdot m_{2,t-1}$$

$$ESS_R = 0.007790, \qquad R^2 = 0.7349$$

Unrestricted regression with lag 2:

$$\hat{m}_{2,i} = \underbrace{0.1867}_{(2.7771)} + \underbrace{0.5979}_{(2.7746)} \cdot m_{2,i-1} - \underbrace{0.2359}_{(-1.0499)} \cdot m_{2,i-2} + 1.01E - 07 \cdot y_{i-1} - 5.64E - 07 \cdot y_{i-2} + 1.01E - 07 \cdot y_{i-2} + 1.01E - 07 \cdot y_{i-1} - 5.64E - 07 \cdot y_{i-2} + 1.01E - 07 \cdot y_{i-2} + 1.01E - 07 \cdot y_{i-1} - 5.64E - 07 \cdot y_{i-2} + 1.01E - 07 \cdot y_{i-1} - 5.64E - 07 \cdot y_{i-2} + 1.01E - 07 \cdot y_{i-2} + 1.01E$$

 $ESS_U = 0.004193, \qquad R^2 = 0.8572$ 

Restricted regression with lag 2:

$$\hat{m}_{2,t} = \underbrace{0.0191}_{(0.3593)} + \underbrace{0.9799}_{(4.1299)} \cdot m_{2,t-1} - \underbrace{0.0236}_{(-0.0913)} \cdot m_{2,t-2}$$
  

$$ESS = 0.007577, \qquad R^2 = 0.7421$$

Unrestricted regression with lag 1:

$$\hat{y}_{t} = -2.0079 + 1.0404 \cdot y_{t-1} + 67879 \cdot m_{2,t-1}$$
  

$$ESS_{U} = 2.13E + 08, \qquad R^{2} = 0.9970$$

Restricted regression with lag 1:

$$\hat{y}_t = \underset{(0.4878)}{825.80} + \underset{(76.256)}{1.0739} \cdot y_{t-1}$$
  
 $ESS_R = 2.51E + 08, \qquad R^2 = 0.9965$ 

Unrestricted regression with lag 2:

$$\hat{y}_{t} = -\frac{13428}{(-0.9252)} + \frac{1.3188}{(5.4958)} \cdot y_{t-1} - \frac{0.2896}{(-1.1585)} \cdot y_{t-2} + \frac{77677}{(1.6695)} \cdot m_{2,t-1} - \frac{31712}{(-0.6536)} \cdot m_{2,t-2}$$

$$ESS_{U} = 1.95E + 08, \qquad R^{2} = 0.9971$$

Restricted regression with lag 2:

$$\hat{y}_{i} = 422.73 + 1.3538 \cdot y_{i-1} - 0.2993 \cdot y_{i-2}$$
  
 $ESS_{R} = 2.30E + 08, \qquad R^{2} = 0.9966$ 

$$1000 \times 1001 \times 100$$

(c). 
$$m_3 = \frac{M_3}{Y}$$
 versus y:

Unrestricted regression with lag 1:

$$\hat{m}_{3,t} = -\underbrace{0.0501}_{(-1.2024)} + \underbrace{1.0017}_{(3.2745)} \cdot m_{3,t-1} + \underbrace{1.01E}_{(0.5786)} - 06 \cdot y_{t-1}$$

$$ESS_U = 0.076765, \qquad R^2 = 0.9738$$

Restricted regression with lag 1:

$$\hat{m}_{3,t} = -0.0641 + 1.1768 \cdot m_{3,t-1}$$
  
 $ESS_R = 0.078118, \qquad R^2 = 0.9733$ 

Unrestricted regression with lag 2:

$$\hat{m}_{3,t} = -\underbrace{0.0517}_{(-1.0959)} + \underbrace{0.8995}_{(1.8005)} \cdot \underbrace{m_{3,t-1}}_{(0.0891)} + \underbrace{0.0481}_{(0.0891)} \cdot \underbrace{m_{3,t-2}}_{(-0.7375)} - \underbrace{3.64E - 06}_{(-0.7375)} \cdot \underbrace{y_{t-1}}_{(-0.7375)} + \underbrace{5.42E - 06}_{(1.2121)} \cdot \underbrace{y_{t-2}}_{(1.2121)} \cdot \underbrace{y_{t-2}}_{(-0.7375)} \cdot \underbrace{y_{t-1}}_{(-0.7375)} + \underbrace{5.42E - 06}_{(1.2121)} \cdot \underbrace{y_{t-2}}_{(-0.7375)} \cdot \underbrace{y_{t-1}}_{(-0.7375)} + \underbrace{5.42E - 06}_{(-0.7375)} \cdot \underbrace{y_{t-2}}_{(-0.7375)} \cdot \underbrace{y_{t-1}}_{(-0.7375)} + \underbrace{5.42E - 06}_{(-0.7375)} \cdot \underbrace{y_{t-2}}_{(-0.7375)} \cdot \underbrace{y_{t-1}}_{(-0.7375)} + \underbrace{5.42E - 06}_{(-0.7375)} \cdot \underbrace{y_{t-2}}_{(-0.7375)} \cdot \underbrace{y_{t-2}}_{(-0.7575)} \cdot \underbrace{y_{t-2}}_{(-0.7$$

ı,

$$ESS_U = 0.067554, \qquad R^2 = 0.9761$$

Restricted regression with lag 2:

 $\hat{m}_{3,t-1} = -0.0721 + 1.0621 \cdot m_{3,t-1} + 0.1320 \cdot m_{3,t-2}$  $ESS_R = 0.076728, \qquad R^2 = 0.9728$ 

Unrestricted regression with lag 1:

$$\hat{y}_{l} = -3016.9 + 0.8415 \cdot y_{l-1} + 41174 \cdot m_{3,l-1}$$
  
 $ESS_{U} = 1.78E + 08, \qquad R^{2} = 0.9975$ 

Restricted regression with lag 1:

$$\hat{y}_{t} = \underset{(0.4878)}{825.80} + 1.0739 \cdot y_{t-1}$$

 $ESS_R = 2.51E + 08, \qquad R^2 = 0.9965$ 

Unrestricted regression with lag 2:

$$\hat{y}_{i} = -\frac{1546.3}{(-0.7214)} + \frac{1.1278}{(5.0319)} \cdot y_{i-1} - \frac{0.2693}{(-1.3267)} \cdot y_{i-2} + \frac{70197}{(3.0965)} \cdot m_{3,i-1} - \frac{39141}{(-1.5957)} \cdot m_{3,i-2}$$
  

$$ESS_{U} = 1.39E + 08, \qquad R^{2} = 0.9979$$

Restricted regression with lag 2:

$$\hat{y}_{t} = \underbrace{422.73}_{(0.2329)} + \underbrace{1.3538}_{(5.9756)} \cdot y_{t-1} - \underbrace{0.2993}_{(-1.2312)} \cdot y_{t-2}$$
  

$$ESS_{R} = 2.30E + 08, \qquad R^{2} = 0.9966$$

(d). 
$$m_N = \frac{M_N}{Y}$$
 versus y:

Unrestricted regression with lag 1:

$$\hat{m}_{N,t} = -0.0223 + 0.9385 \cdot m_{N,t-1} + 8.10E_{(1,1174)} - 07 \cdot y_{t-1}$$
  

$$ESS_U = 0.007604, \qquad R^2 = 0.9962$$

Restricted regression with lag 1:

$$\hat{m}_{N,t} = 0.0120_{(1.7764)} + 1.0939 \cdot m_{N,t-1}$$
  
 $ESS_R = 0.008104, \qquad R^2 = 0.9960$ 

Unrestricted regression with lag 2:

$$\hat{m}_{N,t} = -\underbrace{0.0503}_{(-1.2280)} + \underbrace{1.0516}_{(4.1560)} \cdot m_{N,t-1} - \underbrace{0.2344}_{(-0.8674)} \cdot m_{N,t-2} + \underbrace{1.71E}_{(1.0510)} - \underbrace{0.6}_{(1.0510)} \cdot y_{t-1} - \underbrace{3.86E}_{(-0.2702)} - \underbrace{0.2344}_{(-0.2702)} \cdot y_{t-2} + \underbrace{0.2344}_{(-0.2702)} \cdot y_{t-1} - \underbrace{0.2344}_{(-0.2702)} \cdot y_{t-2} + \underbrace{0.2344}_{(-0.2702)} \cdot$$

 $ESS_U = 0.006991, \qquad R^2 = 0.9964$ 

Restricted regression with lag 2:

 $\hat{m}_{N,t} = 0.0105 + 1.1975 \cdot m_{N,t-1} - 0.1127 \cdot m_{N,t-2}$ 

 $ESS_R = 0.008007, \qquad R^2 = 0.9958$ 

Unrestricted regression with lag 1:

 $\hat{y}_i = \frac{13574}{(2.8060)} + \frac{0.7680}{(6.8999)} \cdot y_{i-1} + \frac{59391}{(2.7654)} \cdot m_{N,i-1}$ 

 $ESS_U = 1.79E \pm 08, \qquad R^2 = 0.9975$ 

Restricted regression with lag 1:

$$\hat{y}_t = \underset{(0.4878)}{825.80} + 1.0739 \cdot y_{t-1}$$

$$ESS_R = 2.51E + 08, \qquad R^2 = 0.9965$$

Unrestricted regression with lag 2:

$$\hat{y}_{t} = \frac{11896}{(2.0853)} + \frac{1.0132}{(4.4616)} \cdot y_{t-1} - \frac{0.2351}{(-1.1818)} \cdot y_{t-2} + \frac{110113}{(3.1263)} \cdot m_{N,t-1} - \frac{61505}{(-1.6349)} \cdot m_{N,t-2}$$

$$ESS_{U} = 1.35E + 08, \qquad R^{2} = 0.9980$$

Restricted regression with lag 2:

$$\hat{y}_{i} = 422.73 + 1.3538 \cdot y_{i-1} - 0.2993 \cdot y_{i-2}$$
  
(0.2329) (5.9756) (0.2329

 $ESS_R = 2.30E + 08, \qquad R^2 = 0.9966$ 

<sup>47</sup> Harris (1979) uses three different definitions of money  $M_1$ ,  $M_2$ , and  $M^*$ .  $M^*$ 

includes credit supplied by the Development bank. Harris uses data from 1954 to 1977 for Korea and finds the coefficient estimate of  $\delta$  positive and statistically significant. Li & Skully (1991) repeats the Harris study (1979) for the sample period from the late 1970s to the late 1980s.

If  $M_3 (= M_2 + M_N)$  is used in the original model, OLS estimate of  $\delta$  is positive but statistically insignificant. In light of the estimated modified model in (5.9), this is hardly a surprise since  $M_3$  is an aggregate of two regressors  $M_2$  and  $M_N$  which have offsetting effects on the original model.

<sup>49</sup> Dowling (1984), Yusuf and Peters (1984), and Moser (1989).

<sup>50</sup> This problem may not be serious if a financial institution adopts a risk management system that pursues a diversified loan portfolio.

<sup>51</sup> The Korean economy registered a robust current account surplus during 1986-1988.

# Appendices

## Appendix A: Bank and Nonbank Deposits

				(in Billion Won)		
	NBD <sub>t</sub>	BDt	$\Delta NBD_t$	$\Delta \mathbf{BD}_{\mathbf{t}}$		
1972	232.0	932.4	-	-		
1973	410.6	1,250.2	178.6	317.8		
1974	584.6	1,510.8	174.0	260.6		
1975	753.3	1,968.3	168.7	457.5		
1976	1,088.9	2,660.8	335.6	692.5		
1977	1,641.2	3,701.7	552.3	1,040.9		
1978	2,281.9	5,214.9	640.7	1,513.2		
1979	3,501.5	6,603.3	1,219.6	1,388.4		
1980	5,427.7	8,727.5	1,926.2	2,124.2		
1981	7,810.2	11,688.7	2,382.5	2,961.2		
1982	11,352.9	14,104.9	3,542.7	2,416.2		
1983	15,094.1	16,154.7	3,741.2	2,049.8		
1984	21,019.5	17,884.9	5,925.4	1,730.2		
1985	26,884.8	21,007.4	5,865.3	3,122.5		
1986	37.761.1	25,024.2	10,876.3	4,016.8		
1987	53,358.2	30,172.2	15,597.1	5,148.0		
1988	71,419.8	36,787.4	18,061.6	6,615.2		
1989	95,289.1	44,309.0	23,869.3	7,521.6		
1990	129,416.3	52,802.2	34,127.2	8,493.2		
1991	161,091.4	61,993.5	31,675.1	9,191.3		
1992	202,018.7	71,672.3	40,927.3	9,678.8		
1993	242,714.1	83,177.8	40,695.4	11,505.5		
1994	309,484.5	100,668.1	66,770.4	17,490.3		

114

## Appendix B: Credit Allocation by Industry

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Total	5,060.6	6,810.7	8,411.9	10,309	14,328.6	16,863.4	20,454.4	25,505.7	30,319.9	40,080.8	51,172.6
Agriculture & Fishery	30.8	39.8	52.3	57.9	90.9	105.2	135.7	172.3	224.0	255.5	353.0
Mining	46.6	43.6	56.5	86.2	88.2	106.0	131.7	110.0	128.0	180.8	229.8
Manufacturing	2,952.2	3,903.3	4,619.1	5,211.7	7,232.4	8,168.6	9,282.5	11,878.7	13,988.2	18,481.4	24,017.2
Electrics, Gas Water	610.8	727.5	812.9	927.31,	1,050.3	1,185.2	1,222.7	1,088.3	750.5	790.2	910.6
Construction	429.3	674.4	874.5	1,199.7	1,816.5	2,066.4	2,279.8	2,077.1	2,022.2	2,973.6	4,166.2
Wholesale & Retail	193.7	278.5	389.7	550.6	1,059.7	1,327.8	1,920.8	2,620.7	3,519.8	4,228.7	5,113,4
Transportation & Communication	347.2	496.6	759.2	1,027.3	1,338.6	1,762.5	2,299.0	2,702.5	2,900.5	3,110.3	3,411.2
Finance & Insurance	91.3	114.9	172.5	224.0	335.3	473.5	607.1	958.3	1,405.9	1,991.6	1,865.3
Social & personal service	90.8	185.0	183.0	287.6	318.6	399.8	548.7	614.5	768.1	944.8	1,375.1
Unclassified	267.9	347.0	492.1	736.8	998.1	1,278.4	2,026.4	3,283.3	4,612.7	7,123.8	9,730.8

Industry Breakdown of Loans and Discounts for Nonbanks (in Billion Won)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Total	12,204.4	15,955	20,225.8	24,150.3	27,978.9	33,810.7	39,098.6	43,095.8	48,805.4	62,547.8	74,028.6
Agriculture & Fishery	1,034.2	1,339.5	1,531.6	1,956.9	2,469.3	2,870.4	3,351.9	4,371.9	5,182.9	6,109 1	7,373.5
Mining	133.6	130.6	177.7	155.9	154.6	184.1	156.2	145.2	234.2	238.9	267.3
Manufacturing	6,672.0	8,689.8	9,786.6	10,999.7	12,295.3	14,733.6	17,972.6	19,547.5	21,586.5	25,918.4	31,072.9
Electrics, Gas & Water	50.9	107.1	94.0	86.4	101.9	123.3	108.7	82.1	82.6	118.2	143.0
Construction	1,469.7	1,486.2	2,040.3	2,910.7	4,065.3	5,337.6	6,530.2	7,332.8	8,244.2	10,336.0	12,227.6
Wholesale & Retail	1,001.5	1,331.2	1,997.6	2,316.6	2,705.2	3,156.4	3,274.2	3,128.1	3,630.1	4,380.7	5,319.0
Transportation & Communication	397.8	494.2	597.2	662.3	707.7	968.7	1,272.7	1,452.3	1,571.6	2,018.1	2,145.9
Finance & Insurance	202.7	324.3	375.2	646.5	787.5	857.0	716.7	750.0	950.3	4,057.6	4,154.1
Social & personal service	350.5	596.0	1,088.8	1,116.6	1,326.4	1,377.8	1,229.7	1,298.5	1.324.9	1,714.7	2,289.0
Unclassified	891.5	1,456.1	2,536.6	3,298.7	3,365.8	4,202.1	4,485.9	4,987.4	5,998.1	7,626.1	9,036.4

Industry Breakdown	of Loans an	d Discounts fo	or Banks	(in	Billion	Won	)
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