THE DYNAMIC LINKAGE BETWEEN FINANCIAL DEPTH, ECONOMIC GROWTH AND SAVINGS IN INDIA

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DECLARATION

I declare that this thesis represents my own ideas and words and where others ideas or words have been included; I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented, fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will result in disciplinary action by the Institute and can also evoke penal action from the sources that have not been properly cited or from whom proper permission has not been taken when needed.

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ABSTRACT

The importance of the relationship between economic growth and financial depth has been well recognized and received serious attention in the literature. The theoretical and empirical studies although substantially advanced in this area but they provide ambiguity on the direction among this relationship. The ambiguity arises primarily because of missing control variables like savings, investment, and trade openness are so far missing in the literature. By keeping the omission of control variable problem, present study examines empirical relationship between financial development and economic growth by taking saving as a control variable. It is new for Indian case because none of the earlier studies taken into consideration of the role of total saving as well as private saving. The study examines the long-run relationship among these variables by employing cointegration and error-correction techniques. The result indicates the existence of long-run cointegrating relationship between financial development, economic growth and savings. The short-run causality results reveals that economic growth Granger causes financial development as well as financial depth but there is no causal flow from financial development and financial depth to economic growth. Economic growth Granger causes the savings but the savings does not cause economic growth. Unidirectional causal flow from financial development to total savings and from financial development to private savings, but the reverse is not happening in Indian context. Hence the aforementioned results from both cointegration and VEC models conclude that though there exists a long-run relationship between financial depth, economic growth and savings, but in the short-run, we did not find any bi-directional causality among these variables. This finding indicates that even if the savings (particularly the household savings) has increased in India, people are still following the traditional patterns of savings rather than opening any account in the bank or putting their savings in the capital markets. Therefore, reform plan should have the aim of constructing new institutions both in private and public sector.

CHAPTER ONE

INTRODUCTION

1.1 **Background of the Study**

The importance of the relationship between economic growth and financial depth has been well recognized and received serious attention in the literature. Although recent writings on this subject seem to accept the hypothesis that financial development is crucial for healthier economic growth, but importance of some of the intermediary variables like savings and investment are so far missing in the literature. To date three views exist in the literature regarding the relationship between financial development and economic growth. The first view argues that the financial development is important and leads to economic growth (McKinnon 1973 & Shaw 1973 and King and Levine1993). The second view, however, maintains that it is economic growth that drives the development of financial sector (Robinson 1952, Romer 1986 and Lucas 1988) while the third view contends that both financial development and economic growth causes each other (Goldsmith 1969, King and Levine 1993, Atje and Jovanovic1993). The theoretical and empirical studies although substantially advanced in this area but they provide ambiguity on the direction among this relationship. Thus, the issue still attracts researchers to advance the knowledge in this area.

There are enormous number of studies which have examined the relationship between financial development and economic growth, but very rare studies have discussed about the intermediate variables through which the financial development and economic growth affects each other. There are two intermediary through which financial activities passes i.e through physical and human capital accumulation and through mobilizing savings. The role of the intermediary variables in the causality may not only change the direction

of the causality between financial depth and economic growth, but also provide a robust inference on the relationship between financial depth and economic growth. The present study considers only one important channel which plays very important role for India's economic growth i.e mobilization of savings as an intermediary channel. A theory about the positive relationship between financial development and saving was initiated by McKinnon (1973) and Shaw (1973) and supported by many other economists. Financial development boosts saving through intermediation efficiency and this cause economic growth through investment and vice- verse. Whereas most growth theory says that saving and economic growth causes each other. Higher saving rates lead to faster capital accumulation and permanent increase in economic growth and this increasing output growth once again leads to faster investment and savings rate. There are other sides of literature which reveal that higher financial development reduces the saving rates of a country. According them, under certain conditions, higher returns on savings that result from financial sector development can reduce savings rates to such an extent that overall growth slows down. Similarly, if development of the financial sector lowers the liquidity constraints of individuals, it leads to declines in the overall savings rate which ultimately weaker economic growth (see Jappelli and Pagano, 1994).

Since there is no study which examined the causal relationship between financial depth economic growth and saving through tri-variate relationship in India, the present study makes an attempt to examine these three variables. Savings is one of the key intermediate macroeconomic variables for sustainability of economic growth in India. The gross savings in India consists of three components, viz. household savings, corporate savings and public savings. The rates of savings in India are relatively high particularly from last

two decades out of which, private savings contributes larger share to country's gross savings. On the other hand, the financial sector developments in India through financial reforms have been substantial during past two decades. Hence proper analysis of the linkage between financial depth, economic growth and savings would help the policy makers for formulating effective policies.

1.1.1 **What is financial depth?**

Financial depth refers to the position of financial sector to the total economy of a country. This includes the financial institutions, the financial markets, and the banking sector of a country taken together related to the total output of a specific country. Financial depth is also the supply of fund available to the government as well as to the private sector of an emerging country.

1.1.2 **Linkage between financial depth and economic growth:**

A theoretical model which has established a positive relation between financial development and economic growth is explained in the present section. The model contributed some important issues that how financial development affect economic growth and vice versa. The model shows that financial development affects economic growth by two channels; one is through savings rate which further leads to investment and capital accumulation and the second is related to allocation channel where the financial sector enhance the efficient allocation of investment, thereby increasing the productivity of investment.

To illustrate the exact relationship between financial depth and economic growth the theoretical framework adapted the endogenous growth model- The AK model, where the

aggregate real output is a linear function of the real capital stock; where capital stock consists of both physical and human capital. This AK model assumes constant exogenous saving rate and fixed level of technology and this model does not have the diminishing returns to capital assumption. Here in this finance growth nexus the financial depth taken in the place of capital stock and economic growth. This model illustrates the linear relationship between the financial depth and economic growth or the effect of financial depth on economic growth.

$$Y_t = AK_t \qquad (1)$$

Where Y_t is the total output at time‘t’ and Kt is the capital stock at time‘t’ and A is a positive constant variable measuring the amount of output produced for each unit of capital; by assuming that a part of income is used for saving and investment and it does not include time indices. The capital accumulation equation can be written as:

$$\Delta K = ϭY - \delta K \qquad (2)$$

Where ϭ is the saving rate and δ is the depreciation rate; which were assumed to be constant. Dividing K in the both side of the capital accumulation equation (2), we obtain:

$$\Delta K/K = ϭY/K - \delta K/K \qquad (3)$$

The result after the change in the equation (3) we find;

$$\Delta K/K = ϭY/K - \delta \qquad (4)$$

Equation (4) substituted A by replacing Y/K which yields:

$$\Delta K/K = ϭA - \delta \qquad (5)$$

By taking logarithm and derivative equation (1) combining with equation (4) the growth rate can be written as:

$$Y = \sigma A - \delta \quad (7)$$

Here Y represents the rate of total growth rate. And this equation shows that the growth rate in the total output is the product of two combinations i.e total saving rate and the marginal productivity of capital. The model itself assumed that the total growth is the function of financial development in the AK model of production function. This model reveals that the financial development can affect economic growth though two channels; first it increases σ saving rate and thus investment rate to ensuring that the funds are allocating to the most productive use. Second, it can influence through A, the rate of accumulation of physical and human capital, to ensure the efficient utilization of capital.

The capital accumulation effect of the finance-growth nexus was highly supported by McKinnon (1973) and Shaw (1973). They mostly discussed about the liberalization of financial market which allows financial deepening and this reflects an increase in the use of financial intermediation by savers and investors, economy monetization and allocation of resources among the people. This financial development encourages saving and allocateive efficiency investment by transferring capital from less productive sector to more productive sector. This also encourages the capital accumulation in the production process. Here the financial institutions lower the cost of saving mobilization and it also provide attractive saving instrument to attract the savers for saving.

A very few studies that highlight the theoretical model through its second channel i.e capital accumulation channel (efficiency enhancing channel of finance growth nexus). This model shows that the financial development affects economic growth through two

ways. One, by providing opportunities to investors for diversify the risks, therefore encourage individual to invest more productive investment. The second one is by collecting and processing the information which evaluates the alternative investment opportunities and this improves the allocation of resources. Long term economic growth mostly depends upon the ability to raise the accumulation of physical and human capital to use the productivity assets more efficiently and to ensure the access of the whole population to the total assets.

1.1.3 **Importance of saving while linking the relationship between financial depth and economic growth:**

Financial development affects economic growth through two channels. One is through accumulation channel; it emphasizes the finance induced growth effect of physical and human capital. The second one is through allocation channel; which focuses on the 'finance induced efficiency gain in resource allocation that enhances growth'.

The channel of allocation is much more important in the present study because this study took saving as an intermediary variable in the finance-growth nexus study in India. A well developed system mobilizes savings by channelizing the saving into further investment. This saving cannot be possible without the presence of financial institutions because mobilizing saving by the savers usually costly due to existence of information asymmetry and transaction cost. Financial institutions lower the cost of mobilizing savings and also provide attractive instruments of savings which later cause higher liquidity in the market. And this allocation of assets in the productive purpose leads to economic growth in the future.

1.2 **Literature Review:**

The debate regarding the direction of causality between financial depth and economic growth has been ongoing since the 19th century. There are several studies conducted related to financial development economic growth nexus, financial development- saving and saving- economic growth nexus by employing several econometrics technique and using time series and cross sectional data but with conflicting results. The key literature include three theoretical direction extracted from the financial development and economic growth nexus. The demand following, supply leading and the bidirectional causality flow; where the supply leading nexus reveals that the financial development supplies more financial services and which leads to economic growth through saving and this hypothesis is mainly supported by Schumpeter (1911), McKinnon (1973), Shaw (1973), Greenwood and Jovanovic (1990), Bencivenga and Smith (1991), Pagano M (1993), King and Levine (1993b), Bose and Corthen (1997), Fry (1997), Stieglitz (1998), in the worldwide.

Another is demand driven phenomena, economic growth leads to financial development here economic growth demands more financial services for savers and investors for further production and new innovation. This statement supported by many economists among them Robinson (1952), Goldsmith (1969), Stern (1989), Grossman and Helpma (1991) Howitt (1992) Stieglitz (1994) and Singh and Weisse (1998), Atje and Jovanovic (1993), King and Levine, (1993), Berthelemy and Varoudakis (1996) Shan et al (2001) among others. The last direction takes place in the finance growth nexus is the bi-directional hypothesis between these two variables. This statement is theoretically

supported by many economist such are; Patrick (1966), Goldsmith (1969), Lucas (1988), King and Levine, (1993) Atje and Jovanovic (1993).

The saving-financial development nexus which follows both accumulation channel and allocation channel are supported by several economists. The capital accumulation channel supported by Greenwood and Jovanovic (1990), Stiglitz and Weiss (1992) Pagano (1993). Similarly McKinnon (1973), Shaw (1973), King & Levine (1993), Bencivenga &Smith (1991), Levine (1991) has supported the allocation channel of production. The literature on the nature of relationships between financial development and savings continues to be debatable. There are some studies which show a significant positive impact of financial development through higher savings (King and Levine, 1993). However, some other studies found negative impact of financial development on savings (Horioka and Yin, 2010; Park and Shin, 2009).

There are several researches which have examined the linkage between financial development and economic growth in case of India and South Asian countries. Some of the prominent studies are Banerjee and Ghosh (1998), Chakravorty (2008, 2010), Pradhan (2009), Ray (2013) and Sahoo and Dash (2013). The finding from above studies concludes the supply leading hypothesis i.e the strong causal flow from three stock market development proxies to economic growth. They also found the bidirectional causality between real GDP growth rate and financial development. In the present thesis, we examine the nexus between financial development, economic growth and savings using secondary data for most recent periods.

1.3 **Statement of the problem and major research questions:**

Majority of the studies conducted worldwide focused on the bi-variate relationship between financial development and economic growth or financial development and

economic development and arrived with different conclusions. Therefore the present research frames its major research questions adding the intermediate variable of saving; which plays an important role in an economy. The thesis addresses the following major research questions:

1. What is the direction between financial depth, saving and economic growth in India?
2. Does financial depth play an important role for mobilizing private saving in India?
3. Does saving causes financial depth or more access to financial sector leads to higher growth.

1.4 **Objectives of the study:**

The objectives of the present thesis are:

1. To examine the trends and growth rates pattern of financial depth, saving and economic growth in India.

2. To examine the long-run and short-run relationship between financial depth and economic growth by considering savings as the key intermediate variable for financial development – economic growth nexus in India.

1.5 **Methodology:**

The present study makes a special attempt to understand the dynamic linkages between financial development and economic growth by taking saving as an intermediary variable in the case of India. The study can be analyzed through quantitative as well as qualitative method. Different econometric methods are applied here to fulfill the proposed

objectives. The first objective of the proposed study is examined through various trends and growth rates using the key indicators. The second objective of the proposed study follows three steps. First, a financial development index is constructed using Principal Component Analysis (PCA) by taking four key major indicators related to financial development. Second, the study uses Johansen–Juselius cointegration test to examine the long-run relationship between financial depth, economic growth and savings rate. Since there exists a long-run relationship between these three variables, in the third step, this study applies Error Correction Mechanism (ECM) to see the short-run adjustment of these variables from their long-run equilibrium path.

1.6 **Data source:**

Proposed study will be analyzed through secondary data. The data mainly extracted from the Handbook of Statistics on Indian Economy published by the Reserve bank of India, Economic survey, CEIC database and World Development Indicators (WDI) published by the World Bank. The data consist of financial depth, savings, and economic growth. In order measure these three variables this study took different variables. For measuring financial depth this paper employed liquidity liabilities to GDP, private sector credit to GDP, commercial bank assets to the ratio of sum of commercial bank asset and central bank asset and bank branches. For savings rate the study took aggregate savings rate, household savings rate and corporate savings rate as a percentage to GDP. The per capita real GDP at factor cost with 2005 base as treated as the economic growth.

1.7 **Scope of the study:**

This study is dealing with the tri-variate causal flow. Where it took saving as an intermediary variable between financial depth and economic growth nexus. There are few studies which considered some of the intermediary variables and tried to find the direction of causality between financial development and economic growth. The present study makes an attempt to examine financial development- economic growth nexus by introducing savings as the intermediary variable in context of India. Though there are many other variables like Investment, trade-openness, and governance can be treated as the intermediaries between financial development and economic growth, but the present study only considered savings as the intermediary variable because of strong theoretical linkage between economic growth and savings and financial development and savings rate. The study only considers the key variables related to banking development as financial depth and does not consider financial performance indicators like stock prices or market capitalization as the financial depth. The study considers household savings and corporate savings as the private savings in India.

1.8 **Relevance of the study:**

There are ample number of studies which examine the causal relationship between financial development and economic growth. But majority of the studies came up with different conclusions without considering some of the intermediate variables between this nexus. Because of this reason the former studies did not get robust result and faced the problem of omission. The researchers who used cross-country data and generalized the financial growth and economic growth relationship and problem faced by using cross-

country data is that it fails to explain the country specific effect of financial development on economic growth. It is because of grouping different countries having with different stages in economic and financial development. The present study used saving as an intermediary variable and examined the relationship between financial depth and economic growth in case of India. Saving channel is appropriate in the case of developing countries because most people in developing countries invest their assets on savings for which they mostly depend upon the financial institutions and their intermediaries. This study took India as its case because there is no study, which examined the tri-variate relationship topic till date. Another reason behind choosing India as case mainly because of increased in access to financial development and per capita income since the year 1980s. The results eventually will help in building a policy focusing on increasing economic growth through financial development and saving in the case of India.

1.9 **Chapter schedule:**

The reminder of the thesis is structured as follows. Chapter two presents the relevant theoretical and empirical literature pertaining to linkage between financial depth, economic growth and savings rate. Chapter three represents the trends and growth pattern of financial depth, economic growth and saving in India. Chapter four presents the empirical results and finally conclusion and policy recommendations are presented on chapter five.

CHAPTER TWO

REVIEW OF LITERATURE

2.1. Introduction

No research activities that can be possible without systematic and extensive review of literature as it brings out the inclusive information concerning with the problem and provides an improved understanding about the objectives of research study. This chapter provides extensive literature review pertaining to the linkage between financial development and economic growth, economic growth and savings, and financial development and savings. This chapter addresses ample number of theoretical and empirical studies explaining about the relationship between financial-growth nexus and other nexuses which is already mentioned. Comprehensive review of earlier studies relevant to this study is presented below.

2.2. Theoretical review

There have been voluminous applications for examining the nexus between financial development and economic growth to both single countries as well as multiple countries. In this context, there are two streams of literature. One group argues that a well-developed financial system can make the economy more productive, which ultimately enhances economic growth. Specifically, a vigorous financial system not only reduces asymmetric information between savers and investors but also helps people share risks, and lowers transaction costs. However, there also exists a potential growth-retarding impact of financial development (King and Levine, 1993), which suggests that higher returns on the improved resource allocation may decrease saving rates and then depress the economic activity. But there are studies which give importance of intermediary variables in

its channel of flow like the savings, investment, degree of openness and inflation without which the link between these two variables are incomplete. Among these saving and investment plays a vital role in the channel of flowing. In the context of this relationship, two dominant view emerges which is discussed by Patrick (1966). One is "supply leading" and another one is "demand following". He also argued that the direction of causality of finance and growth nexus changes over the course of development.

Supply leading phenomena is that where the creation of financial institutions and market increases supply of their financial services like financial assets, liabilities. According to Patrick the supplies leading performs two functions such are; transfer of resources from traditional sector to the modern sector and another one is to stimulate the entrepreneurial response in the modern sector. This view represent that the financial sector through its intermediary is affects economic growth in two ways; one is trough accumulation channel and another one is trough allocation. The accumulation channel emphasizes the finance-induced growth effects of physical and human capital accumulation channel which at last leads towards economic growth (McKinnon 1973 and Shaw 1973) whereas allocation channel focuses on the finance-induced efficiency gains in resource allocation that enhance growth (King and Levine 1993). This channel is also called as saving channel because here saving is the immediate result of the financial development which leads to investment and therefore growth.

Financial intermediaries and market performs several functions like saving mobilization, pooling of risk, allocation of resources, easing exchange of goods and services, exerting corporate control and monitoring managers (Levine, 1997). For fueling these functions financial sector affect real sector through saving accumulation channeled by investment.

Capital accumulation and technological progress is an important variable in growth model which is followed by saving and investment in the process of financial development. This effect is clearly discussed by neo-classical economists Romer (1986), Lucas (1988) in growth theory.

Schumpeter (1912) argued that the financial services provided by financial intermediaries are essential for technological innovation and economic development. Goldsmith (1969) says that the financial development would support growth in the long run. Financial liberalization plays a role of engine in financial development hence economic growth Mc Kinnon (1973) and Shaw (1973). They said that the savers will save more if interest rate deregulation occurred in the market which is also increase the level of investment by providing more fund towards productive projects and this leads to higher economic growth. Growth is also can fueled by reducing cost of bank intermediation which increase the competitiveness of banking system, well-functioning stock market and minimum taxation on intermediation. A part from banking sector the secondary market (stock market) is also plays an important role in the path of economic growth through financial development. This eases liquidity risk and attracts huge long term investments and this market improve the allocation of capital which later on cause huge economic growth in long-run. The efficiency enhancing role of financial development shows the two major ways of effect on growth; one by collecting information needed to evaluate investment projects which can improves the allocation of resources, and two by providing opportunities to the investors and hedging risk which usually attracts more investors to invest in the productive sector.

In 1990s a huge number of theoretical papers followed the supply-led hypothesis. This hypothesis followed by Saint-Paul (1992), Roubini and Sala-i-Martin, (1992), Obstfeld (1994), Greenwood and Jovanovic (1990), Bencivenga and Smith (1991), Greenwood and Smith (1997). Stieglitz (1998) compare the financial system as the 'brain' of the economy, performing the function of allocating resources across space and time in an environment of uncertain. King and Levine (1993) are representative of this body by literature: 'higher levels of financial development are significantly and robustly correlated with faster current and future rates of economic growth, physical capital accumulation and economic efficiency improvement." Bose and Corthen (1997) have developed theoretical models of endogenous growth to demonstrate how the development of financial markets eases informational frictions in financial markets, enhances the economy's efficiency of resource allocations, and thereby fosters economic growth.

The financial development affect on growth is not always being positive sometimes this can also affect negatively. It is also found that financial development may progress slowly and economic grows may be much faster. Kindleberger (1978) found the negative influence of financial development on economic growth i.e increase in financial development does not cause increase in economic growth.

Second, the 'demand following' phenomenon, which views that the real sector's demand i.e the demand of savers and investors for financial services like creation of modern financial institutions, their financial assets and liabilities and other financial services leads to financial development. In this case, the continuous increase in the

financial development is the immediate consequence of economic development. This newly emerged monetized financial system framed both by change in the objective opportunities like the institutional framework and the economic environment or by change in the subjective response which includes individual motivation, tastes and preferences; Patrick (1966). According to him the demand for financial services depends upon the commercialization and monetization of agricultural sector and other traditional sector and their increasing output. The real sector demands more external funds in the development purpose is for the expansion of firms, new innovations and new technological implementations because in most circumstances firms will be not able to finance the expansion from initially generated depreciation allowances and retained profits.

The demand-following phenomena supported theoretically by many economists. Robinson (1952) said that "where enterprise leads finance follows. According to this view, economic development creates demands for the financial services and the financial system responds automatically to these demands. According to Romer (1986) and Lucas (1988)'s model; the functions performed by financial system affect steady-state growth by influencing capital formation. The financial sector affects capital accumulation through saving. According to Romer (1990) financial development affects the steady state growth through technical innovation. Except them other set of economists like Stern (1989), Grossman and Helpma (1991) Howitt (1992) Stieglitz (1994) and Singh and Weisse (1998) give the theoretical view about demand following phenomenon.

The third view which was not mentioned by Patrick (1966) but given by other sets of economist is that financial development and economic growth flow both the direction. They cause each other, financial development and financial development relationship is bidirectional in nature. It changes according to time and the data which the study took for the study. This view supported by Goldsmith (1969), King and Levine, (1993) Atje and Jovanovic (1993).

In this finance-growth nexus the intermediary plays a vital role. Those intermediaries are mentioned earlier. Present study taken saving 'the second most important channel' as an intermediate variable. Here saving connect with economic growth in one side and financial development in the other side. The saving economic growth relation says that higher rate of saving and leads to permanent higher rate of growth; "new growth model" Romer (1987) and Traditional Solow (1956) model also support this view. On the contrary Modigliani (1986); in his model shows that higher income growth causes higher saving. This view was supported by Baumol, and Blackman and Wolfe (1991).

Many economists like MacKinnon (1973) and Shaw (1973) have discussed the financial development and saving relationship in their work. They specially focus on financial repression ceiling on deposit rate or loan interest rate. Financial liberalization consist lots of reforms. This reforms includes both banking sector and capital market reforms. The main objectives of these reforms is to create an efficient, competitive and stable financial

sector which can contribute in greater measure to stimulate growth through higher saving and investment. These two reforms perform certain functions like higher change in interest rate, removal of credit controls, easing of entry into the financial services industry and liberalization of international capital flows. Mostly the increasing interest rate in the financial reforms method attracts more savers for saving. Except this higher interest rate there are other incentives which usually attracts more savers in the long term are wider range of saving media with higher risk-return and reduction in liquidity constraint. 'Higher financial liberalization leads to higher saving' supported by Schiantarelli et.al (1998) and Caprio (1998). These people also discussed about the other liberalization policies, like openness of capital account, securities markets development etc. along with interest rate liberalization. In this context Goldsmith (1969) also views in his study that the incentives to save may increase with the improvement in financial instruments.

As it discussed that higher financial liberalization leads to higher saving and investment in the long run supported by Mc Kinnon (1973) and Shaw (1973), Japelli and Pagano (1994). However, another economist Pagano (1993) said that financial development cause economic growth through two channels i.e allocation channel and accumulation channel where allocation channel deals with resource allocation through saving and accumulation channel deals with capital and human accumulation for further productions. On the other hand the fund which borrowed by the household due to the financial liberalization system can also reduces the precautionary saving rate. Because

every time people are not going to utilize the borrowed fund for saving but they will go for consumption purpose Japelli and Pagano (1994).

Financial liberalization has theoretically both long-term and short-term effects on saving. Long term effects include higher deposit interest rates, risk-return characteristics, more banks, reduction in liquidity constraints and other financial intermediaries which later on increase the courage of household sector for further investment. This theoretical view supported by Mc Kinnon (1973) and Shaw (1973), Romer (1986), Lucas (1988), Jepalli and Pagano (1994). On the contrary higher saving leads to higher investment which tends to higher demand for the financial services; Schmidt-Hebbel and Serven, (2000). On the other hand the saving and economic growth model discussed more by neo-classical economists. Neoclassical Solow (1956) model argues that the increase in the saving rate boosts steady-state output leading to a further rise in investment. According to endogenous growth model of Romer (1986) and Lucas (1988) permanent increase in growth can be determined by higher savings and capital accumulation. Kaldor (1956) and Samuelson and Modigliani (1966) studied how different savings behaviors induced growth. This model also supported by Lewis's (1955) traditional theory, Jappelli and Pagano (1994). On the contrary economic growth contributes to saving; theoretically supported by Modigliani's (1985) life cycle hypothesis, Carroll and Weil (1994).

2.3 **Empirical Review**

To the date there are ample of studies have been conducted with respect to the causal relationship between financial development and real economic growth. And there are also some studies which have been discussed about the relationship between the intermediaries like savings and financial development as well as the saving-economic growth relationship. Most of the studies used multiple numbers of theories and econometrics techniques to investigate the relationships between these financial developments and its intermediary saving and the relationship between financial development and economic growth by taking cross-sectional data. But there are very less number of studies related to the relationship between these three variables: financial development, saving and economic growth. The present study has done a thematic empirical review literature.

2.3.1**. Linkage between financial depth and economic growth**

Odhiambo N.M (2007) attempts to examine the relationship between the financial depth, savings and economic growth in Kenya by taking saving as an intermediary variable and by implementing cointegration and error correction techniques from the year 1969 to 2005. This empirical result of this study suggests that there is a uni-directional causal flow from the economic growth to financial development. His result also reveals that economic growth Granger causes savings, while savings drives the financial sector development in Kenya during the study period. This study supports the argument that the financial development unambiguously leads to the economic growth. But this study unable to explain another side causality relationship.

There are several empirical studies which includes various financial development indicators to examine the finance-growth nexus. Using the data from 80 countries over the 1960-1989 periods King and Levine (1993a) examine the relationship between financial development and economic growth. Hence concludes that financial development is robustly correlated with subsequent rates of growth, capital accumulation, and economic efficiency and where financial leads to economic growth. Levine and Zervos (1996) use the various measures of stock market development and conclude that more financial growth promotes the real sector growth. Beck, et al. (2000) finds that financial development has a large and positive impact on GDP growth through total factor productivity. . Demetriades and Hussein (1996) find out that finance is the leading factor in the economic growth process. They further found that financial development follows economic growth. Beck et al. (2000) find that financial development has a large positive impact on total factor productivity which leads towards overall economic growth process.

Loayza N.V and Ranciere R (2006) investigate the short-run and long-run impacts of financial intermediation on economic growth. They found that a positive long-run relationship between financial intermediation and output growth and negative short-run relationship among these two variables. Graff M (2003) "the financial system is certainly not the major source of economic growth; at best, its services to the rest of the economy as an intermediary and allocator play an auxiliary role in the process of economic growth and development." Benhabib J and Spiegel M.M (2000) find that financial development

positively influences both investment rate and total factor productivity which further lead to economic growth.

Apergis N et al (2007) tries to examine the causal relationship between financial development indicators and economic growth by taking large sample of 65 countries both developed and under developed from the year 1975 to 2000. Their result supports the positive equilibrium relationship between the financial development and economic growth for all the indicators of financial development. Bader and Qarn (2008) examine the causal relationship between financial development and economic growth for six Middle Eastern and North African countries. The results strongly support the hypothesis that finance leads to growth in five out of the six countries.

There are lots of studies which found the supply leading phenomenon. Halicioglu (2007) investigates the supply leading and demand-following hypothesis by using annual data from the year 1968 to 2005 of Turkey and their empirical finding suggests that there is unidirectional causality takes place from financial development to economic growth which is called as supply leading phenomena. Hsueh S.J et al (2013) use Bootstrap Granger causality test for ten Asian countries and found that the financial variables lead to economic growth. Fry (1997), Hermes & Lensink (2003), Chrisopoulos D.K & Tsionas E.G (2004), Huang (2009), Rajan and Zingales (1998), Gelb (1989), Levine (1997) used cross-sectional data and check for the causality test between financial development and economic growth. They found the unidirectional causal flow from financial development to the real output growth i.e supply leading growth.

Levine and Zervos (1998) found that stock market and banking development lead economic growth. Hung F.S (2003) focused on the role played by inflation in

determining the effects of financial development on economic growth. The result concludes that both inflation and financial development influence the operations of financial markets and thus economic growth. Atje and Jovanovic (1993) examine the role played the stock market in the process of economic development and found that there is positive effect of the stock market variables to the development.

Caporale G.M (2009) found that banking sector as well as stock and credit market development leads to real output growth in ten new European Union member countries in the study period. Khan M.A et al (2005) concludes that in the long run financial depth and real interest rate exerted positive impact on real economic growth in Pakistan from the study period 1971 to 2004. Mero k (2004) suggests in his study that a prosperous financial intermediation causes the economic growth in the case of three Central and Eastern European economies (CEC3): Hungary, the Czech Republic and Poland. Similarly, Jalil et al. (2009) examine the finance-growth nexus in China and found the supply leading response. By using Vector Autoregressive (VAR) model, Shan and Jianhong (2006) examine that whether financial development cause economic growth in the case of China and the result support the "finance-led-growth" hypothesis. Gurgul and Lach (2012) examine the causal link between finance and growth by using quarterly data from 2000 to 2011 for Poland. They divided it in to two period post crisis (before the crisis of 2008) and after the crisis. And their result found that the stock market and banking sector development leads to economic growth during pre-crisis period whereas in the period of crisis it has a negative effect.

Odhiambo N.M (2007) tries to investigate the dynamic causal relationship between financial deepening and economic growth taking in Tanzania by taking foreign capital

flow as an intermediary variable. With the implementation of ARDL-bound testing procedure the study found that the causal flow from financial deepening to foreign capital flow and from foreign capital flow to economic growth in the long run as well as in the case of short run. Bailliu J.N (2000) concludes that the domestic financial sector plays a pivotal role in ensuring that foreign capital inflows which leads to real economic growth in developing countries.

Ghirmay T (2004) uses time-series methods and new Granger causality procedures to examine financial development affect long-term economic growth in the U.S. The result shows that financial development affects growth by increasing the level of investment and its productivity. And no evidence of reverse causality from economic growth to financial development is found. Gries, Kraft & Meierrieks (2011) investigates the causal interactions between financial deepening, trade openness and economic growth in 13 Latin American and Caribbean countries. They find almost no evidence for the popular hypothesis of finance-led growth and most results indicate a demand following or insignificant causal relationship between finance and growth.

Ang (2007) investigates the short run and long run relationship between financial development and economic growth for Malaysia by applying Autoregressive Distributed Lag (ARDL) model. The result concludes that financial regulations and efficient institutions tend to improve the effectiveness of financial sector and this improved financial sector leads towards higher growth in Malaysia. Huang (2009) in his study finds that financial development affects economic growth through productive channel.

Similarly the supply-leading hypothesis for causing financial development was supported by Jalil et al. (2008) in Pakistan and China, Christopoulos and Tsionas (2004), Jalilian and Kirkpatrick (2002) in the case of developing countries, Halicioglu (2007) in Turkey, Shan and Morris (2002) in the case of 19 OECD countries, and Beck et al. (1999). The empirical studies which does not support the supply-leading hypothesis i.e increase in financial development does not causes economic growth are highlighted here. Achy (2005) examines the relationship between financial development and economic growth for five MENA countries for the period1970 to 1997. The empirical results show that financial depth indicators fail to explain growth experience in the MENA countries. Kaboski and Townsend (2011) found that financial development leads to more consumption rather than saving which leads to fall in the economic growth in the case of Thailand.

All the aforementioned studies are related to the supply leading phenomenon. Except this there are very few sets of empirical studies which found the demand following relationship between finance and growth. Waqabaca C (2004) examines the relationship between financial development and growth in Fiji using time series data from 1970-2000. The result reveals that there is positive relationship between financial development and economic growth in Fiji and the direction of causality flowing from economic growth to financial development which is also called demand following phenomenon. By applying Johansen-Juselius cointegration technique and vector error correction mechanism and using time series data, Odhiambo (2004) examines the direction of causality between financial development indicators and economic growth in

South Africa. The result shows the demand following response between finance and growth. This implies that, here the financial development driven by economic growth in South Africa. The study suggests that it is the real sector which should be developed further in order to stimulate economic growth.

Agbetsiafa (2003) used Vector error-correction model to the African data in order to examine the long-run equilibrium relationship, and the causal relationship between financial development and economic development in a sample of eight SSA countries namely, Ghana, Ivory Coast, Kenya, Nigeria, Senegal, South Africa, Togo, and Zambia. He found that the results are different for different countries. In most of the countries the uni-directional causal flow takes place from financial development to economic growth those countries are Ghana, South Africa, Togo, Nigeria, Senegal and Zambia. Bidirectional causal flow takes place in two courtiers Kenya and Zambia.

Odhiambo (2007) investigates empirically the direction of causality between financial development and economic growth in three Sub Saharian African countries i.e Kenya, South Africa, Tanzania, etc. The study found that there the demand following response takes place in the country like Kenya and South Africa; while in Tanzania it follows supply leading response. Therefore the study suggests that the real sector development should be increased further in Kenya and South Africa in order to sustain the development of financial sector. While in the case of Tanzania the financial sector should be developed in order to make the real sector monetized.

Boulila and Trabelsi (2004) explore the causality issue between financial development and economic growth in the 16 Middle East and North Africa (MENA) countries for periods 1960 to 2002. The empirical findings support the hypothesis that causality is running from the real to the financial sector. Al-Awad and Harb (2005) investigate the linkages between financial development and economic growth in the Middle East using newly developed methods of panel cointegration technique. The result suggests that the causation runs unilaterally from economic growth to financial development. Chukwu et al. (2009) also found in his study that the unidirectional causal flow takes place from economic growth to financial depth indicators like banking sector's private sector credit and real broad money supply by using Nigerian data. Odhiambo (2010) examines the tri-variate causal relationship between financial development, investment and economic growth by applying ARDL bound procedure in South Africa. The result found that there is unidirectional causal flow takes place from economic growth to investment and the investment causes development in the finance sector. Kilimani (2009) also found the unidirectional causal flow run from real sector to financial development.

Studies by Al-Foul (2010) and Sinha (2009) found in their study that financial development and economic growth cause each other. Shan et al. (2001) found the same bi-directional causal flow between these variables in all most half of the OECD countries. Sinha and Macri (2001) examines the finance-growth relationship in the case of eight Asian countries – India, Japan, Korea, Malaysia, Pakistan, Sri Lanka, Philippines, and Thailand and the result found two way relationship between income and the financial

development variables. Blackburn and Hung (1998) found the positive and two-way causal relationship between growth and financial development multi-countries.

All these above studies are discussed on the international basis. There are several studies which are conducted in case of India. The following section briefly reviewed those studies which have examined the relationship between the financial development and economic growth in India.

2.3.2. **Review Literature Related to India**

Banerjee and Ghosh (1998) examined the 'supply-leading' and 'demand-following' linkage of financial institutions and economic growth in India by employing time series data from the year 1962-63 to1996-97. This analysis shows the existence of a strong supply-leading relationship from real disbursements to real investment. Whereas, the demand-following relationship from real investments to real disbursements found to be weak in the context of India. Chakraborty (2010) discussed about impact of financial development on economic growth in India in the post reform period by taking quarterly data for the year 1993 to 2005 and applying the technique of cointegration and vector error correction method. She found that stock market development is not enhancing economic growth in developing country like India. But the banking sector is playing an important role in the path of financial development to economic growth in India. Katircioglu et al. (2007) found long run equilibrium relationship between financial development and economic growth and there is also a bi-directional relationship between financial development and economic growth in India. Similarly, Demetriades and Luintel

(1996) found the bidirectional causality between financial development and economic growth in India.

Chakravorty (2008) examined the role of financial development in the economic growth process of India. The study found that the economic growth causes financial development in India during the post reform period. By using monthly data from April 1994 to March 2010 Sarkar (2013) looked at the relationship between economic growth and the growth of the stock market India. He found positive relationship between economic growth and growth of stock market. It shows that growth of stock market leads to real sector growth in India.

Pradhan (2009) investigate the casual relationship between the financial development and economic growth in the context of India using a multivariate VAR approach. The study found that there is bidirectional causal flow between some financial development variables and economic growth those relations are money supply and economic growth, bank credit and economic growth, money supply and foreign trade, and market capitalization and foreign trade. The study also finds unidirectional causal flow from market capitalization to economic growth i.e supply leading response.

Ray (2013) made an attempt to examine the relationship between financial development and economic growth in Indian context using granger causality test for the period, 1990-91 to 2010-11. The result concludes that the financial development measured by ratio of gross domestic capital formation to GDP, ratio of gross domestic savings to GDP granger

causes economic growth in India. Deb and Mukherjee (2008) tried to find out the causal relationship between stock market development and economic growth for the Indian economy. The study finds the supply leading hypothesis i.e the strong causal flow from three stock market development proxies to economic growth. The study also found the bidirectional causality between real GDP growth rate and real market capitalization ratio.

Intermediary variables between financial development and economic growth can change the direction of the causal flow. Many empirical studies face the problem of omission in their studies. To overcome this problems, the present study took saving as an intermediary in the finance-growth nexus and re-examine the linkage between financial depth (synonymous as financial development) and economic growth in case of India.

2.3.3. **Review related to Linkage between Financial Development and Savings**

There are a huge number of empirical studies which supports the saving-growth relationship. Some of the prominent studies are highlighted in this section.

Melo and Tybout (1986) examined in their study that at macro level financial reform induced structural shift in savings and investment in the case of Uruguay. Mrak (1989) analyzed the importance of the informal financial sector in the mobilization and allocation of household savings in Zambia. The study concludes that the formal sector institutions in Zambia are fairly well developed but it has not fulfilled the role to mobilize and allocate the household saving. In this situation informal financial sector helps the household for the mobilization of the savings. Schmidt and Hebbel (2002) also found a positive association between financial development and savings by taking cross-country

analysis. The study indicated that financial development is an important determinant of the saving rate. Higher financial development leads to higher saving. Abbott (1985) find that extent of financial development can increase the volume of financial savings in the case of South Asian countries.

Bandiera et al (2000) tries to find out whether financial reforms raise or reduce saving for the eight developing countries- Chile, Ghana, Indonesia, Korea, Malaysia, Mexico, Turkey, and Zimbabwe. The result does not follow the hypothesis that financial liberalization will increase savings. They found that financial development and savings are negatively related. Kelly and Mavrotas (2001) examine the impact of financial sector development on private savings by using panel cointegration tests for seventeen African countries. The study found that the relationship varies across the countries. However, for most of the countries in the sample, the result holds positive relationship between financial development and private savings.

Musalem and Tressel (2003) conclude that contractual savings institutions have an independent and positive impact on securities market development, which have indirect positive effect on economic growth. The study also found that banking system is more resilient to liquidity and credit risks when contractual savings institutions are more developed.

Khan and Hye (2010) examine the impact of financial reforms on household saving in Pakistan applying ARDL cointegration technique on annual time series data for the year 1988 to 2008. The study found that the financial liberalization index negatively impact

on the household savings in the short-run, as well as in the long-run. Thus the result suggest that financial liberalization cause fall in the rate of savings instead of increasing it. Sahoo and Dash (2013) examined the role of financial development on private saving in five developing south Asian countries viz. India, Pakistan, Bangladesh, Sri Lanka, and Nepal by using latest panel cointegration estimation from 1975 to 2010. The result suggests that the significant positive impact of financial sector development on the savings rate. Ang (2010) tries to investigate the key factors behind the remarkable savings performance of Malaysia. The result shows that financial deepening, increased banking density development in the insurance market and financial liberalization tend to encourage private savings.

Chowdhury (2001) evaluates the impact of various determinants of savings in Bangladesh. The results show that financial reform index has a negative impact on private savings. Whereas Odhiambo N.M (2008) examine the impact of interest rate on financial deepening and saving by using financial deepening model and saving mode implementing the cointegration and error-correction techniques. The empirical results of this study reveal a positive impact of interest rate reforms on financial deepening and financial deepening also have positive impact on domestic savings in Tanzania. Neal and Dewenter (1996) examine the empirical relation between gross private savings rate and three measures of financial development in case of sixteen emerging market countries for the year 1982 to 1993. The result suggests that that a growing or deepening stock market will not necessarily be associated with higher savings rates. Wang et al. (2011) investigate the hump-shaped empirical relationship between financial development and

the national saving rate across 102 countries. The result follows the "hump shaped hypothesis" of financial development and saving, i.e. the aggregate savings rate rise initially with financial development and after certain point it started falling with financial development because of substantially reduction in precautionary savings by the households.

The relationship between financial development and savings are less researched in case of India. Nair (2006) in her study examines the impact of financial sector liberalization measures on household sector savings rate in India. The results suggest that a significant negative impact of the financial sector liberalization index on household saving rate; it is because increased credit availability due to financial sector liberalization leading to increased consumption rather than savings.

2.3.4. **Review related to Economic Growth and Saving**

There are vast number of empirical studies which examine the linkage between the economic growth and saving relationship by several economists. The present study reviewed the literatures which have focused on investigating the long-run relationship between savings and economic growth. Carroll and Weil (1994) examine the relationship between income growth and saving using both cross-country and as well as using the household data. The study finds a positive effect of saving on economic growth. Irandoust and Ericsson (2004) found the same result in African countries by using panel cointegration technique. Mohan (2006) examined the casual relationship between these private saving and economic growth in different income level countries by

using time series data and applying granger causality test taking annual data from the year 1960 to 2001. Sajid and Sarfraz (2008) found uni-directional short-run causal flow from gross national product (GNP) to national and domestic savings; and from gross domestic product (GDP) to public savings in the case of Pakistan. The result suggests the causality flow from economic growth to growth rate of savings. Agrawal and Sahoo (2009) found the bi-directional causal relationship between private saving and economic growth in Bangladesh.

Al-Foul (2010) found that there is long-run relationship between saving and GDP in the case of Morocco. Where, in the case of Tunisia, the empirical results reveal that no long-run relationship exists between saving and GDP growth over the period. Rasmidatta (2011) also found that the economic growth rate lead to growth rate in private saving of Thailand. Aghion (2009) examine whether domestic saving matters economic growth. The result shows that the saving positively correlated with productivity growth in poor countries but not in rich countries. Hevia and Loayza (2011) found in their study that percentage increase in the total factor productivity allow double percentage increase in gross domestic product per capita with national saving rate in the case of Egyptian economy.

Verma (2007) employed the ARDL co-integration approach to determine the long-run relationship of gross domestic saving and gross domestic product for the period 1950 to 2004 and supported the Carroll-Weil hypothesis that saving does not cause growth, but growth causes saving. On the other hand Sinha and Sinha (2008) examined the

relationship among growth rates of the GDP, household saving, public saving and corporate saving for the period 1950 to 2001 and found that economic growth causes higher savings. Anoruo and Ahmad (2001) investigated the causality of savings and economic growth in seven African countries using vector error correction model. The study finds that economic growth Granger causes the growth rate of domestic savings in four out of seven countries.

Sinha (2009) examine the long run relationship between savings and economic growth in India by using cointegration test followed by causality test from the period 1950 to 1993. The result finds no causal flow from economic growth and private and total saving rate. Jangili (2011) suggests that higher saving and investment leads to higher economic growth in India. Singh (2010) examined the long-run effect of domestic savings on income and he found bi-directional causality between saving and growth in the case of India.

2.4 **Conclusion**

By reviewing the literature it can be seen that the financial development and economic growth tested for developing economy especially Asian and African countries more as compared to developed economy. Most of the studies used cross-countries data and very few studies are focused on a particular country using time series analysis. Those studies which examined the nexus between financial development-economic growths by taking group of countries failed to provide a clear cut direction about the nexus. This is mainly because of in same basket without looking the stages of financial development. The

financial developments of countries do vary and it comes through different stages of development depending upon specific reforms or policies adopted by the country. Second, most of the studies try to examine the causal linkage between those two key variables without considering the importance of the intermediary variables. Thus the motivation of the study is to investigate the causal link between the financial development and economic growth by using savings as an intermediary variable in developing country like India. The next chapter provides the preliminary results related to trends and growth rates of key variables considered in the study and compare the results between pre-reform periods and post-reform periods.

CHAPTER THREE

TRENDS AND GROWTH PATTERNS OF FINANCIAL DEPTH, ECONOMIC GROWTH AND SAVINGS

3.1. **Introduction**

This chapter will discuss the historical data related to economic growth, financial development and savings in India. The objective of this chapter is to provide a preliminary analysis of the trends and growth patterns of financial development, economic growth and savings in India. India is the tenth largest by nominal GDP and third largest by purchasing power parity (PPP) country in world economy. After the economic reform of 1991 India became the fastest growing economy. This reform includes number of sub-sectors reforms which include fiscal correction, financial reform, trade reform, and industrial sector reform. Financial development in a developing country like India depends on the pace of financial sector reforms. Therefore, this chapter try to address the growth patterns of several financial development indicators both pre and post-economic reforms periods.

The remaining sections of this chapter are as follows. Section 3.2 presents the trends and growth patterns of financial development and compares the results between pre and post liberalization periods. Section 3.3 discusses the trends, growth rates and composition of savings in India. Section 3.4 exhibits the growth pattern of real per capita GDP. Similarly, 3.5 section analyses the growth rates of economic growth, savings and financial development between pre-reform and post-reform era. Section 3.6 provides concluding remarks based on the preliminary results.

3.2. Trends and Growth Patterns of Financial Development

The current position of Indian financial system is relatively well and good as compared to other developing countries because of better regulated financial markets by the central bank. Indian financial sector play a vital role in the path of economic growth in India. India has had a relatively developed financial system among the developing economies of South Asia. This financial sector consists of both banking and capital market. And these sub sectors includes number of banking and non banking financial institutions. The financial development takes rapid stage after 1991 reforms. There is huge difference between the pre-reform financial situation and post-reform financial situation in India.

Since India is a developing country where most of the residents are belongs to middle class and poor families, therefore, majority people of India are concerned about the future so their main motive is to save for future. For this reason financial institution in are the main pillars for mobilization of savings. For fulfilling this requirement, establishment of financial institutions which can offer safe and reliable instruments and have been increasing rapidly particularly after 1991 reform period. People always want a safe and reliable institution for saving. But such facilities are very rare in developing country like India. Especially in rural areas, where the people usually faces the problem of lack of financial institutions facility so the rate of saving in rural India is very low as compared to urban areas. For increasing saving and economic development advanced financial incentives are most required especially for rural India. On the path of development India is implementing so many reform programmes for improving financial condition for the fast growing population. Because of this the improvement in banking and non-banking

sectors improved substantially. After the deregulation law of interest rate, Indian banking sector has become more market oriented after 1991 reforms. This paragraph mostly discussed about the banking and non banking institutions. Now it is more important to know about the capital market situation in Indian scenario.

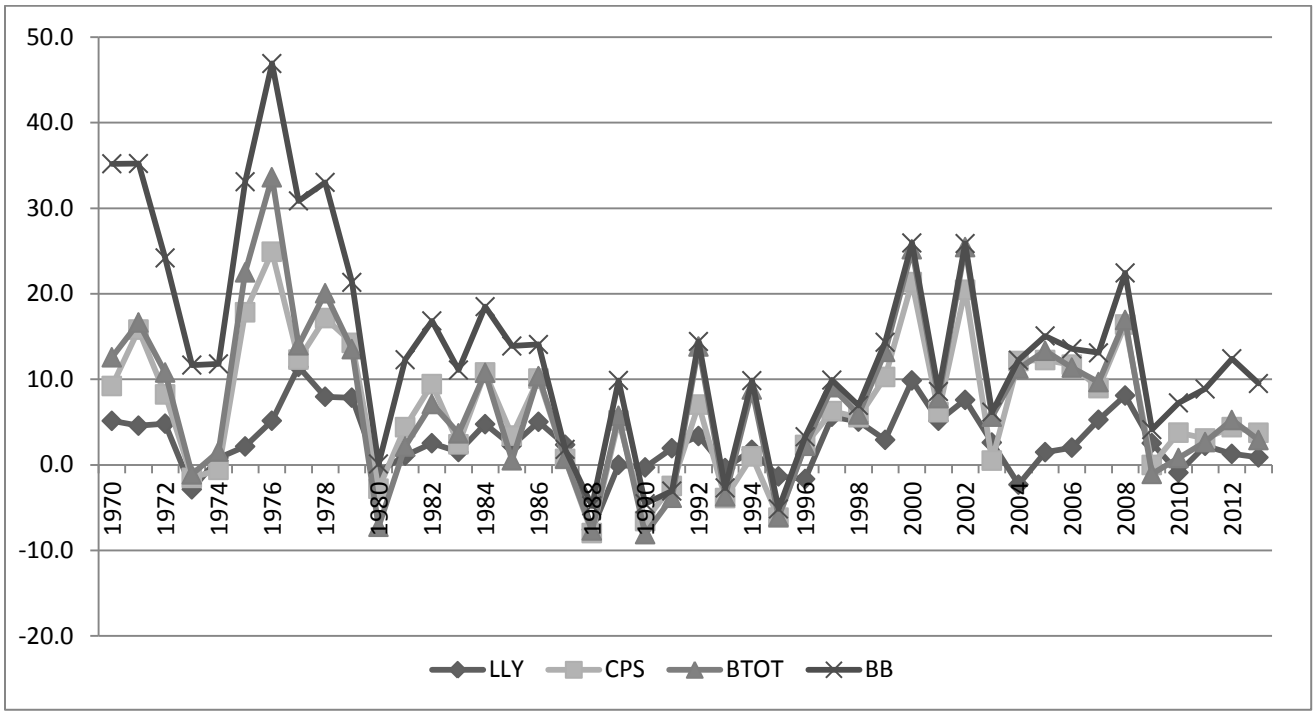
There has been a rapid expansion of the capital market in Indian economy. Capital market plays an extremely important role in promoting economic growth. In the year 1993 Indian capital market was open up to the foreign institutional investors and Indian companies are allowed to raise money abroad by issue of equity in the form of global depository receipts. This capital market reforms further become an accelerator for financial sector development and economic growth in the country. This is an important drain to channel fund to an organization and to encourage them towards profitable investment. It also plays the role of mobilizing saving, which further leads towards investments and it cause the long run economic growth. This reform makes more innovative, efficient and competitive Indian market to in the world market. Now India is on the path of globalization. And it has brought has brought in new opportunities to developing countries.

Both banking sector and capital market development is very important part of economic development in India. India is considered as one of the developed financial system among the other developing south Asian countries. It is already discussed that the financial sector consists of both banking and non banking institutions. In the year 1969 all banks are nationalized in India. By 1969 India has having only 22.2 per cent of bank offices and

it reached to 58.5 per cent in the year 1991, this is all about pre reform period growth. In the post reform period it reached to Indian financial sector has traditionally been bank based. The banking sector has so far played an influential role in supporting economic growth in India.

By highlighting the role and importance of financial sector for mobilizing savings and thereby the economic growth of a country, this section began with discussing the trend and growth rates of key financial development variables. Based on the review literature, the present study considered four key financial development variables which consist of liquidity liabilities to total GDP (here after LLY), credit to the private sector to GDP (here after CPS), the ratio of commercial bank assets to sum of commercial bank asset and central bank asset (here after BTOT) and number of bank branches (here after BB) per million people. Now we discuss these four variables in detail. The composition of these variables showed in Figure 3.1. This figure shows the annual growth rate of all four variables related to financial development from the year 1970 to 2012.

Figure 3.1: Annual Growth Rates of Key Financial Development Indicators



Source: Author's calculation based on secondary data

The results from Fig-3.1 indicate a volatile pattern of growth from the period 1970 to 2012. The figures specify that in some years the growth rates of all the variables are very high and in some years it shows deceleration in growth rates. The figure shows that in the beginning from 1970 to 1980, the growth rate of all the four variables were very high and reveal upward trends. Then the growth rates of all the financial development indicators show downward trends particularly in late 1980s. But after the economic reforms period, it is noticed that the growth patterns of financial development indictors show more or less upward trends barring few years. Overall, we noticed from the Fig-3.1 that growth

patterns of all the four financial development variables are similar and the move in same direction.

After discussing the growth patterns of all the four variables, the present study try to examine the decadal growth rates of different financial development indicators and compare the results. In addition to the decadal growth rates, the study also examined the growth patterns of these four variables during pre and post-reform periods. Table 3.1 shows the decadal growth rates of the financial development variables from the year 1970s to 2012s.The entire time span is divided into two sub-periods, i.e. pre-reform period (1970 to 1991) and the post reform period (1992-2012). The division of two sub-periods is completely based on the introduction of economic reforms in July 1991. This table also shows the average decadal growth rates of these variables since 1970s.

The first variable of financial development i.e Liquidity liabilities to the GDP which is also considered as financial depth (Levine, 1997); the average growth rate in 1970s is 4.7 per cent and which is come down to 1.1 per cent during 1980s. In the period 1990s it became 1.7 per cent and in 2000s it again increased to 4.2 percent then it became less than 1 per cent i.e 0.9 per cent in 2012. Then the growth rate of LLY in pre-reform periods was 2.8 per cent and it was 2.7 per cent during post-reform periods. The overall growth rates of LLY were 2.7 per cent. The growth patterns of LLY conclude that there is not much difference in growth between the pre and post-reform periods. But the rate was significantly varies when we compare it across different decades. Finally, it shows no

such difference between pre and post reform period growth rate of liquidity liabilities in India as the total average growth rate is 2.7 per cent.

Table 3.1: Phase-wise Growth Rates of Financial Development Indicators

Periods	LLY	CPS	BTOT	BB
1970s	4.7	7.1	2.7	13.9
1980s	1.1	2.5	-0.9	6.7
1990s	1.7	-0.4	1.8	1.2
2000s	4.2	6.8	1.6	2.1
2012	0.9	2.9	-0.8	6.6
Pre-reform	2.8	4.2	0.7	10.0
Post-reform	2.7	3.6	1.4	2.4
Total	2.7	3.9	1.1	6.1

Source: Author's calculation based on secondary data

Next, we discuss about credit to the private sector (CPS). The decadal growth of CPS in 1970s was 7.1 per cent, 2.5 per cent in 1980s, negative growth of -0.4 per cent in 1990s and much robust growth in 2000s barring the year 2012 where the growth rate was just 2.9 per cent. The pre and post reforms growth rates were 4.2 and 3.6 per cent respectively. The finding of the growth rates of CPS is no more difference from LLY's growth patterns. There is only one major difference, i.e. the growth of credits to private

sector to the GDP ratio was much higher as compared to the growth rates of liquidity liabilities ratio during both pre and post-reforms periods. Next we discuss the growth patterns of the ratio of commercial bank assets to sum of commercial bank assets and central bank assets. The decadal growth rates are 2.7 per cent in 1970s, negative growth of - 0.9 per cent in 1980s, 1.8 per cent in 1990s, and 1.6 per cent in 2000s and again negative growth of -0.8 per cent in the period 2012. Similarly, the growth rates of BTOT during the pre-reform and post-reform were 0.7 per cent and 1.4 per cent respectively. This financial indictor provides somewhat different results as compared to LLY and CPS indicators. The ratio of commercial banks assets to total banking (commercial and central) assets growth has increased in two fold in post-reform era as compared to pre-reform periods, which was reverse in case of liquidity-liabilities ratio and ratio of credit to private sector to total GDP. But the results are not surprising because the assets of commercial banks have been increasing in the post-reform periods and the its base was neither very low in 1970s nor less in 1980s.

The last important variable related to financial development indictor is the number of bank branches per million people in India. This is one of the crucial financial development indictors because it gives access to the people of a country to open an account. It also gives an indication about the financial inclusion of an economy. The bank branches decadal growth rate was 13.9 per cent (1970s), 6.7 per cent (1980s), 1.2 per cent (2990s), 2.1 per cent (2000s) and 6.6 per cent (2012s). The growth rate in pre-reform periods was 10 per cent, which is much higher than the post-reform periods (2.4 per cent). The results are not surprising because the banks became nationalized in 1969

so the growth rate of bank branches is rapid soon after the nationalization and it reduced after that. The other reason for slow growth in post-reform period was probably due to higher number of bank branches in 1990s in absolute term as compared to 1970s. But the average annual growth rate from the entire span shows around 6.0 per cent growth, which is good for a developing country like India. All these growth rates are related to banking financial development indicators. The growth rate of all these variables follow same patterns except the BTOT where it shows a higher growth rates in pre-reform periods as compared to post-reforms periods.

It is known very well that the financial development means not only the banking sector development it also consist of financial market development. Though the objective of this study is to only concentrate on financial development related variables, but this paragraph discusses about the current scenario of various financial market development variables like financial market capitalization, financial turnover, private debt securities and other variables. During the pre-reform period the capital market was completely controlled by government. There have been significant reforms in the regulation of the capital market after 1992 along with the economic reforms. The capital market variable like market capitalization growth rate was 23.3 per cent during 1990s and in 2000s it became 12 per cent (WDI). By the time of 2007 it reached to 54.15 per cent and it started falling after 2008, the treat financial depression and it reached to negative 17 per cent during the 2011-12. And the stock market turnover ratio was -5 percent during 1990s and it increased after the reform 1993 and it reached to 58.7 percent in the year 2000 (WDI). After this the turnover started falling and it became negative 22 per cent in the year 2011.

Another important capital market variable is the stock traded to the GDP. This variable percentage growth rate was 26 percent during 1990s and it increased by 81 percent in the year 2000. After 2000s it started falling and it reached by 27 percent in 2011 (WDI). In developing country like India the banking sector development is most appropriate and can be considered for financial depth of an economy. It is mainly because majority people of our country belongs to lower-income category and hence not interested to invest their income in capital market. Second, theoretically there is a direct linkage between savings and financial development, which is primarily the development of banking sector rather than the capital markets. The next section discusses the trend and composition of savings in India.

3.3 **Trends and Components of Savings in India**

This section discusses about the trends in saving rate in India over 1970 - 2012. This section also deliberated about the components of savings i.e household savings, corporate savings and public savings in India. Figure 3.2 shows the share of household, corporate and public savings rate to the total savings rate for India from 1970 to 2012. The share of household savings rate to the total saving rate was 66.4 percent which was highest rate from the other saving rate in 1970s. Whereas the other saving rates, i.e corporate saving and public saving were 9.8 percent and 23.8 percent respectively in the same periods. During the period of 1990s, the period of great depression the share of household saving increased and covered almost 80 percent of total saving whereas the share of corporate saving was 11.4 percent and the share of public saving is 7.9 percent. After the period 1990s the corporate sector started growing and public sector started falling which is

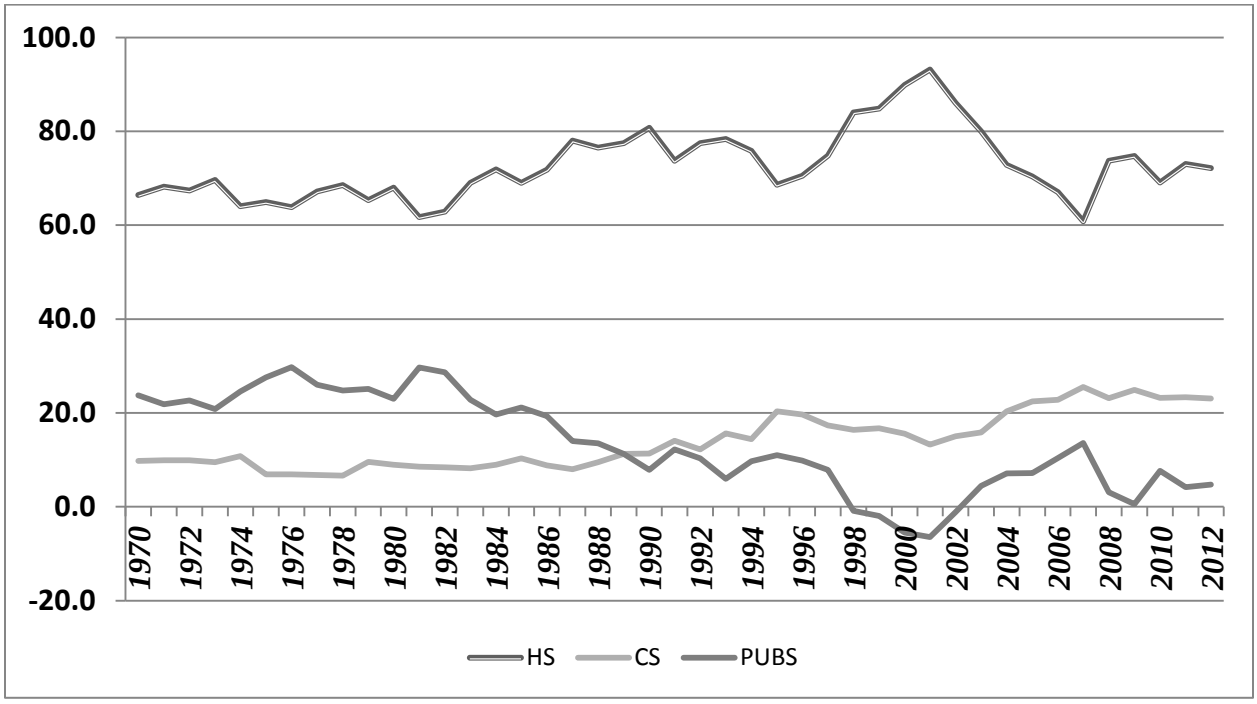
shown clearly in the figure 3.2. In the post-reform periods the financial sector started growing continuously and the share of savings in the household sector also started growing and it covered almost 90 percent in the year 2000 and the share of corporate and public savings were 15.5 percent and -5.5 percent in the same period. But after 2000, the share of household savings has fallen bit and the corporate savings share was accelerated. In the year 2012 the savings shares of household sector, corporate sector and public sector were 72.2 per cent, 23.1 per cent and 4.7 per cent respectively.

Table 3.2 Decadal Growth Rates of Household, Corporate and Public Savings

periods	**Household Savings (HS)**	**Corporate Savings (CS)**	**Public Saving PUBS**
1970s	3.3	6.2	5.3
1980s	2.7	3.4	-6.0
1990s	3.3	7.3	6.4
2000s	1.5	8.5	-29.1
2012	-3.2	-4.5	2.8
Pre-reform	3.5	5.0	-1.5
Post-reform	1.2	6.2	-5.3
Total	2.3	5.6	-3.5

Source: Author's calculation based on secondary data

Figure 3.2: Trends of household, corporate and public savings (%)



Source: Author's calculation based on secondary data

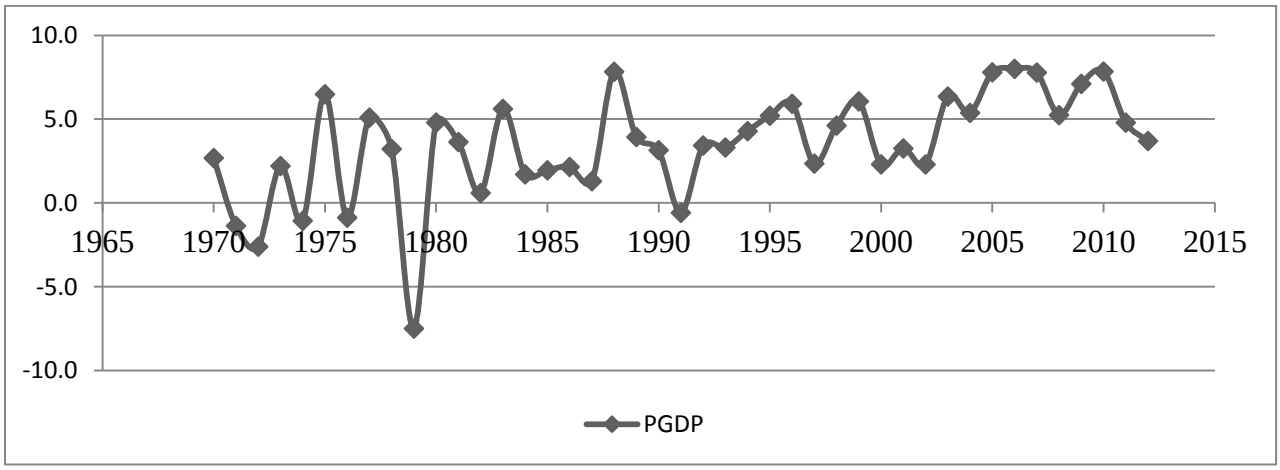
Table 3.2 shows that the period of 1970s the household sector average growth rate was only 3.3 per cent and the average growth rate of corporate sector was double than household sector i.e 6.2 per cent and public sector average growth rate was 5.3 per cent. But during the 1980s all the three variables declined to 2.7 per cent (household), 3.4 per cent (corporate) and negative – 6.0 percent (public sector). Similarly, in 1990s these variables again started increasing and the average decadal growth rates of household, corporate and public savings were 3.3 per cent, 7.3 per cent and 6.4 per cent respectively. The growth rates of public savings further declined in 2000s. In the period 2000 the decadal average growth household saving rate was fall to 1.5 per cent and the corporate saving rate increased to 8.5 percent. This was because of huge increase in the industrial sector. And the public saving has become negative – 29.0 per cent in the same decade.

The post reform period average growth rate of household savings is half as compared to pre-reform period i.e 1.5 percent. Similarly, the corporate savings growth rate was increased from 5.0 in pre-reform era to 6.2 per cent during post-reform period. The entire span indicates that corporate savings saving grew at 5.6 per cent and highest among the composition of savings. The household savings growth was moderate and public saving's growth has shown a negative of -3.5 per cent.

3.4 **Trends and growth of Per Capita Income in India**

Economic growth refers to the quantitative rise in the national income or per capita income during the particular time period. To understand the economic growth rate in India here we examine the trend of per capita income rate during the study period from 1970 to 2012. The trend in per capita income growth has been shown in the figure 3.

Figure 3.3: Trend of Economic growth in India



Source: Author's calculation based on secondary data

Figure 3.3 demonstrates the annual economic growth rate of India since the year 1970s to 2012. In the year 1970s the per capita income growth rate by taking 2004-05 as base year was only 2.7 per cent. The economic growth of measured in per capita income had drastically fell from 3.0 per cent growth 1977 to -7.5 in 1979 and the negative growth was mainly because of oil crisis. In 1990s it reached to 3.2 percent after suffering a negative growth rate during the balance of payment crisis in 1990. After the great depression of 1990s the reform has been takes place in 1993 and the growth rate reached to 6 per cent in 1999 and again increased to 8 percent during 2007. The country has achieved higher growth rates in the decade of 2000s barring the global financial crisis period in 2008. The real per capita income growth in 2012 was around 5 per cent.

3.5 **Trends and growth patterns of Financial Depth, Economic Growth and Savings**

Table 3.3 shows the annual growth rate of financial depth, economic growth, private and total saving rate in India for the year 1970 to 2012. It is seen that the financial depth has increased from 5.1 percent to 11.5 percent from 1970 to 1977 and again started falling during 1980s it became negative 0.8 percent. During 1990s the annual growth rate again falls to minus 0.3 percent. In 2000s it reached to 9.9 percent and again it falls to 1.3 percent in 2012. However, the private savings growth was -0.9 per cent in 1970. It reached to 6.8 per cent in 1977 and in 1980s it fall drastically and became -8.1 per cent. The total savings growth rate has moved from 1.4 percent (1970s), 2.1 percent (1977), -10.6 percent (1980), 7.9 percent (1990), -7.4 (2000) and 2.6 per cent in 2012. The

economic growth rate also changed from 1970s to 2012. In 1970s it was 2.7 percent, 5.1 percent in 1977, 4.8 percent in 1980s, and 3.2 percent in 1990s. It became 2.3 percent in 2000s and at last it reached to 2.6 percent in 2012. The trend of financial depth, private and total saving rate and economic growth is same up to 1980s.

Table 3.3 Trends and Growth pattern financial depth, economic growth, private saving and total saving

Periods	**Per Capita GDP (PGDP)**	**Financial Depth (FD)**	**Private saving (PS)**	**Gross Domestic Saving (GDS)**
1970s	0.6	4.7	3.4	3.7
1980s	3.4	1.1	2.7	0.8
1990s	3.8	1.7	3.5	2.1
2000s	5.8	3.8	1.8	2.8
2012	3.7	1.3	2.0	2.6
Pre-reform	2.1	3.1	3.3	2.2
Post-reform	8.3	3.5	2.7	2.3
Total	7.3	4.7	4.1	2.8

The average decadal growth rate of financial depth for the period 1970s is 4.7 per cent, it reduced to 1.1 per cent in 1980s. During 1990s it increased little bit and reached to 1.7

percent. In 2000s it once again increased and reached to 3.1 percent that is more than half percentage increase. After that it once again reduced in 2012 and reached to 1.3 per cent. Similarly the private average savings growth rate was 3.4 per cent in 1970s, 2.7 per cent in 1980s, 3.5 per cent in 1990s, 1.8 per cent in 2000s and 2 percent in 2012. Similarly the total average growth rate was 3.7 per cent in 1970s, 0.8 per cent in 1980s, 2.1 per cent in 1990s, 2.8 per cent in 2000s and 2.6 per cent in 2012. The per capita income average decadal growth rate in 1970s was 0.6 per cent. In 1980s it became 3.4 percent, 3.8 percent in 1990s; it increased to 5.8 percent in 2000s and 3.7 percent in 2012. As compared to 1970s average decadal growth all variables are in increasing trend except gross domestic saving. From the decade 1980s to 1990s all four variables are in increasing trend it means financial development cause higher saving and economic growth. But from 1990 decade to 2000 the variable like economic growth, financial depth, total saving was in the increasing trend and private saving is in decreasing trend. In 2012 all these tree variables which were in increasing trend in last decade were in decreasing trend. This implies that the three variables financial depth, savings and economic growth are interrelated to each other. So the trend is moving similarly in most of the decades.

This table also shows the pre and post reform period growth rates. The pre reform period average growth rate of financial depth and economic growth is less than the post reform period growth. The average growth rate of financial depth and economic growth was 2.1 percent and 3.1 per cent and it increased to 8.3 and 3.5 per cent in post reform period. The average growth rate of total study period is 4.7 per cent for financial depth, 7.3 per cent in case of per capita income growth, and 2.8 percent the gross domestic saving rate.

3.6 **Conclusions**

This chapter presents a linkage between financial development indicators, economic growth and savings in India. The preliminary results based on trend and growth patterns indicate that there exists a direct relationship among these three key variables. The decadal growth rates of various indicators like economic growth, financial development and savings shows irregular trends. The results also further indicate that the growth of financial development and private savings are more or less around 4 per cent during the entire time periods. To sum up, the findings from chapter three reveals close relationship among these variables. However, it is not possible to find the direction of causality among these variables form preliminary analysis. Therefore, in the chapter four, we have addressed this issue using the cointegration and vector error correction mechanism.

CHAPTER FOUR

EMPIRICAL ESTIMATION OF LINKAGE BETWEEN FINANCIAL DEPTH, ECONOMIC GROWTH AND SAVING

4.1 **Introduction**

The linkage between financial development, economic growth and savings was not clear from the preliminary results of previous chapter. This chapter made an attempt to examine the dynamic linkage between these three variables using econometrics tools. The objective of the chapter is to examine the long-run relationship among financial development, economic growth and savings using cointegration technique. Once cointegration is noticed among these three variables then in the next step, we examined the short-run and long-run causality. The study construct a financial development index using four banking development related variables like liquidity liabilities ratio to GDP, credit to the private sector to GDP, number of bank branches per million people and ratio of commercial banks assets to commercial banks plus central bank assets. In the second stage, the study uses liquidity liabilities ratio to GDP as the single variable which is broadly used as a proxy for financial depth in the literature. We have used both the variables to check the robustness of the results. Assuming all variables is endogenous and all are inter dependent upon each other.

This chapter is structured as follows. Section 4.2 briefly discussed methodology of the study which includes the principal component analysis for constructing financial development index and Unit Root tests to check the stationary properties of the variables. The section also explained Johansen (1988) cointegration technique to examine the long-run relationship and finally used the vector error correction (VEC) model to see the short-run causality among financial depth, economic growth and savings. The study uses two types of savings i.e. gross domestic savings and private savings. The idea for using two

types of savings to check whether the causal relationship among these three variables are same or different when we substitute the gross savings variables by taking private savings variable. Section 4.3 discusses the data source and measurement of variables. Section 4.4 presents the empirical results and final section provides concluding remarks.

4.2 **Methodology of the Study**

Most of the studies in the literature used the Granger Causality, cointegration and Vector Autoregressive (VAR) model to examine the relationship between financial development and economic growth. However, the present study include saving as one of the intermediary variables and used cointegration and causality tests to solve the problem of omission and for obtaining robust results. This section starts with the methodology of principal component analysis (PCA) for constructing the financial development index. Then the study uses Augmented Dickey-Fuller and Ng-Perron test to examine the stationary property of time-series data. In the final sub-section of 4.2, the study discusses the Johansen (1988) conintegration technique and Vector Error Correction (VEC) model.

4.2.1 Principal Component Analysis

Principal component analysis (PCA) is a statistical method used for data reduction. Principal component transforms a number of possibly correlated variables into a smaller number of variables. The origins of PCA lie in multivariate data analysis. It is commonly used to analyze the large dataset. Principal component analysis consists of three steps: first creation of a correlation matrix, second extraction of factor loadings, and third calculation of communalities. These steps are described clearly below:

- First we have to choose a data set which should consists of n number of indices. From this the mean has to subtract from each dimensions n of the Traces T_i , is calculated in a vector M_n .

$$M_n = \frac{\sum_{i=1}^{T} T_i, n}{n} \qquad (4.1)$$

The mean has to subtract from each and every dimension for getting each trace.

$$T_i, n = T_i, n - M_n \qquad (4.2)$$

- The second step is calculating a covariance matrix $\sum$. This matrix is a $n \times n$ matrix whose $(\mathrm{i}, \mathrm{j})^{th}$ element is the covariance between them i^{th} and j^{th} dimension of each trace. If we calculate covariance for two dimensions X and Y then it can be defined as follows;

$$\mathrm{cov}(XY) = \frac{\sum_{i=1}^{n} (X_i - \bar{X})(Y_i - \bar{Y})}{n-1} \qquad (4.3)$$

This covariance matrix can also be defined as follows:

$$\Sigma^{n \times n} = (c_{i,j}, c_{i,j} = C\,\mathrm{ov}(\mathrm{Dim}_i, Dim_j))$$

- The third step is to calculate eigenvectors and eigenvalues of the covariance matrix.

$$\sum = U * A * U^{-1} \qquad (4.4)$$

Where the eigenvalue matrix A is diagonal and U is the eigenvector matrix of $\sum$.

The eigenvector corresponding to the largest eigenvalue which is called as the first principal component; this component corresponds to the direction with the most variance.

- The last step is choosing components (p) and forming a feature vector. Here one has to choose the component which one wishes to keep and form a matrix with these vectors in the column. This matrix can call as feature vector.

  For forming feature vector one has to take the eigenvectors which one want to keep from the list of eigenvectors, and forming a matrix with these eigenvectors in the columns.

$$FeatureVector = (eig_1, eig_2 ..... \text{eig}_n) \qquad (4.5)$$

This study uses the STAT 11.0 software for estimating the financial development index (here after FDI).

4.2.2 **Test of Stationarity**

Before studying the relationship between the variables the study has to look into the test of stationarity, just like other time series analysis. Time series analysis predicts the future path of the variables based on the information of its past behavior. The time series analysis always has some irregularities in its time path. And the way by which the irregularities can identified is the stationarity test that is unit root test. Suppose we are taking a time variable Xt. This variable Xt is said to be stationary when it does not have any unit root at level; it means the variables should have constant mean and variance in all point of time and the correlation between the variables Xt and Xt-1 depend upon the lag (k) but not any other variables. If it does not fulfill any of the property of these then the variable is nonstationary it means it has unit root at level then the study has to go for first difference or integration of order one and so on. The properties of stationarity are;

(i) $E[y_t] = E[y_{t+k}] = \mu$ for all t (4.6)

(ii) $Var(y_t) = Var(y_{t+k}) = \delta^2$ (4.7)

or, $E[(y_t - \mu)^2] = E[(y_{t+k} - \mu)^2] = \delta_y{}^2 = \gamma_0$

(iii) $Cov(y_t, y_{t+k}) = Cov(y_{t+j}, y_{t+j+k})$ (4.8)

or, $E[(y_t - \mu)(y_{t+k} - \mu)] = E[(y_{t+j} - \mu)(y_{t+j+k} - \mu)] = \gamma_k$

Where, $\mu, \delta_y{}^2$ and all γ_k are constants. The covariance may depend on *k*, the lag length. The above conditions are also referred as conditions of weak stationarity, second order stationarity or wide sense stationarity. A strongly stationary process need not have finite mean and variance (i.e. μ and/or γ_o need not be finite).

A simple autoregressive process of order one, AR (1), below:

$$y_t = \delta_0 + \delta_1 t + \rho y_{t-1} + u_t \quad (4.9)$$

Where, u_t denotes a serially uncorrected white noise error term with a mean of zero and a constant variance, y_t is the stochastic process, δ_0, δ_1 and ρ are parameters and δ_0 is called drift or constant or intercept. This equation (4.9) depends on the parameter values. This equation (4.9) said to be deterministic trend when $\delta_1 > 0$. If the parameter $|\rho|$ <1, then the equation is stationary. And equation (4.6) becomes a random walk without drift model i.e nonstationary process when $\rho = 1$. If the series is nonstationary then that has to be differentiating to get rid from the nonstationary problem. And the stochastic process, which becomes stationary after differentiating is said to be difference stationary process.

There are several methods to check stationary properties of time-series data. Those are both formal and informal in nature. Formal non stationarity or unit root tests are

Augmented Dickey–Fuller (ADF) test, Elliott–Rothenberg–Stock test, KPSS unit root test, Phillips–Perron test, Schmidt–Phillips test and Ng-Perron (2001) test. But in this study only two stationarity tests i.e Augmented Dickey–Fuller (ADF) test and Ng-Perron test has been applied. Similarly, the informal methods are time series plots and use of Correlogram.

4.2.2.1 Augmented Dickey-Fuller Tests

There are several tests of stationarity but the study is going to discuss only those tests which became popular over the past years i.e the unit root tests (Dickey-Fuller tests). The Dickey-Fuller tests examines whether the first order lag have unit root i.e $\rho = 1$ in the equation (4.9). For this purpose the study has to manipulate the equation and express it differently by subtracting the lagged value from both the side in the equation (4.6). The modified equation is

$$\Delta y_t = \delta_0 + \alpha y_{t-1} + u_t \qquad (4.10)$$

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

$\alpha = \rho - 1$.

In practice the study can estimate a model and the null hypothesis is y_t has unit root i.e $H_0 : \alpha = 0$. The alternative hypothesis is y_t does not have unit root i.e $H_A : \alpha < 0$. The Dickey-Fuller test is conducted under the assumption that the residuals are serially uncorrelated.

For solving the problem of large and more complicated sets of time series model the extended version of time series has been used which is called as Augmented Dickey-

Fuller Test (ADF). The test is conducted under the assumption that the residuals or error may be serially correlated. According to this if the autoregressive time series follow the k^{th} lagged values the equation will be;

$$y_t = \delta_0 + \sum_{i=1}^{k} \rho_i y_{t-i} + u_t \qquad (4.11)$$

After some mathematical manipulation, the equation (4.11) can be rewrite as;

$$\Delta y_t = \delta_0 + \alpha y_{t-1} + \sum_{i=2}^{k} \beta_i \Delta y_{t-i+1} + u_t \qquad (4.12)$$

Where $\alpha = -(1 - \sum_{i=1}^{k} \rho_i)$

And $\beta_i = \sum_{j=i}^{p} \rho_j$

The ADF test can be tested in three possible models those are, a pure random walk without a drift, a random walk with a drift and the last is a deterministic trend with a drift. The DF and ADF tests are similar with each other as they have the same asymptotic distribution. ADF test is the popular test in the history of stationarity test analysis.

4.2.2.2 Ng-Perron Unit Root Test

Augmented Dickey Fuller test and Phillip-Perron unit root tests are two important tests for stationarity checking but these two tests also having the problem of potentially severe finite sample power and the problem of size. By taking this problem under consideration Ng and Perron (2001) introduced a new method for unit root test which has good size and power properties. This test is the modified version of Dickey Fuller and Phillip-Perron test statistics. The extra feature of Ng-Perron test which differentiate from the earlier unit

root tests are; first, the test statistics are based upon GLS detrended time series data. The second feature is that the test is a modified lag selection criteria.

Ng and Perron (2001) construct four tests statistics which are based on upper GLS detrended data. These tests statistics are modified version of Phillip-Perron test Zα and Zt statistics and ERR point optimal statistics. These efficient modified Phillip-Perron tests do not exhibit the severe size distortions of the Phillip-Perron tests for errors with large negative Moving Average (MA) or Autoregressive (AR) roots, and they can have considerably higher power than the PP tests especially when is α close to unity.

Using the GLS detrended data $\tilde{y}_t$, the efficient modified PP tests are defined as;

$$MZ_{\alpha} = (T^{-1}\tilde{y}_t^2 - f_0)/2\mathrm{k} \tag{4.13}$$

$$MSB = \left(\frac{k}{f_0}\right)^{1/2} \tag{4.14}$$

$$MZ_t = MZ_a \times MSB \tag{4.15}$$

$$MPT = \left\{\begin{matrix}(\vec{c}^2 k - cT^{-1}\tilde{y}_t^2)/\ f_{0,} \\ (\vec{c}^2 k + (1-\vec{c})T^{-1}\tilde{y}_t{}^2)/\ f_0\end{matrix}\right\} \text{If } x_t = \{1\} \quad \text{if} = x_t = \{1,t\} \tag{4.16}$$

Where $k = \sum_{t=2}^{T} y_{t-1}{}^2 / T^2$ and f_0 is an estimate of the residual spectral density at the zero frequency. The statistics MZα and MZt are efficient versions of the PP Zα and Zt tests that have much smaller size distortions in the presence of negative moving average errors. Again the choice of the autoregressive truncation lag p is critical for correct calculation of f_0 . Here p is chosen using the Modified Information Criteria (MIC (p)) of Ng and Perron (2001) as

$$\rho = \rho_{MIC} = arg\ min_p MIC(\rho) \qquad (4.17)$$

Where

$$\tau_\tau(p) = \left(\hat{\sigma}_p{}^2\right)^{-1} \hat{y}^2 \sum_{t=p_{\max}+1}^{T} \hat{y}_{t-1}{}^2$$

$$\hat{\sigma}_p{}^2 = (T - p_{\max})^{-1} \sum_{t=p_{\max}+1}^{T} \hat{u}_t{}^2$$

4.2.3 **Cointegration Analysis**

Cointegration is an econometric model which simulates the existence of long run relationship between two time series variables. The cointegration model can be applied there where two or more series are nonstationary at level but the linear combinations of these variables are stationary. On the basis of theory if the group of variables is individually integrated of order one I (1) and there is at least one linear combination of these variables that is stationary, then the variables are said to be cointegrated. Testing for cointegration implies testing for the existence of long-run relationship between economic variables. The cointegration phenomena include number of cointegration tests, namely the Engle-Granger method commonly known as the two-step estimation procedure, the Phillips-Ouliaris methods and the Johansen's procedure. As it is a multivariate analysis so the study is going to use Johansen and Juselius Maximum Likelihood Cointegration test procedure.

4.2.3.1 Johansen Maximum Likelihood Procedure

Johansen (1988) Maximum Likelihood Procedure is a method which only can apply when there are more than two variables. The Engel-Granger co-integration procedure will

not ruled out here because of the presence of more than one co-integrating vector. As it known that the Engel-Granger co-integration procedure is deals with only two variable regressions. Johansen's procedure builds cointegrated variables directly on maximum likelihood estimation instead of relying on OLS estimation. Unlike Engel-Granger test a single equation Johansen's procedure can also estimates the co-integrating relationship in a system. This procedure makes use of all short run and long run fluctuations and information of each variable and allow for testing multivariate vector analysis. This method generally builds directly on maximum likelihood instead of partly relying on least squares. In this way Johansen proposed two maximum likelihood ratio tests such as:

- The trace test
- The maximum Eigenvalue test

This procedure is better than Engle-Granger test as it can estimate more than one cointegration relationship. This method deals with vector cointegration procedure which contains more than two time series. This procedure also required the variables which are integrated of same order as like Engle-Granger method.

Johansen's method takes as a starting point the vector autoregression (VAR) of order p given by

$$z_t = a_0 + a_1 z_{t-1} + a_2 z_{t-2} + \ldots\ldots\ldots + a_k z_{t-k} + u_t \qquad (4.18)$$

Where z_t = the (n×1) vector of variables that are integrated of order one, that is, I (1)

a_1 through a_k = an (n×n) matrix of parameters

u_t = an independently and identically distributed n-dimensional vector with mean 0 and variance.

4.2.4 **Vector Error Correction Model**

Vector Error Correction Models (VECM) is a multiple time series models which can be derived as the speed at which a dependent variable Y returns to equilibrium after a change in an independent variable X. VECM model estimate both short term and long term effects of one time series on another. This is the third step after stationarity test and Johansen and Juselius cointegration test. If the set of variables integrated of order one and if these I (1) variables have one or more equilibrium relationship then the VECM model is applicable. The regression equation for VEC model is as follows:

$$\Delta LFINDEV_t = \alpha_0 + \sum_{i=1}^{n} \alpha_{1i} \Delta LFINDEV_{t-i} + \sum_{i=1}^{n} \alpha_{2i} LY_{t-i} + \sum_{i=1}^{n} \alpha_{3i} LGDS_{t-i} + \alpha_4 EC_{t-i} + u_t$$

(4.19)

$$\Delta LY_t = \beta_0 + \sum_{i=1}^{n} \beta_{1i} \Delta LFINDEV_{t-i} + \sum_{i=1}^{n} \beta_{2i} \Delta LY_{t-i} + \sum_{i=1}^{n} \beta_{3i} LGDS_{t-i} + \beta_4 EC_{t-i} + \varepsilon_t$$

(4.20)

$$\Delta LGDS_t = \delta_0 + \sum_{i=1}^{n} \delta_{1i} \Delta LFINDEV_{t-i} + \sum_{i=1}^{n} \delta_{2i} \Delta LY_{t-i} + \sum_{i=1}^{n} \delta_{3i} LGDS_{t-i} + \delta_4 EC_{t-i} + \nu_t$$

(4.21)

In VEC model past values of the error correction term help to predict future values. It describes the behaviour of the variables in the short-run having with the long-run cointegrational relationship. A coefficient of the error correction term indicates the short term fluctuations between the independent variable and dependent variable which will further give raise the stable long run relationship between variables.

4.3 Data Source and Measurement of Variables

The empirical analysis of this chapter based on secondary data. The data on per capital real GDP is collected from the Handbook of Statistics on Indian Economy published by the Reserve Bank of India. The total gross domestic savings and it's components like household savings, corporate savings and public savings are collected from CEIC Data Manager published by Euromoney Institutional Investor Company. The study has used four variables for financial development index. These are ratio liquidity liabilities to GDP in percentage, credit to the private sector as percentage of GDP, ratio of commercial banks assets to sum of commercial and central bank assets and bank branches per million populations. All the variables related to financial developments are collected from World Development Indicators (WDI) except bank branches per million populations, which is collected from CEIC Data Manager published by Euromoney Institutional Investor Company. All the variables are converted in logarithms and per capital GDP data is in constant base (2005 = 100).

4.4 The Empirical Results:

Before doing any econometrics analysis, this study first constructed a financial development index (FDI) using principal component analysis (PCA). The index includes four variables, viz., ratio of liquidity liabilities to the GDP (LLY), credit to the private sector as the percentage of GDP (CPS), the ratio of commercial banks assets to the sum of commercial banks and central bank assets (BTOT) and bank branches (BB) per million people. The results are presented in Table 4.1. The Eigen values indicate that the first

principal component explains 92 per cent of the standardized variance. Since 92 per cent of the variations among the four variables are taken care by first principal component, this study ignores other three components because their Eigenvalues are less significant to the model. The first Eigenvalue indicates that the variation of the dependent variable explain well than the linear combination of the other explanatory variables. The factor loadings for all the four variables corresponding to first principal component are 0.517 for LLY, 0.507 for CPS, 0.491 for BTOT and 0.483 are for BB. The factor scores suggest that the contributions of LLY, CPS, BTOT and BB to the standardized variance of the first principal component are 26, 25, 25 and 24 per cent respectively. By using these factor scores as weights, we construct a financial development index which is used as a proxy for financial depth.

Table 4.1: Principal Component Analysis

Principle component	**Eigen values**	**% of Variance**	**Cumulative %**
1	3.687	0.921	0.921
2	0.217	0.054	0.976
3	0.080	0.020	0.996
4	0.014	0.003	1.000
Variable	**Factor Loadings**	**Communalities**	**Factor scores**
LLY	0.517	0.997	0.259
CPS	0.507	0.944	0.254
BTOT	0.491	0.904	0.246
BB	0.483	0.883	0.242

Source: Author's own calculation

After constructing a financial development index, the next step was to check the stationary property of all economic growth, financial development index and savings variables. There were two methods used for the unit root test one is ADF test and another one is Ng-Perron test which are presented in Table 4.2 and Table 4.3. The result of Augmented Dickey Fuller unit root test has been shown in Table 4.2.

Table 4.2: Results of ADF test Statistics for Unit Root Test

Variables	**Level**	**1st difference**	**Inference on integration**
LY	-1.26 (0.88)	-7.73*** (0.000)	I (1)
LFINDEV	-1.31 (0.87)	-4.74*** (0.000)	I (1)
LFDPTH	-1.65 (0.75)	-4.33*** (0.000)	I (1)
LGDS	-2.59 (0.28)	-7.71*** (0.000)	I (1)
LPS	-2.74 (0.22)	-7.95*** (0.000)	I (1)

Source: Author's own calculation, notes: values in parenthesis shows the P-value

The results of this table suggest that the null hypothesis of a unit root test can be accepted at significance level for all the variables i.e financial development index, financial depth, gross domestic saving, private saving, per capita GDP. Therefore, these all variables are considered as nonstationary at level I (0). The next step is to check whether the variables are stationary at first-difference. And the result shows that the null hypothesis of a unit

root test can be rejected at the first difference I (1). It means these variables are stationary at first difference.

To check the robustness of integral property of time-series data, the study furtehr applied another unit root tests i.e Ng-Perron test which is an extended version of PP test. The results of Ng-Perron test are presented in Tab 4.3. The results from the Ng-Perron test shows that the variables are non-stationary at level and becoming stationary at first difference. The null hypothesis of unit root can be rejected at the first difference both with trend and as well as without trend. These results prove that result of ADF test and Ng-Perron test are similar. All the five variables are nonstationary at level.

Table 4.3: Results of Ng-Perron test Statistics for Unit Root

Variable	**Ng-Perron test statistics (without trend)**				**Stationarity status**
	MZa	MZt	MSB	MPT	
LY	-17.92	-2.77	0.15	2.13	stationary
LFINDEV	1.89	2.44	1.28	130.65	Non stationary
LFDPTH	1.80	2.30	1.27	127.07	Non stationary
LGDS	0.29	0.19	0.65	29.49	Non stationary
LPS	0.56	0.47	0.81	44.31	Non stationary
Asymptotic Critical Value (Table 1, Ng-Perron, 2001)					
1%	-13.800	-2.58	0.17	1.78	
5%	-8.100	-1.98	0.23	3.17	
10%	-5.700	-1.62	0.27	4.45	
Variable	**Ng-Perron test statistics (with trend)**				**Stationarity**

	MZa	MZt	MSB	MPT	**status**
LY	0.27	0.014	0.533	66.27	Non stationary
LFINDEV	-3.98	-1.40	0.35	22.77	Non stationary
LFDPTH	-4.51	1.50	0.33	20.17	Non stationary
LGDS	-10.60	-2.27	0.21	8.71	Non stationary
LPS	-12.20	-2.39	0.19	7.88	Non stationary
Asymptotic Critical Value (Table 1, Ng-Perron, 2001)					
1%	-23.800	-3.420	0.143	4.03	
5%	-17.300	-2.910	0.168	5.48	
10%	-14.200	-2.620	0.185	6.67	

Variable	**Ng-Perron test statistics (with trend)**				**Stationarity status**
	MZa	MZt	MSB	MPT	
ΔLY	-19.51	-3.082	0.157	4.91	Stationary
ΔLFINDEV	-19.07	-3.087	0.161	4.77	Stationary
ΔLFDPTH	17.97	-2.996	0.166	5.07	Stationary
ΔLGDS	-19.55	-3.124	0.159	4.67	Stationary
ΔLPS	-19.88	-3.152	0.158	4.58	Stationary
Asymptotic Critical Value (Table 1, Ng-Perron, 2001)					
1%	-23.800	-3.420	0.143	4.030	
5%	-17.300	-2.910	0.168	5.480	
10%	-14.200	-2.620	0.185	6.670	

Source: Author's own calculation; Note: The results of Ng-Perron unit root test (without trend) also suggest that all the variables are stationary at first-difference.

After knowing the all variables in the model are in orders of one (i.e. I(1)) at level, the study precedes for examining the long-run relationship between financial depth, economic growth and savings. Since all the variables are nonstationary at level and endogenous in nature, we use Johansen Maximum Likelihood Procedure. The results of Johansen–Juselius cointegration tests are presented in Table 4.

The results of Table 4.4 indicates the presence of one cointegrating vector in all the three models, which implies that there do exits a long-run relationship between financial depth, economic growth and savings in India. Generally for getting number of cointegrating equations are sensitive to the selection of lags. In the present study, we select maximum of lag 1 in a VAR structure based on Akaike information criterion and Schwartz Bayesian criterion.

Table 4.4: Johansen Cointegration Test for three variables

Johansen Cointegration Test for LFINDEV, LY, LGDS					
Trace Statistics			Maximum Eigenvalue		
Null	alternative	Statistics	95% critical value	statistics	95% critical value
r = 0	r≥1	36.87*	29.79	28.84*	21.13
r ≤ 1	r≥2	8.03	15.49	7.24	14.26
r≤2	r=3	0.79	3.84	0.79	3.84
Johansen Cointegration Test for LFDPTH, LY, LGDS					
Trace Statistics			Maximum Eigenvalue		
Null	alternative	Statistics	95% critical value	statistics	95% critical value
r = 0	r≥1	37.42*	29.73	29.34*	21.13
r ≤ 1	r≥2	8.08	15.49	7.65	14.26
r≤2	r=3	0.43	3.84	0.43	3.84
Johansen Cointegration Test for LY, FINDEV, LPS					
Trace Statistics			Maximum Eigenvalue		
Null	alternative	Statistics	95% critical value	statistics	95% critical value
r = 0	r≥1	31.25*	29.79	25.45*	21.13
r ≤ 1	r≥2	5.80	15.49	5.69	14.26
r≤2	r=3	0.10	3.84	0.10	3.84

Source: Author's own calculation, * indicates 5% level of significance

There are three cointegration equations run between all variables. First, between LFINDEV, LY and LGDS, second between LDPTH, LY and LGDS and finally, between LY, FINDEV and LPS. The results of trace statistics and maximum likelihood Eigenvalue statistics are reported in Table 4.4. The result of trace statistics confirmed that the presence of one cointegration vector at 5 per cent level of significance in all three equations. The maximum Eigenvalue results also show the presence of one cointegration vector at 5 percent level of significance in all three models. The rational for choosing three equations is to check the robustness by altering the variables. In the first equation, which is the benchmark model, we examined the relationship between financial development, economic growth and savings and found long-run relationship among these variables. To check the robustness, in the second equation we replace the financial development index with a single financial development indicators (i.e. ratio of liquidity liabilities to the GDP (LLY), which is broadly considered as financial depth in the literature. We obtain the similar results. Finally, we examined this relation by taking the private savings variables and the result also concluded a long-run relationship between economic growth, financial development and private savings. Once we get the long-run relationship between the variables, the next step is to examine the long-run elasticity coefficients of all the three models. The results are presented in the following page.

The long run cointegrating equations can be written as:

$$LFINDEV = -3.2016 + 3.2015LGDS - 1.1272LY \qquad (4.22)$$

$$(2.9206) \qquad (-1.7192)$$

$$LDPTH = -1.500 + 3.413LGDS - 1.314LY \quad (4.23)$$

$$(2.969) \qquad (-1.922)$$

$$LY = 3.096 - 2.373LFINDEV - 0.917LPS \quad (4.24)$$

$$(-0.8027) \qquad (-1.689)$$

The‘t’ statistics values are presented in the parentheses. Equation 4.22 implies that 1 percent increase in the gross domestic savings declines the financial depth by 3.20 percent in the long run. It is also found a positive relationship between LY and LFINDEV. It means 1 percent increase in economic growth leads to 1.12 per cent increase in financial depth. The results are again same in second model (see equation 4.23. The result of 4.24 equations indicates that coefficient of financial development index is not statistically significant, whereas, 1 per cent increase in private savings boost the economic growth by 0.91 per cent. Since the study found a cointegration relationship among these variables, then the existence of Granger causality cannot be ruled out. The analysis of causality based on error-correction model is presented in Table 4.5. We included an error-correction term (ECM_1) lagged once in the tri-variate model explained from equation (4.19) to (4.21). The empirical results of Table 4.5 show that economic growth causes the financial development but the gross savings does not cause the financial development in short-run. The ECM_1 coefficient of column 1 shows that the error correction term is not statistically significant.

Table 4.5: Vector Error Correction Test for all Variables

Causality test between LFINDEV, LY,LGDS				
Independent Variables	**Dependent Variables**			
	∆FINDEV (1)	**∆LY (2)**	**∆LGDS (3)**	**∆LDPTH (4)**
∆FINDEV(-1)	-	-0.113 (0.676)	0.884**(2.391)	-
∆LY(-1)	0.339**(2.185)	-	0.915**(2.391)	0.478* (2.18)
∆GDS(-1)	0.020 (0.338)	-0.087(-1.382)	-	0.05 (0.07)
ECM-1	-0.0126 (-1.47)	-0.0357***(-3.902)	-0.0534***(-2.5239)	-0.0140 (-1.29)
F-statistics	2.00	4.56	3.14	2.68
R^2	0.18	0.33	0.25	0.22

Notes: Author's own Calculation, ***, **, * indicate 1%, 5% and 10% level of significance respectively.

The economic growth is also causing financial development and gross domestic saving as well as private saving at 5 percent level of significance shown by lagged economic growth variable. But financial development and total saving are not causing economic growth. The total saving is also not causing economic growth. Here the ECM (-1) term shows that the speed of adjustment towards long run equilibrium in the economy. The EC term shows that the economic growth and gross domestic savings are significant, but for

financial development/financial depth the coefficients are insignificance. The speed of adjustment for the long run equilibrium is very slow in the study period.

Table 4.6: Summary of Causality Test

Variables	**Causality**	**General conclusion**
$\Delta FINDEV$ (Dependent variable), ΔLY , $\Delta LGDS$	- No unidirectional causality from saving to financial development. -There is unidirectional causality from economic growth to financial development.	-Total saving does not Granger cause financial development. -Economic growth Granger causes financial development
ΔLY (Dependent variable), $\Delta FINDEV$, $\Delta LGDS$	-No unidirectional causality from financial development to economic growth detected. -No unidirectional causality from savings to economic growth detected.	-Neither financial development nor total savings Granger causes economic growth
$\Delta LGDS$ (Dependent variable), $\Delta FINDEV$, ΔLY	-There is unidirectional causality from financial development to total saving. -There is unidirectional causality from economic growth to total saving	-Financial development Granger cause saving. -Economic growth Granger causes savings.
$\Delta DPTH$ (Dependent variable), ΔLY , $\Delta LGDS$	-No unidirectional causality from saving to financial depth. -There is unidirectional causality from economic growth to financial depth.	-Total saving does not Granger cause financial depth. -Economic growth Granger causes financial depth

Source: Author's own calculation

Now Table 4.6 has summarized the direction of the causality between financial development, financial depth, economic growth, total savings, and private savings in India for the period 1970 to 2012.

First, there is causal flow from economic growth to financial development as well as financial depth but there is no causal flow from financial development and financial depth to economic growth. Whereas economic growth Granger causes the savings but the savings does not cause economic growth. And there is unidirectional causal flow from financial development to total savings and from financial development to private savings, but the reverse is not happening in Indian context. Hence the aforementioned results from both cointegration and VEC models conclude that though there exists a long-run relationship between financial depth, economic growth and savings, but in the short-run, we did not find any bi-directional causality among these variables. In the short-run economic growth causes financial development, economic growth and financial development cause the gross savings, but savings does not cause either financial development or growth.

4.5 **Conclusions**

This study has dealt with the economic estimation of long-run and causal relationship between financial depth, economic growth and savings in India. The chapter first constructed a financial development index using principal component analysis. Once the index is constructed, in the step, this chapter conducted the unit root tests for examining the stationarity property of time-series. The unit root results indicate that all the variables

are non-stationary in nature and hence open the question for checking the long-run relationship among these variables. By using the Johensen cointegration test, we found one long-run cointegrating vector among financial development, economic growth and savings. Then the study tried to examine the casual relationship among these variable in a VEC framework. The empirical results show the positive granger causality from financial development as well as financial depth and economic growth. Economic growth also causes positively to financial depth and financial development index. The results also indicate that the causality runs from financial development to savings and from economic growth to savings. But surprisingly both gross savings as well as private savings do not cause financial development. To sum up though some of the earlier studies in India found a bi-directional causality between economic growth and financial development by omitting important intermediary variables like savings. When we add gross savings as the intermediary variables and re-examined the relationship between financial development and economic growth, our findings give somewhat different results. The study, therefore, warns that any argument which says that financial depth of a country ultimately leads to economic growth should be treated with thrilling attention.

CHAPTER FIVE

CONCLUSIONS AND FUTURE RESEARCH

5.1 Introduction

This chapter summarizes the main findings of this study and draws out their implications for financial development in India. The conclusion links with the results and findings of the broad objectives of the thesis. The chapter starts with the main contribution of the study in section 5.2. Then in section 5.3, it summarizes the main findings that derived from the preliminary and econometrics results. Section 5.4 discussed about the scope for future research and final section 5.6 provides some policy implications.

5.2 Main contribution of the study

Most of the studies in the literature analyzed the linkage between financial development and economic growth and found ambiguity results. Some of the studies conclude that financial development causes economic growth, while, other group of economists discovered a bi-directional causality between economic growth and financial development. There were few studies which examined the linkage between these two variables in India. But most of the studies in literature ignored the importance of intermediary variables while testing the causality between financial development and economic growth. The study made an attempt to link the financial development with economic growth by considering the gross domestic savings as an intermediary variable. In a developing country like India, saving plays an important role for boosting the economic growth and financial development. Similarly, the growth in financial sector can also lead to mobilization of higher savings. To examine the relationship, this thesis looked at the long-run and casual linkage between financial development, economic growth and savings in India during 1970 to 2012.

This study first constructed a Financial Development Index using four financial development indicators through Principal Component Analysis (PCA). This study uses four indicator of financial development, which is different from other studies because most of the Indian studies either took a single financial development indicators or considered ratio of broad money to GDP as financial development. This study uses more recent time-series data for analyzing the tri- variate analysis. The study has used one of the recent Ng-Perron Unit root test in addition to existing ADF test, to check the stationarity property of time-series variables. This study also used both gross savings and private savings to examine the linkage between financial development and economic growth. To my knowledge, this is a new approach in the study of financial development and economic growth in the case of India.

5.3 Summary

This thesis uses time series data from the year 1970 to 2012 to examine the relationship between financial depth, economic growth and saving in India. To know the long run causal relationship between these variables present study applies Johansen cointegration technique and vector error correction model (VECM). This study taken four financial development indicators which are measures of financial development index; liquidity liabilities (LLY), credit to the private sector (CPS), commercial bank asset to the ratio of sum of commercial bank asset and central bank asset (BTOT) and bank branches (BB).

The study first examined the linkage between these variables through preliminary analysis. The preliminary results based on trend and growth patterns indicate that there

exists a direct relationship among these three key variables. The decadal growth rates of various indicators like economic growth, financial development and savings shows irregular trends. The results also further indicate that the growth of financial development and private savings are more or less around 4 per cent during the entire time periods. To sum up, the findings from chapter three reveals close relationship among these variables.

To make the correlated financial development variables dataset in to smaller dimension and for avoiding the problem of multicollinearity, the thesis constructed a financial development index using principal component analysis (PCA). This also helps to find out weightage for these variables. First, the study used ADF and Ng-Perron unit root tests for checking the stationarity of all the variables used in the model. The results of both the unit root tests show that all variables are nonstationarity at level and stationary at first difference. Since all the variables are nonstationary in nature, this provides a room for examining the long-run relationship among financial development, economic growth and savings. The results of the cointegration test suggest that there is at least one cointegration exists from each equation, which provides an evidence of long-run relationship among these variables. In the next step, the study goes for a causality test through a vector error correction framework. The results show that economic growth Granger causes financial development as well as financial depth but there is no causal flow from financial development and financial depth to economic growth. Similarly, the results also found that economic growth Granger causes total as well as private savings but the reverse is not occurred in case of India. The study also found a unidirectional causal flow from financial depth/financial development to total savings as well as private

savings. But there is no causal flow form savings to financial development or financial depth. Similarly, the results also demonstrate that economic growth Granger causes the savings. From the above summary, we came to a conclusion that though some of the earlier studies in India found a bi-directional causality between economic growth and financial development by omitting important intermediary variables like savings. When we add gross savings as the intermediary variables and re-examined the relationship between financial development and economic growth, our findings give somewhat different results. it can thus be concluded that for India the long run causality between financial development and economic growth and saving is not that much strong. Therefore adequate policy measures are required to ensure the link between these three variables.

5.4 Scope for the Future Research

The current study examined the linkage between financial depth and economic growth by considering savings as an intermediary variable. The results indicate that there exists a long-run relationship among these three variables. However, while testing the causality among these variables, we didn't get any strong evidence of causality running from savings to financial development. Even the study also does not find any casual relation runs from financial development and savings to economic growth. The results are somewhat surprising in nature. Since the study has only consider saving as the intermediary variable, so the further studies should examine the finance-growth nexus by taking other variables like investment, inflation, trade openness as an intermediary variables in India. Second, one of the major problems of the financial growth nexus is

how to obtain an appropriate measure of financial development. This study uses four banking sector related variables while constructing an index but ignored most of the variables related to financial markets. The financial markets also play a crucial role for country's financial development. Therefore, inclusion of financial markets variables like market capitalization ratio, value traded ratio etc. would help to construct better financial development index. Finally, a non-linear causality between financial development and economic growth can be examined using advanced econometrics techniques. Since there are many exogenous factors that affect the economic growth and financial development of a country, it is bound to have some non-linear relationship between these two variables.

5.5 Policy Recommendations

There are several policy implications which can be drawn from this thesis. Empirical findings suggest some policy implications with regard to the finance-growth nexus. This finding indicates that the financial development, economic growth and saving are moving together in long-run. But in the short-run the causality among these variables are very weak. Though economic growth causes the financial development, but financial development does not cause the economic growth. Theoretically financial development should cause economic growth, but it did not occur in case of India. Therefore, policy makers need to focus and pay more attention for promoting the banking sector development particularly in rural areas.

Indian financial system has experienced vast reforms since 1992s; there is still lack of well-developed financial institutions especially in rural India which can provide a huge

amount of financial instruments and that can allow a high degree of diversification. Because of this reason Indian financial system is still backward as compared to other developing countries. So the policy makers should give more attention towards the financial market and further construction of institutions in remote areas. The rural India people are not aware of this financial institutions and its instrument. To solve the problem the government and policy makers should provide proper guidance to the rural people and make them aware about the financial instruments of banks. Financial market includes both banking sector and capital market. The value of banking sector is more in India. So the policy maker should give important to the secondary market in developing country like India and this may help further economic growth.

In general, in order to promote the development of financial sector, which will leads to economic growth in future should have aim to enhance competition and allowing the wider scope of ownership in the market. For this reason the Indian government should improve the plans of financial reforms. The study also found that financial development causes savings rate of the country. But savings does not cause for financial development. This finding indicates that even if the savings (particularly the household savings) has increased in India, people are still following the traditional patterns of savings rather than opening any account in the bank or putting their savings in the capital markets. Therefore, reform plan should have the aim of constructing new institutions both in private and public sector, providing new incentives for investment.

BIBLIOGRAPHY

1. Abu-Bader, S., and Abu-Qarn, A., (2008), "Financial Development and Economic Growth: Empirical Evidence from Six MENA Countries", *Review of Development Economics,* vol.12, pp.803–817.
2. Achy, L., (2005), "Financial liberalization, savings, investment, and growth in MENA countries", *Research in Middle East Economics,* Vol. 6, pp. 67-94.
3. Al-Foul, B., (2010), "The Causal Relation between Savings and Economic Growth: Some Evidence from MENA Countries", The 30th MEEA Meeting Atlanta (Jan.2010).
4. Ang, J., B., (2007), "Financial Deepening and Economic Development in Malaysia", *A journal of applied economics and policy,* vol.26, pp.249-260.
5. Atje, R., and Jovanovic, B., (1993), "Stock Markets and Development", *European Economic Review*, Vol. 37, pp.632-640.
6. Bailliu, J., N., (2000), "Private Capital Flows, Financial Development and Economic Growth in Developing Countries", *Working Paper 00-16,* Bank of Canada.
7. Bandiera, O., Caprio, G., Honohan, G., Schiantarelli, F., (2000), "Does Financial Reform Raise or Reduce Savings?", *The Review of Economic and Statistics*, vol.82, pp.239-263
8. Bandiera, O., Caprio, G., Honohan, P., and Schiantarelli, F., (2000), "Does Financial Reform Raise or Reduce Saving?", *Review of Economics and Statistics*, Vol. 82, pp. 239-263.

9. Banerjee, S., S., and Ghosh, S., (1998), "Demand following and supply leading relationships: An empirical analysis for India", *MPRA Paper No. 22443*.

10. Baumol, W., J., Blackman, S, A, B., Wolff, E., (1991), "*Productivity and American Leadership: The Long View*", The MIT Press, Cambridge MA.

11. Beck, T., Levine R., Loayza, N., (2000), "Finance and the Sources of Growth." *Journal of Financial Economics,* vol.58, pp.261–300.

12. Beck, T., Levine, R., Loayza,N., (1999), "Finance and the sources of growth", *Journal of Financial Economics,* vol.58, pp.261-300

13. Bencivenga, V., R. and Smith, B., D., (1991), "Financial Intermediation and Endogenous Growth", *The Review of Economic Studies,* Vol. 58, pp. 195-209.

14. Blackburn, K., and Hung, V., T., Y., (1998), "A theory of growth, financial development and trade", Economica, vol. 65, pp.107-124.

15. Bose N., Corthen R., (1997), "Asymmetric information and loan contracts in a neoclassical growth model", *Journal of Money, Credit and Banking,* vol.29, pp. 423-439

16. Boulila, G., and Trabelsi, M., (2004), "The Causality Issue in the Finance and Growth Nexus: Empirical Evidence from Middle East and North African Countries", *Review of Middle East Economics and Finance,* vol.2, pp.123-38.

17. Caporale, G., M., Rault, C., Sova, R., and Sova, A., (2009), "Financial development an economic growth: evidence from ten new EU members", *DIW Berlin Discussion Paper 940.*

18. Caprio, G., J., (1998), "Banking on Crises: Expensive Lessons from Recent Financial Crises", *Policy Research Working Paper 1979,* Washington, D. C.: The World Bank, June.

19. Carroll, C., and Weil, D., N., (1994), "Carnegie-Rochester Conference Series on Public Policy", vol. 40, pp. 133-192

20. Chakraborty, I., (2008), "Does Financial Development Cause Economic Growth? The Case of India", *South Asia Economic Journal,* vol.11, pp.287-308.

21. Chakraborty, I., (2010), "Financial Development and Economic Growth in India: An Analysis of the Post-Reform Period", *South Asia Economic Journal,* vol.11, pp.287–308.

22. Chrisopoulos, D., K., & Tsionas, E., G., (2003), "Financial development and economic growth: evidence from panel unit root and cointegration tests", *Journal of Development Economics,* vol. 73, pp. 55 – 74.

23. Christopoulos, D., K., & Tsionas, E., G., (2004), "Financial development and economic growth: Evidence from panel unit root and cointegration tests", *Journal of Development Economics,* vol.73, pp.55-74.

24. Chukwu, J., O., and Agu, C., C., (2009), "Multivariate causality between financial depth and economic growth in Nigeria", *African Review of Money Finance and Banking*, vol. 36, pp. 7-21.

25. Deb, S., G., and Mukherjee, J., (2008) "Does Stock Market Development Cause Economic Growth? A Time Series Analysis for Indian Economy", *International Research Journal of Finance and Economics,* vol.21, pp.142-149.

26. Demetriades, P., and Luintel, K., (1996), "Financial development, economic growth and banking sector controls: evidence from India", *Economic Journal* vol.106, pp. 359-374.

27. Demetriades, P., Hussein, K., (1996), "Does Financial Development Cause Economic Growth? Time-series Evidence from 16 Countries'', *Journal of Development Economics,* vol.51, pp.387-411.

28. from Pakistan and China', *International Research Journal of Finance and Economics*, vol.14, pp. 212-231

29. Fry, M., J., (1997), "In Favour of Financial Liberalisation", *The Economic Journal*, Vol. 107 pp.754-70.

30. Gelb, A., H., (1989), "Financial Policies, Growth, and Efficiency." *World Bank Policy Planning and Research Working Paper No. 202(June).*

31. Ghirmay, T., (2004), "Financial Development, Investment, Productivity and Economic Growth in the U.S", *Southwestern Economic Review*, pp.23-29

32. Goldsmith, R., W., (1969) "*Financial structure and development*", CT: Yale University Press, New Haven.

33. Graff, M., (2003), "Financial Development and Economic Growth in Corporatist and Liberal Market Economies", *Emerging Markets Finance & Trade*, Vol. 39, pp. 47-69.

34. Greenwood, J. and Jovanovic, B., (1990), "Financial Development, Growth, and the Distribution of Income", *The Journal of Political Economy*, Vol. 98, pp. 1076-1107.

35. Greenwood, J. and Smith, B., D., (1997), "Financial Markets in Development, and the Development of Financial Markets", *Journal of Economic Dynamics and Control*, vol.21, pp.145-181.

36. Gries, T., Kraft, M., and Meierrieks, D., (2009), "Linkages between Financial Deepening, Trade Openness, and Economic Development: Causality Evidence from Sub-Saharan Africa." *World Development*, vol.37, pp. 1849-1860.

37. Grossman, G., Helpman, E., (1991), "Quality Ladders in the Theory of Growth", *The Review of Economic Studies,* Vol. 58, pp. 43-61.

38. Gurgul, H., and Lach, E., (2012), Financial Development and Economic Growth in Poland in Transition: Causality Analysis", *Journal of Economics and Finance*, vol.62

39. Halicioglu, F., (2007), "The Financial Development and Economic Growth Nexus for Turkey", *MRPA paper 3566,* University Library of Munich, Germany.

40. Halicioglu, F., (2007), "The Financial Development and Economic Growth Nexus for Turkey", *MPRA paper 3566.*

41. Hermes, N., & Lensink, R., (2003), "Foreign Direct Investment, Financial Development and Economic Growth", Journal *of Development Studies,* vol.40, pp.142-163.

42. Howitt, P., Aghion, P., (1998), "Capital Accumulation and Innovation as Complementary Factors in Long-run growth", *Journal of Economic Growth*, vol.3, pp.111-130.

43. Hsueh, S.-J., Hu, Y.-H., &Tu, C.-H., (2013), "Economic Growth and Financial Development in Asian Countries: A Bootstrap Panel Granger Causality Analysis", *Economic Modeling*, vol.32, pp.294-301.

44. Huang, H-C., Lin, S-C., (2009) "Financial Development On Growth Convergence", *Scottish Journal of Political Economy,* vol.57, pp.493-514

45. Hung, F., S., (2003) "Inflation, financial development, and economic growth", *International Review of Economics and Finance*, vol.12, pp.45-67.

46. Hung, F., S., (2009), "Explaining the nonlinear effects of financial development on economic growth", *Journal of Economics*, vol.97, pp.41–65.

47. Jalil, A., Ma, Y., and Naveed, A. (2008) ‘The finance-fluctuation nexus: Further evidence

48. Jalil, A., Ma, Y., and Naveed, A., (2008) “The finance-fluctuation nexus: Further evidence from Pakistan and China”, *International Research Journal of Finance and Economics,* vol.14. pp. 212-231.

49. Jalilian, H., and Kirkpatrick, C., (2002), “Does Financial Development Contribute to Poverty Reduction?”, *The Journal of Development Studies,* vol.41, pp.636-656.

50. Japelli, T., and Pagano, M., (1994), “Saving, Growth, and Liquidity Constraints”, *The Quarterly Journal of Economics,* Vol. 109, pp. 83-109.

51. Kaboski, J., and Townsend, R., (2011), “A Structural Evaluation of a Large-Scale Quasi-Experimental Microfinance Initiative,” *Econometrica,* vol.79, pp.1357–1406.

52. Kaldor, N., (1956), “Alternative Theories of Distribution”, *The Review of Economic Studies,* Vol. 23, pp. 83-100.

53. Khan, M., A., Qayyum, A., and Saeed, A., S., (2005) ‘Financial development and economic growth: the case of Pakistan”, *The Pakistan Development Review*, vol.44, pp.819-837.

54. Kilimani, N., (2009), “The Link between Financial Development and Economic Growth in Uganda: A Causality Test”, The Centre for the Study of African Economies (CSAE) Conference, 22– 24th March.

55. Kindleberger, C.P., (1978), *“Manias, Panics and Crashes”,* Basic Books, New York.

56. King, R., Levine, R., (1993), “Finance, entrepreneurship and growth: theory and evidence”, *Journal of Monetary Economics,* vol. 32, pp.513–542.

57. Levine, R., (1997), "Financial Development and Economic Growth: Views and Agenda", *Journal of Economic Literature,* vol.35, pp.688-726.

58. Levine, R., Zervos, S., (1996), "Stock Markets, Banks, and Economic Growth", *The American Economic Review,* Vol. 88, pp. 537-558.

59. Lewis, W., A., (1955). "*The Theory of Economic Growth*", George Allen & Unwin, London.

60. Loayza, N., V., Ranciere, R., (2006). "Financial Development, Financial Fragility, and Growth", *International Monetary Fund Working Paper*, Washington, DC, USA.

61. Lucas, R., (1988), "On the mechanics of economic development", *Journal of Monetary Economics,*vol.22,pp.3-42

62. McKinnon, R., (1973), "*Money and Capital in Economic Development*", Washington DC, the Brookings Institution.

63. Mero, K., (2004), "Financial Depth and Economic Growth the Case of Hungary, The Czech Republic and Poland", *Acta Oeconomica,* Vol. 54, pp. 297–321.

64. Modigliani, F., (1986), "individual thrift, and the wealth of nations", *American Economic Review,* vol. 76, pp.297–313

65. Obstfeld, M., (1994), "Risk-Taking, Global Diversification and Growth", *American Economic Review,* vol.84, pp.1310-29.

66. Odhiambo, N., M., (2004a), "Is Financial Development Still a Spur to Economic Growth? A Causal Evidence from South Africa', Savings and Development", 28(1), 47-62.

67. Odhiambo, N., M., (2007), "Financial depth, savings and economic growth in Kenya: A dynamic causal linkage", *Economic Modelling,* vol. 25, pp. 704–713.

68. Odhiambo, N., M., (2007), "Supply-leading versus Demand-following Hypothesis: Empirical Evidence from Three SSA Countries", *African Development Review*, vol.19, pp.257-280.

69. Odhiambo, N., M., (2007), "Supply-leading versus demand-following hypothesis: empirical evidence from SSA countries", *African Development Review*, vol.19, pp.257 - 280.

70. Odhiambo, N., M., (2010), "Finance-Investment-Growth Nexus in South Africa: An ARDL-bounds Testing Procedure", *Economic Change and Restructuring*, vol. 43, pp.205–219

71. Pagano, M., (1993), "Financial markets and growth: An overview", *European Economic Review*, vol. 37, pp.613-622.

72. Patrick, H., (1966), "Financial Development and Economic Growth in Underdeveloped Countries", Economic *Development and Cultural Change*, vol.14, pp.174-189.

73. Pradhan, R., P., (2009), "Finance Development, Growth, and Inflation: The Trilateral Analysis in India", *Journal of Economic and Social Research*, Vol. 13, pp. 45-59.

74. Rajan, R., J., & Zingales, L., (1998), "Financial Dependence and Growth", *The American Economic Review*, Vol. 88, pp. 559-586.

75. Ray, S., (2013), "Does Financial Development Promote Economic Growth in India?", *International Journal of Economic Practices and Theories*, Vol. 3, pp. 2247-7225.

76. Robinson, J., (1952), "*The Generalisation of the General Theory in: The Rate of Interest and other Essays"*, McMillian, London.

77. Romer, P., (1986), "Increasing returns and long-run growth", *Journal of Political Economy,* vol.94, pp.1002–1037.

78. Romer, P., (1990), "Endogenous Technological Change", *Journal of Political Economy,* vol.98, pp. S71-S102.

79. Roubini, N. and Sala-I-Martin, X., (1992), "Financial repression and economic growth", *Journal of Development Economics,* vol.39, pp.5-30.

80. Saint-Paul, G., (1992), "Technological choice, financial markets and economic development", *European Economic Review,* vol.36, pp.763-781.

81. Samuelson, P., A., Modigliani, F., (1966), "The Pasinetti Paradox in Neoclassical and More General Models", *The Review of Economic Studies*, Vol. 33, pp. 269-301.

82. Sarkar, A., (2013), "Financial intermediation and economic growth: the post-liberalization Indian experience", *Macroeconomics and Finance in Emerging Market Economies,* vol.6, pp. 280-294.

83. Schmidt-Hebbel, K., Serven, L., (2000), "Does income inequality raise aggregate saving?", *Journal of Development Economics*, Vol. 61, pp. 417–446

84. Schumpeter, J.A., (1912), *"Theorie derWirtschaftlichen Entwicklung [The Theory of Economic Development]*". Dunker & Humblot, Leipzig, (Translated by Redvers Opie, Cambridge, MA, Harvard University Press, 1934)

85. Shan, J., and Jianhong, Q., (2006), "Does Financial Development 'Lead' Economic Growth? The Case of China", *Annals of Economics and Finance,*vol.1, pp.197–216

86. Shan, J., and Morris, A., (2002) "Does financial development lead economic growth?", *International Review of Applied Economics,* Vol. 16, pp. 153–168.

87. Shan, J., Z., Sun, F., and Morris, A., (2001), "Financial development and economic growth", *Review of International Economics,* vol.9, pp.443-454.

88. Shaw, E., (1973), "*Financial Deepening in Economic Development*", Oxford University Press, London

89. Singh, A. and Weiss, B., (1998), "Emerging Stock Markets, Portfolio Capital Flows and Long-term Economic Growth: micro and macroeconomic perspectives", *World Development,* vol.26, pp. 607-622.

90. Singh, T., (2009) "Does domestic saving cause economic growth? A time-series evidence from India", *Journal of Policy Modeling.*vol.32, pp.231-253.

91. Sinha, D., and Macri, J., (2001) "Financial Development and Economic Growth: The Case of Eight Asian Countries", *Economia Internazionale*, vol.54, pp.219 - 234.

92. Solow, R., (1956), "A contribution to the theory of economic growth", *Quarterly Journal of Economics,* vol. 70, pp. 65-94.

93. Stern, N., H., (1989), "The Economics of Development: A Survey", *Economic Journal*, vol.99, pp. 597- 685.

94. Stieglitz, J., E., (1998) "Towards a New Paradigm for Development: Strategies, Policies, and Processes", the *1998 WIDER Annual Lecture, Helsinki, January 1998, reprinted Chapter 1 in The Rebel Within, Ha-Joon Chang (ed.),* London: Wimbledon Publishing Company, 2001, pp. 17-56.

95. Stiglitz, Joseph (1994), "The Role of the State in Financial Markets", *Proceedings of the World Bank Annual Conference on Development Economics, 1993: Supplement to World Bank Economic Review and World Bank Research Observer*, vol.1, pp. 19-62.