IMPACT OF FINANCIAL LIBERALISATION ON INDIA

A Thesis Submitted to the Goa University for the Award of the Degree of

DOCTOR OF PHILOSOPHY

in

ECONOMICS

By
VISHAL RAMA CHARI

Goa University
Taleigao Goa
2017

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Research Guide
Dr. Pranab Mukhopadhyay
Professor
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CERTIFICATE

This is to certify that **Mr. Vishal Rama Chari** has worked on the thesis entitled **'Impact of Financial Liberalisation on India'** under my supervision and guidance. This thesis being submitted to Goa University, Taleigao Plateau, Goa, for award of the degree of Doctor of Philosophy in Economics is a record of an original work carried out by the candidate himself and has not been submitted for the award of any degree, diploma, of this or any other University.

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DECLARATION

I declare that the present thesis entitled **'Impact of Financial Liberalisation on India'** is a consolidation of an original work which has been carried out by me under the guidance of **Dr. Pranab Mukhopadhyay** at the Department of Economics, Goa University, and that the same has not been submitted to any other University or Institution for the award of any other degree, diploma or other such title.

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ACKNOWLEDGEMENT

First and above all, I praise God, the almighty for providing me this opportunity and granting me the capability to proceed successfully. This thesis appears in its current form due to the assistance and guidance of several people. I would therefore like to offer my sincere thanks to all of them.

I take this opportunity to express my profound gratitude and deep regards to my guide, Dr. Pranab Mukhopadhyay for his exemplary guidance, monitoring and constant encouragement throughout the course of this thesis. The blessing, help and guidance given by him time to time shall carry me a long way in the journey of life on which I am about to embark.

I sincerely appreciate the Comments, advice, suggestions and encouragement rendered by Prof. Amit Bhaduri, Professor Emeritus JNU.

I am extremely grateful to the members of the Faculty Research Committee

Dr. N. Shyam Bhat (Dean), Dr. K. Subhash (Department of Commerce), Dr. P. K. Sudharshan and Dr. Silvia Noronha (Department of

Economics) for their aspiring guidance, invaluably constructive criticism and friendly advice during the research work.

I acknowledge creative suggestions by the participants at the 50th Annual Conference of the Indian Econometric Society at IGIDR (December 2013), 51st Annual Conference of the Indian Econometric Society at Panjabi University (December 2014), 52nd Annual Conference of the Indian Econometric Society at IIM Kozhikode (January 2016) and the Young Economics School Seminar at Hyderabad University (March 2012).

I also express my sincere thanks to the Prof. Y.V. Reddy and Prof. Anjana Raju (Department of Commerce) for providing access to CMIE database.

I also express my sincere thanks to the administrative staff of the Department of Economics. The library staff of Goa University was always ready to extend their helping hand.

I warmly thank and appreciate my parents and family for support in completing this thesis.

Vishal Rama Chari
July, 2017

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Chapter I: Introduction

1.1 Background of the Study:

In the post-independence era, the Indian financial sector evolved in two distinct phases; these phases could be broadly categorized into pre-reform and post-reform. The pre-reform period of 1947-1991 could be further divided into two, from 1947 to 1968 in which the central bank (the Reserve Bank of India) sought to consolidate its role as an agency in-charge of supervising and controlling the monetary and financial system in India. The second phase starting from 1969 to 1990 is known as the period of nationalisation of commercial banks. The nationalisation gave the Government and the RBI a direct control over banking system. A significant period of financial reforms started from 1991. The objective of financial liberalisation was to ensure that the financial services industry acquires more operational flexibility and financial autonomy, with a view to enhancing efficiency, profitability and productivity. The course of liberalisation involved various measures like deregulating the interest rates, allowing financial innovations, reducing subsidized credit, easing the entry of private sector into various segments of the financial sector and greater freedom for international capital flows.

Financial liberalisation has been implemented in many countries with the aim to enhance economic growth. After the devastation of World War II, the post war recovery was rapid in many countries mainly the United States of America, United Kingdom, Japan and Germany (Demirgüç-Kunt & Maksimovic, 2002; Levine, 1999, 2002). The expansion in the manufacturing sector in these economies created demand for finance. The United States of America and the United Kingdom developed themselves through equity markets, but in case of Japan and Germany, finance was provided only through banks. These economies experienced a high rate of savings and investment, during this period (Demirgüç-Kunt & Maksimovic, 2002; Levine, 2002).

In contrast, many economies which were colonies and gained independence in post-World War II, tried to establish and rebuild themselves as closed economies like India. Drained of accumulated capital and wealth by their colonial masters, these economies had to start building their countries from a primitive stage. India relied on a period of planned investment for development due to limited resources at its disposal. The saving and investment during 1950-51 were estimated to be around 5.5 percent of the national income. The per capita income was low and there was widespread poverty, lack of primary resources like power, transportation, communication, cement and finance made it difficult for rapid investment in India (Mohan, 2008).

1.1.1 Financial System in India:

The financial system in India during British era was largely characterized by the existence of many private banks. The banks functioned at the local level with small private shareholding and many of them failed during the inter war and post war period (Mohan, 2008). These banks were functioning under the Reserve Bank which was established as a central bank with the passing of the Reserve bank of India Act, 1934 to regulate and supervise the banking system in India, along with the companies Act, 1913.

The banking system in India till today sees the existence of the institutional and non-institutional finance simultaneously. The non-institutional banking in India was mainly in rural areas in the form of indigenous bankers and moneylenders who remained isolated from the institutional part of the system. The co-operative movement started as early as 1901 in India. Co-operative credit was only one percent of the institutional finance during the independence period. The cooperative movement in India was successful only in a few regions (Pathak, 2011).

The Indian economy in early years of independence from 1947 to 1967 faced several challenges; the underdeveloped nature of the economy with an enormous size of the rural sector. In 1955, the Imperial Bank of India was transformed into State Bank of India and it started massive expansion both geographically and in areas not catered for by banks. Proactive measures undertaken by banks like credit guarantee and deposit insurance helped in promoting the spread of credit and savings to the rural areas. An expansion of State Bank of India and its associates was not sufficient to meet the requirement of the economy; many of the banks during that period were under the control of business houses (Pathak, 2011).

The next important phase for Indian Banking and financial system was the period from 1967 to 1991; this period saw an increase in social control on banking along with nationalisation of 14 banks in 1969 and an additional six banks in 1980 (Pathak, 2011). The Lead Bank Scheme initiated during that time helped bank branch expansion. This period was marked by a rapid expansion of bank branches across the country, helped to channelize the monetary transmission wide across the economy (Chandrasekhar & Ghosh, 1999). However, the provisions which helped the banking system to spread institutional credit and foster the financial system also led to distortions. The nationalisation came with administered interest rates and directed lending. The social control limited operational flexibility and commercial banks had to open bank branches which were unprofitable (Chand & Puri, 1983).

The 1990s crisis forced the Indian Economy to liberalise the financial sector. The primary objective of financial reform was to provide a strong and flexible banking system. There was a strengthening of the regulatory and supervisory norms for greater accountability and market discipline. The Reserve Bank of India made sustained efforts towards implementation of the international standards in areas such as risk management, corporate governance, supervision, prudential norms and transparency. The deregulation of the banking sector enhanced competition from new private sector banks as well as challenges from the global bankers (Ghosh, 2005).

Pre-reform period was looked at as a period of financial repression by some like Shaw & Mckinnon (1973). Others felt that the social control of banks was needed in India at that time to put banking sector on track for faster economic growth. Sen and Vaidya (1997) found that in the period between 1969 and 1994 there was substantial increase in the deposits mobilized. The nationalisation had developed trust among the depositors, it was able to channelize the deposits through the organised sector, and it enhanced public confidence in the financial system.

1.1.2 Finance and Growth: International Evidence:

The effect of Financial Liberalisation on economic growth has been of interest for a long time. Schumpeter (1934) suggested that financial transactions will take central stage in economic growth, and more importantly finance and inventions would be central for the capitalist engine of growth. In the 1960s and 1970s the financial system was highly controlled by central authorities, by setting of interest rate, high reserve requirements and quantitative restrictions on credit allocation. Financial repression as a measure of controlled development was challenged by Goldsmith, (1969) and later by McKinnon, (2010) and Shaw (1973). They argued that it led to low savings, low investment and credit rationing. King & Levine, (1993) did an extensive study on the association between financial development and economic growth an analysis of 80 countries for the period 1960 to 1989. A number of studies followed (Beck, Levine, & others, 1999; Rajan & Zingales, 1996) but they analyzed the relationship between financial development and growth.

Some authors suggest that there are differences between financial liberalisation and financial development. Financial liberalisation is not the by-product of financial development but it is an exogenous event which could enhance financial development (Bonfiglioli & Mendicino, 2004). A number of studies did time series analysis for a large group of countries to find relationships between financial

liberalisation and growth (Bekaert, Harvey, & Lundblad, 2002; Bonfiglioli, 2008; Borensztein, De Gregorio, & Lee, 1998; Levine, 2001) Financial liberalisation seems to have stimulated savings and investment leading to growth (Laeven, 2003). It leads to efficient allocation of resources by minimizing the control of central bank and government. Other benefit of financial liberalisation are availability of finance for technological development (Gallego & Loayza, 2001; Ozdemir & Erbil, 2008) and reduced liquidity risk (Levine, 1997).

1.1.3 Finance and Growth: Indian Evidence:

In India there are a number of studies on the relation between reforms and economic growth. (Acharya, Amanulla, & Joy, 2009; Chakraborty, 2008; Mohan, 2008) studied financial reforms and its effect on growth using time series analysis for country level data. (Ahluwalia, 2000; Dholakia, 2009; Kalirajan, Shand, & Bhide, 2008) did state level studies. Pal & Vaidya, (2009) have demonstrated that the reform in banking sector has lead to regional imbalance. The bank penetration does not explain the end use of credit for development of the economy. In India it is claimed that its pace in economic growth happened due to the financial liberalisation in early 1991, and this increased income has fueled demand for financial assets, financial resources and financial markets (Rajan and Zingales 2003).

1.2 Research Gap:

The existing studies on India have concluded mixed results on the effect of financial liberalisation on growth. The effect of financial liberalisation has been found to depend on several factors, including the legal setup and initial level of development in the country. These studies have used different techniques to analyse the effect of financial liberalisation. However, there is a lack of comparative studies on pre and post-liberalisation period with time series data. Secondly the effect of financial liberalisation has been undertaken without testing for causality. Most of the studies used banking and stock market development as a proxy for financial development. There is a need to understand use of finance specially bank credit in India and whether it is investment enhancing or not. Another important gap is an understanding of the effect of financial liberalisation on different sectors in the economy such as agriculture, industrial and services.

In order to address these research gaps we undertake our study with the objectives as listed below.

1.3 Objectives:

The objectives of this study are to:

1. Study the impact of financial liberalisation on economic growth comparing pre and post-liberalisation period in India.
2. Understand financial liberalisation and cross country differences.

3. Understand the use of finance at the firm level and its impact on the growth of the Indian economy.
4. Analyse the impact of financial developments on the growth of various sectors (Industry, Agriculture and Services).
5. Understand the level of financial development and regional disparities among Indian States.

Our study proposes to address these objectives using a chapter scheme as listed below.

1.4 Chapter Scheme:

Chapter I Introduction

In this introductory chapter, we look at financial system in India and the effect of financial liberalisation on growth briefly. The history of financial system since independence underwent a radical change from a controlled environment to liberalisation of financial system in 1991. This chapter further identifies the research gaps by scrutinizing the Indian and international evidences and sets out the objectives of the study.

Chapter II Financial Liberalisation Debate

This chapter provides a systematic analysis of empirical literature on impact of financial liberalisation and financial development on economic growth. We summarize how studies have captured the effect of financial liberalisation since no direct measures are available to analyze it. Some of the literature establishes positive links between financial liberalisation and economic growth, banking efficiency, growth in stock market and industrial productivity. However some studies have shown concerns for agriculture sector and rural economy, which probably may find it difficult to get credit with banks having opportunities to invest in more remunerative ventures. We conclude that it is difficult to separate the effect of the financial liberalisation and banking development as technological advancement happened in same period.

Chapter III Data

In this chapter we discuss the details of the datasets used in the study, its sources and how data is screened to meet the requirement of the study. In order to examine the first objective of our study where we look at international experience of financial liberalisation we use a cross country dataset from World Bank data repository (1970 to 2012). In order the other objective of studying the regional and sectoral effect of the financial liberalisation we use a country level dataset of 21 Indian states (1971 to 2013). Then for the third part of our analysis on firms we use the Prowess database of Centre for Monitoring of Indian Economy (CMIE) for 7007 non financial industrial units in India (1998 to 2015).

Chapter IV Methodology

The methodology and data analysis techniques are discussed in this chapter. The dynamic nature of the datasets used for this study allows us use advanced econometric techniques. Most of the models used in our study are panel regressions. In addition to the normal fixed effect and random effect models we have used the quantile panel techniques provided in R-Stat. To study the regional effect of financial liberalisation we used panel quantile regression. To our knowledge this is the first study to make use of panel quantile regression to examine the effect of financial liberalisation in India. We also used GMM (Generalized Method of Movements) dynamic panel data techniques to analyse the effect of financial liberalisation on industrial accumulation of capital.

Chapter V Financial liberalisation and cross country analysis

The received international evidence has shown mix results while studying relationship between financial liberalisation and economic growth. The cross country analysis is undertaken with a panel Granger causality test to determine the causation between financial liberalisation and economic growth in this chapter.

Chapter VI Financial liberalisation and Indian Economy: Regional analysis

In this chapter we highlight the regional effect of financial liberalisation on the Indian economy. It gives an opportunity to assess the effect of financial liberalisation on the three broad sectors – agriculture, industry and services. Since

the debate of financial liberalisation revolves around the positive impact of it on developed region and negative impact on the rural economy. We examine this hypothesis using panel quantile regression for 21 Indian states and the results are quite surprising. We also scrutinize the effect of financial liberalisation on the three sectors (agriculture, services and industry).

Chapter VII Financialisation and its impact on accumulation of physical capital

In this chapter we examine the accumulation of capital through financial borrowing by non financial industrial units in India using CMIE Prowess dataset. The received theory states that there is a positive impact of financial liberalisation on industrial growth. We use the Indian database to test this hypothesis with a special focus in capital accumulation.

Chapter VIII Financial development in Goa

We deviate in this chapter from the rest of the study, to examine a small state of Goa – partly because of the lack of literature in this state on the financial system. The financial system in Goa is different from rest of the country, its high per capita deposits, lowest credit deposit ratio in country and 100 percent financial inclusion brings our attention to study it.

Chapter IX Conclusion

In this chapter we summarize our findings and our contribution to the financial liberalisation literature. Our cross country analysis showed uni-directional causality from economic growth leading to financial liberalisation but no evidence showing financial liberalisation leading to enhanced economic growth. The regional study using panel quantile regression highlights that states which are at a lower quantile (below 25^{th}) of economic growth have positive and significant impact of financial liberalisation while those that are at a higher quantile are not being influenced by financial liberalisation. We conclude that there could be the possibility of a threshold effect. The firm-level study shows that increased borrowing by the firms in era of financial liberalisation is not influencing capital formation. However, there is positive and significant effect of the borrowings on financial investments and on inventories.

We discuss the financial liberalisation debate in the next chapter. We look into international evidences of impact of financial liberalisation. We also examine the literature studying India.

Chapter II: Financial Liberalisation Debate

2.1 Introduction:

The financial sector plays a critical role in achieving sustained economic growth in any economic system with its enhanced size and structure. This role of the financial sector is augmented by financial liberalisation which leads to the increase in size of total investable funds and improvement in efficiency of the capital (Levine 2001). There has been a long argument on the causality between the financial development and economic growth. According to the demand led hypothesis, growth comes first, while the development of the financial sector follows as a result of the growing demand for financial service and financial instruments. According to the supply-led growth hypothesis, innovation and factor accumulation requires a well developed financial sector which in turn leads to growth. The growth theories advocated by the classical economists, ignored the role of finance in explaining economic growth and real factors were considered as the only factors influencing growth. The importance of the financial sector in the growth process emerged as a major point of policy emphasis in the early 1970s. The relationship between financial development and economic growth received a new impetus from the rapidly growing 'endogenous growth' literature, which provided a natural framework for the integration of the financial system into the

theory of growth. Pagano (1993) analysed three basic parameters of financial development

$$g = A \text{ Ø } s - \delta \qquad 2.1$$

in equation (2.1) where 'g' is the long-run growth rate. 'A' is the social marginal productivity of capital. 'Ø' is the proportion of saving channelled to investment. 's' is the saving rate 'δ' is the rate of depreciation. Financial intermediation implies absorption of a fraction (1-Ø) of resources by banks and other financial institutions by way of intermediation cost. The higher the intermediation cost, the lower is the fraction (Ø) of saving that is transformed to investment. The role of financial development is to minimise this intermediation cost and increase the resources available for the investment.

The discussion on Financial Liberalisation and financial development on economic growth goes back to many years. Schumpeter (1934), argued that financial transactions will take central stage in economic growth. He expected finance and inventions to be of central importance for the capitalist engine of growth. In the 1960s and 1970s, the financial system was highly controlled all over the world by central authorities, by setting of interest rate, high reserve requirements and quantitative restrictions on credit allocation in countries which went for financial liberalisation later 1970s. Financial repression as a mechanism of controlled development was challenged by many like Goldsmith (1969) and later by

McKinnon (1973) and Shaw (1973). They argued that such measures led to low savings, low investment and credit rationing. The period from 1973 to 1993 has seen limited research on this topic until a paper by King and Levine (1993b) who examined the relationship between financial development and economic growth. They used data for 80 countries for the period 1960 to 1989. A number of studies followed (Rajan and Zingales 1996; Beck et al.1999) they examined financial development and growth relation. Literature during 1990's seems confusing between the financial development and financial liberalisation. Ghosh (2005) argues that developing economies can achieve financial development through controlling financial system and without going for liberalisation. The developing economies will be able to channelize the investment needs in a controlled system into areas that best meet the economy's needs. Borensztein et al. (1998); Levine (2001); Bonfiglioli (2008); and Bekaert et al. (2002) studied panel analysis to find the relationship between financial liberalisation and growth. Financial liberalisation leads to growth by stimulating savings and investment. It leads to efficient allocation of resources by minimizing the control of central bank and government. Other benefit an economy realizes because of financial liberalisation are availability of finance for technological development (Ozdemir and Erbil 2008; Gallego and Loayza 2001) and reduced liquidity risk (Levine 1997)

In India there are a number of studies that document the relation between economic reforms and economic growth. Mohan (2008), Acharya et al. (2009), Chakraborty (2008) studied financial reforms and its effect using time series

analysis for country level data. Kalirajan et al. (2008), Ahluwalia (2000), Dholakia (2009) concentrated on regional study. However, these studies do not examine whether financial liberalisation has had any impact on regional growth. Pal and Vaidya (2009) have demonstrated that the reform in banking sector has lead to regional imbalance. They studied geographical penetration and demographic penetration using number of bank branches in per 1000 sq km and number of bank offices per 10 lakhs people respectively. Unfortunately bank penetration does not explain the end use of credit.

If we compare Indian economy with the USA economy we will notice that America's development led to financial liberalisation. It is the exponential demand for financial resources and constrained supply within the economy that lead to the liberalisation. The USA attracted financial resources from Europe in early 1970's. Financial development was triggered by economic growth. In case of India according to one view it was reverse way, much of its pace in economic growth happened due to the financial liberalisation in early 1991, and this increased income has fueled demand for financial assets, financial resources and financial markets (Rajan and Zingales 2003).

2.2 Financial liberalisation/ Development and Economic Growth:

Initial studies by Goldsmith (1969) and later by McKinnon (1973) and Shaw (1973) discussed the importance of the financial openness that will help economies

to achieve faster economic growth. An intervention of the fiscal and monetary bodies in the financial system for regulating interest rates, the obligation to maintain high reserve requirements and other qualitative and quantitative restrictions on functioning of financial system, was a common practice in most of the countries prior to financial liberalisation, particularly in developing countries. The critics argued that too much of state control will lead to poor savings, rationing of credit and low investments. Goldsmith (1969) analyzed correlation between financial development and economic growth using data for thirty-five countries for the period 1860 to 1963. The study suffered due to authenticity of data and methodology. Similar studies were undertaken by numerous researcher using cross country, firm level and industry level panel datasets (Rajan and Zingales 2003; Bekaert et al. 2006; Levine 1997; Borensztein et al. 1998). However, these studies are subject to important data limitations. The data used by the most of the cross country studies are estimates. As a result of these data limitations, there is no strong agreement concerning the effect of financial liberalisation on growth. King and Levine (1993a) show that the level of financial development is a good at predicting the long-run economic growth, productivity and capital accumulation. One of the most essential national policy decisions has been the financial liberalisation. There are well documented studies which have shown evidence, that financial liberalisation is important for countries economic growth prospects.

Financial liberalisation may contribute to increased growth in many ways. The improved risk sharing will lower the cost of capital. It will also lead to investment in projects that are riskier and have a higher expected returns (Obstfeld and Rogoff 1994). On the other hand it may reduce precautionary savings and low growth (Devereux and Smith 1994). Opening capital markets may lead to more efficient markets, and usually increase financial development. There is large literature showing how improved financial intermediation can increase growth (Greenwood and Jovanovic 1990; Bencivenga and Smith 1991; Bencivenga et al. 1995). The implementation of enhanced policies and development of institutions permits economies to benefit from frontier technology (Klenow and Rodriguez-Clare 1997), same way financial liberalisation permit economies to take advantage from frontier financial technology leading to increased growth. While there is substantial research on the relation between financial development and economic growth, the literature lacks detailed analysis of the effects of the financial liberalisation on economic growth.

Levine and Zervos (1996) introduced a market integration measure in their cross sectional growth regression for the period 1976 to 1993, but did not clearly indicate how the measure relates to financial liberalisation. Bekaert et al. (2002) and Henry (2000) state that financial liberalisation have tendency to reduce the cost of capital and increase investment. Sachs et al. (1995) find that one of the openness variables most significantly affecting economic growth is the black market exchange rate premium, but this measure is probably correlated with the

existence of capital controls (Bekaert 1995), and hence related to capital market liberalisation. Finally, Bekaert et al. (2001) establish that economic growth increased after liberalisation in 30 emerging markets, even when controlling for a number of standard determinants of economic growth.

Another important aspect of the financial liberalisation is the growing role of the equity markets. The stock market has shown tremendous growth and financial liberalisation has played substantial role in it (Beck and Levine 2004; Arestis and Demetriades 1997; Singh 1997a). Though there is growth in equity issues and stock markets a very minimalistic attention is paid to it by the proponents of financial liberalisation. Fundamentally, because the contribution of the equity issues in investment in many countries is limited, the flow of fund for investment channelized through stock market is very small. As a result, equity market development are considered as small fraction of the total investment in many countries and studies have ignored this part of market completely (Fry 1997).

Equity markets play an important role in financial liberalisation mainly due to three reasons. First, countries which are highly liberalized will prefer investment through equity issues rather than through the debt market. Second, stock markets are important link to attract international investors and give access to emerging market economies. Third, implicitly or explicitly, reforms in stock market will come as a part of financial liberalisation package. The increase in the resources

available for investment due to stock market capitalization and stock turnover will help economic growth in country. The high level of liquidity in equity markets helps in diversifying the risk and increases efficiency with which capital is allocated. Thus, highly liberalized equity market will attract the resources from domestic and foreign investors and promote economic growth. The extent to which equity market in developing economies are liberalized will depend on the institutional factors such as contract enforcement and transparency, legal setup of the country and level of development of debt market. The equity markets in many developing economies are not able to calculate risk accurately and suffer from excessive volatility, lack of transparency, and insider trading (Singh 1997). This risk and volatility limits the role of equity markets, which financial liberalisation entails is necessarily good for growth. Chandrasekhar and Ghosh (1999) states equity markets reforms should not target only enhanced investments, they should partly insulate the market from external shocks.

Bekaert et al. (2005) dispute the claim that equity market liberalisation enhances growth but it is largely dependent on the financial structure of the economy. The studies have shown that country characteristics are important factors which influence the end results of the financial liberalisation. The studies in particularly by, Edwards (1998), Arteta et al. (2001), Bekaert et al. (2005) Alfaro et al. (2008), and Papaioannou (2009) suggest, strong and positive relationship between financial liberalisation and degree of economic development within the country. The developing economies will able to take advantage of financial liberalisation

once countries have developed their domestic financial markets. Financial liberalisation in many developing countries did not translate into an increased growth, net capital inflows and investment. A study by Henry (2006) states that liberalisation increases growth and investment, but that the effect of liberalisation on growth is temporary.

The studies by (Diaz et al. 1985), Kaminsky et al. (1999) and Kose, et al. (2003) concluded that financial liberalisation leads to increase in equity market volatility. The study by Bekaert et al. (2006) show that financial liberalisation especially reforms in equity market reduce consumption volatility. The increase in volatility in both consumption and capital flows are caused by the poor institutional setup of the country and its underdeveloped financial markets Bekaert et al. (2006) and Fernando Broner (2006). Using large data Reinhart and Rogoff (2009) showed country characteristics influenced frequency of crises. However Rancière et al. (2008) Prasad et al. (2007), Kose et al. (2009), and Obstfeld (2009) empirical evidence on countries which are prone to crises have realized faster economic growth than countries which followed a more careful reforms strategy. A large number of studies provide evidence regarding the well coordinated relations of domestic and international financial markets in post reforms period. The domestic financial crises are found to be more recurrent when country is more financially integrated in international markets, and this further leads to defaults on foreign debts (Kaminsky et al. 1999; Borensztein et al. 2009; Gennaioli et al. 2009; Reinhart et al. 2009).

The International Monetary Fund (IMF) and the World Bank promoted financial reforms and brought free market conditions in the economies of Asia, Europe and Africa, even though lot of uncertainties revolving around on the effect of financial liberalisation on the economy. IMF and World Bank pushed many economies towards the reforms as a stabilization programs and to open economies to the rest of the world. Looking at the past three decades a large number of economies both developed and developing opted for liberalizing the financial system of the country.

Numbers of reforms were followed all over the world starting with abolishing ceilings on interest rate and moving towards market determined interest rates. Secondly the reforms in reserve requirements of the banks and reducing it substantially made available enhanced resources with the bank for credit. The entry barriers for the domestic and foreign private sector banks were eased, which saw increase in the entry of new private banks in the economies. The government involvement in banking sector has been reducing significantly specially in area of credit allocation. Insurance sector was privatized, private and foreign insurance companies were allowed to business and compete in Insurance market. The development in the equity market helped attract foreign institutional investments and increase market turnover as well as market capitalization in the developing economies. Furthermore, reduction in the capital account restrictions or

completely opening capital account increased the free movement of international capita across borders. Financial liberalisation followed by many countries, had terrible effect on their economies (Arestis and Demetriades 1997).

Rajan & Zingales, (1996) examined the differences in the growth of industrial sector in economies with different levels of banking developments. Initially industrial units will use internal funds to develop and as the expansion of the industrial units finds that internal financing is not sufficient, they will look for the external sources of finance. The well developed banking sector meets the financial constraints of industrial unit; industries which are dependent on external financing will benefit most in terms of production growth. This theory of Rajan & Zingales, (1996) is put for scrutiny by many studies. Vlachos & Waldenström, (2005) found increased growth rate of output for firms in liberalised economics which achieved relatively high financial development. Friedrich et al., (2013) industrial sector has grown due to banking sector integration in Europe. Manjappa & Rajanna, (2014) concluded positive association between financial development and industrial sector using CIME data. Galindo et al. (2007) and Gupta & Yuan, (2009) used industrial units data and found positive relation between financial liberalisation and growth. Gourinchas & Jeanne, (2006) Welfare gains to the liberalised developing economy is relatively small. Prasad et al. (2007) Using micro data showed the growth and productivity gains from financial integration.

Chandrasekhar (2008) expressed concern over the role of commercial banks on their ability to generate credit. He argued that there are three main outcomes of financial liberalisation. The first is an increased financial fragility, which is caused due to irrational movements in the stock market. Second the adverse effects on public capital formation due to deflationary macroeconomic steps and hampering the objectives of promoting output and employment growth. Finally, there is a decline in credit to rural sector and small-scale industry. Ghosh (2005) argued that the countries which controlled its financial system showed balanced growth in their economies. Japan, the Republic of Korea and Germany achieved its industrialization strategy by controlling the banking sector. China has controlled the allocation and distribution of bank for achieving rapid economic growth (Chandrasekhar and Ghosh 1999). Financial liberalisation lead to making of huge profits on highly speculative investments (Chandrasekhar, 2008b). Ramachandran & Swaminathan (2005) examined the effect of financial liberalisation on credit delivery and its effect of the debt portfolios of rural poor families. They concluded that in an era of financial liberalisation, banks have the liberty to park their credit in investments which gives high financial returns (but not necessarily socially desirable) and which are less risky. This would mean lower credit for the rural sector and the poor.

2.3 Conclusion:

There are many studies which have tried to understand the effect of the financial liberalisation on the growth. There are studies which try to find out the effect of financial liberalisation through increased banking efficiency. In case of the banking efficiency, the entry of foreign and private banks in Indian financial system has increased competition between public banks and these new players. Most of competition in banking sector is because of advancement and innovation in technology in early 90's in India. It is difficult to differentiate the effect of financial liberalisation of early 1990's and technological adoptions and advancement in banking sector in the same period, making it more complex to understand the effect of the financial liberalisation through banking efficiency.

The debate summarized in this chapter suggests there is evidence financial liberalisation and financial development could lead to growth if some restrictive set of conditions such as legal setup, country characteristics are fulfilled within the economy. There is a strong set of contributions which has shown that a controlled financial system may bring well balanced economic growth. These studies distinguish between liberalisation and development of the financial system. There is evidence that rural poor are neglected in a developing country context even though they still constitute a sizable portion of the population. This divergence of views provides opportunity to undertake further research in this area.

In our study we will use regression techniques to estimate the effect of financial liberalisation. These estimations we believe add to the received literature.

In the next chapter we discuss the data used in the study. We use three different datasets to examine the impact of the financial liberalisation in India.

Chapter III: Data

In the last chapter we discussed literature review which examined the research studies on the role of financial liberalisation. In this chapter we will focus on the types of data used in our analysis. A detailed look at the data sources and variation will help us understand the impact of financial liberalisation on growth.

3.1 Background of Data:

Over the years India has made progress in constructing Macro and Micro level databases, both by public and private agencies. The RBI maintains large time series data on Indian Economy which is easily available through their dedicated data web site "Database on Indian Economy". Many private agencies have come up with their databases which give access to the standardized datasets for research institutions and industry.

In this study we made use of data Indiastat.com owned by Datanet India established in 2000. Indiastat.com provides secondary level socio economic information for India, over a long period. The other agency which is now providing data is the Economic and Political Weekly Research Foundation (EPWRF) was established in conducting research on financial and macroeconomic issues in India. The Foundation has been focusing on a systematic compilation

and dissemination of current and long-term data series on the various issues in economic, social and demographic sectors. A third agency is the Centre for Monitoring of the Indian Economy (CMIE) that has numerous modules and databases. CMIE Prowess database maintains details of the financial performance of Indian companies. The database is compiled using Annual Reports of individual companies in India, which is the principal source of this database and it covers listed and unlisted companies. Prowess contains time-series data from 1998-99 for about 27 thousand companies. It is updated continuously and latest data is available for assessment.

For international data we use the World Bank database that contains various macroeconomic variables from 1960's for most countries. This chapter is divided into three different sections. Sections 3.2 deals with data used to understand cross country dynamics, followed by, section 3.3 which discuses the macroeconomics data of Indian states and section 3.4 discusses data of Indian Industrial units. Since we cover the Impact of financial liberalisation at three different levels – international, national/ subnational and firm level, hence there is need to use three different datasets. Financial liberalisation and its impact on Indian economy are studied through cross country differences, data of financial structure and financial development database of World Bank created by Beck et al, (1999). To understand the regional dynamics of financial liberalisation in Indian States, a state level data is used. The effect of the financial liberalisation on the industrial sector uses firm level data.

3.2 Cross Country Dataset:

Financial liberalisation and its impact are studied through cross country differences, data of financial structure and financial development database of Beck et al., (1999) This database a range of indicators (31 indicators), starting from 1960, that measure the size, activity, and efficiency of financial intermediaries and markets.

The compiled data permits the construction of financial structure indicators to measure whether, for example, a country's banks are larger, more active, and more efficient than its stock markets. They can be used to analyze the implications of financial structure for economic growth. The Financial Development and Structure dataset contains data from 1960 through 2012.

3.3 Indian State Data:

To measure and understand the effect of the financial liberalisation on the economy, we have studied the banking sector along with macroeconomic variables. We will examine the degree to which banks improve market frictions and thereby advance competition, diversification, and ease the mobilization and pooling of savings. However, such empirical variables do not exist for a broad cross-section of states over the last few decades in India. We therefore have to rely on standard measures of the size and activity of banks. These measures are

constructed over the period from 1971 to 2013. We measure financial liberalisation, total credit sanctioned by schedule commercial banks statewise and the data is taken from RBIs Basic Statistical Returns, from 1971 to 2013. Also the credit sanctioned to agriculture, service and industry by schedule commercial banks is used to capture sectorwise effect. As a measure of economic growth, the Log Real NSDP per capita at constant price (2004) is used. The data for NSDP per capita was calculated using deflator to construct constant series for analysis. The NSDP data is taken from the Economic and Political Weekly Research Foundation database. The data for 21 states for 43 years from 1971 to 2013 is used which gives 903 observation points for analysis.

In November 2000, three new states were created namely, Chhattisgarh from eastern Madhya Pradesh, Uttaranchal from northwest Uttar Pradesh renamed Uttarakhand in 2007 and Jharkhand from southern districts of Bihar. These three states are merged with the parent state to facilitate comparison from 1971 to 2013. Similarly Goa attained statehood in 1987. Prior to statehood, data for Goa then a Union Territory is available as Goa, Daman and Diu. This data of Goa, Daman and Diu is taken as data for Goa from 1971 till 1987 as there is no mechanism available to separate this data to get fair picture of the Goa state. Since Daman and Diu are small territories their output is likely to be considered insignificant from the point of view of our study. The remaining states (Andaman and Nicobar Islands, Chandigarh, Dadra and Nagar Haveli, Daman and Diu, Delhi, Lakshadweep, Meghalaya, Mizoram, Nagaland and Sikkim) which are not

included in the study, is because that data for these states was not available continuously for the period of our study.

Table 3.1 PCNSDP for 1971 to 2013

Sr. No	States	Mean	Std. Dev	Min	Max
1	Andhra Pradesh	17689	12229	6408	48726
2	Assam	12205	5459	4837	25413
3	Bihar	8499	4793	4015	21207
4	Goa	44925	36948	10221	132515
5	Gujarat	22812	14777	7422	61059
6	Himachal Pradesh	20230	13558	7276	50602
7	Haryana	27110	18171	9900	74444
8	Jammu and Kashmir	14258	7108	5949	32124
9	Karnataka	18965	14591	5871	53937
10	Kerala	18337	11938	6476	45644
11	Madhya Pradesh	25721	15789	8173	62716
12	Maharashtra	12191	5100	5225	22345
13	Manipur	12705	6796	5608	30792
14	Orissa	12196	7172	5265	29737
15	Puducherry	25852	11461	12133	50789
16	Punjab	31895	21410	10470	81572
17	Rajasthan	14049	8186	6028	35690
18	Tamil Nadu	20948	15833	6525	61769
19	Tripura	14668	9631	5208	37902
20	Uttar Pradesh	13861	9844	5608	41121
21	West Bengal	16518	8376	7686	38056

Source:EPWRF. (Figures in Rupees)

Table 3.1 shows the descriptive statistics of PCNSDP (Per Capita Net State Domestic Product) for the 21 states of India for the study period from 1971 to 2013. The highest average PCNSDP for the period under study is for Goa (44925) followed by Punjab (31895), the lowest average (8499) is Bihar followed by Maharashtra (12191).

Table 3.2 Agricultural credit for 1971 to 2013

Sr. No	States	Mean	percent Share in Total Credit
1	Andhra Pradesh	109.93	21.13
2	Assam	5.84	12.79
3	Bihar	26.42	32.48
4	Goa	0.70	3.46
5	Gujarat	45.76	12.55
6	Himachal Pradesh	4.79	16.89
7	Haryana	44.04	22.31
8	Jammu and Kashmir	3.21	8.53
9	Karnataka	76.05	14.78
10	Kerala	39.69	18.53
11	Madhya Pradesh	47.02	28.19
12	Maharashtra	87.70	4.62
13	Manipur	0.42	16.58
14	Orissa	17.35	17.31
15	Puducherry	1.23	16.31
16	Punjab	49.87	24.13
17	Rajasthan	50.44	25.49
18	Tamil Nadu	97.80	13.69
19	Tripura	0.94	18.25
20	Uttar Pradesh	94.54	29.22
21	West Bengal	31.05	8.01

Source:- Basic Statistical Returns (Figures in Rupees Billion)

If we look at state wise credits to agriculture sector from 1971 to 2013; the highest mean credit is received by the Andhra Pradesh state, a highest producer of Maize in the country which is also state with highest credit deposit ratio of above 100 (Table 3.2). Other big states which receive credit are Tamil Nadu, Uttar Pradesh and Maharashtra.

Table 3.3 Industrial credit for 1971 to 2013

Sr. No	States	Mean	percent Share in Total Credit
1	Andhra Pradesh	228.56	43.92
2	Assam	13.31	29.17
3	Bihar	18.80	23.11
4	Goa	8.69	43.23
5	Gujarat	233.09	63.90
6	Himachal Pradesh	11.79	41.61
7	Haryana	87.34	44.26
8	Jammu and Kashmir	9.54	25.33
9	Karnataka	220.32	42.82
10	Kerala	44.63	20.84
11	Madhya Pradesh	59.22	35.50
12	Maharashtra	1010.00	53.16
13	Manipur	0.40	16.07
14	Orissa	39.06	38.99
15	Puducherry	2.16	28.81
16	Punjab	95.92	46.41
17	Rajasthan	88.06	44.49
18	Tamil Nadu	343.42	48.09
19	Tripura	0.84	16.36
20	Uttar Pradesh	114.41	35.36
21	West Bengal	214.05	55.24

Source:- Basic Statistical Returns (Figures in Rupees Billion)

Industrial credit from 1971 to 2013 shows the highest average disbursement to Maharashtra. This is not surprising since Mumbai is the financial capital of the country and the largest Industrial state of the country. The second largest state in terms of industrial credit is Tamil Nadu followed by Gujarat and Andhra Pradesh. The lowest mean credit is disbursed in North eastern states Manipur and Tripura.

Table 3.4 Services credit for 1971 to 2013

Sr. No	States	Mean	percent Share in Total Credit
1	Andhra Pradesh	275.92	53.03
2	Assam	32.07	70.26
3	Bihar	47.54	58.44
4	Goa	12.98	64.58
5	Gujarat	145.47	39.88
6	Himachal Pradesh	15.02	53.03
7	Haryana	91.86	46.55
8	Jammu and Kashmir	28.39	75.38
9	Karnataka	273.48	53.15
10	Kerala	160.05	74.72
11	Madhya Pradesh	83.20	49.88
12	Maharashtra	1090.00	57.37
13	Manipur	1.99	79.39
14	Orissa	58.33	58.22
15	Puducherry	5.49	73.04
16	Punjab	89.91	43.50
17	Rajasthan	97.00	49.01
18	Tamil Nadu	382.90	53.62
19	Tripura	4.24	82.08
20	Uttar Pradesh	170.07	52.56
21	West Bengal	197.50	50.97

Source:- Basic Statistical Returns (Figures in Rupees Billion)

In terms of credit to the services sector once again Maharashtra tops the list. Second largest state in terms of services credit is Tamil Nadu followed by Andhra Pradesh and Karnataka. The lowest mean credit is disbursed in the North eastern states Manipur and Tripura.

Table 3.5 NSDP for 1971 to 2013

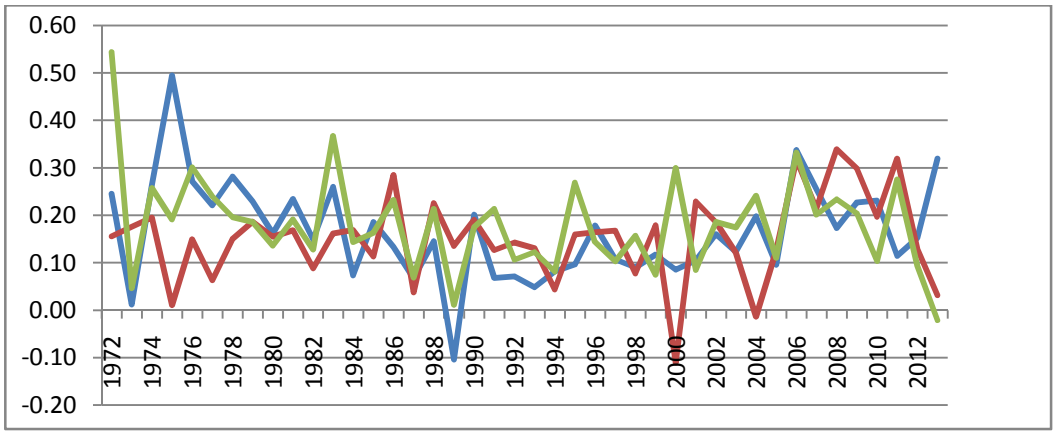
Sr. No	States	Mean	Std. Dev	Min	Max
1	Andhra Pradesh	1250	997	282	4110
2	Assam	366	318	94	1400
3	Bihar	804	660	309	3150
4	Goa	82	108	10	426
5	Gujarat	1380	1560	152	6520
6	Himachal Pradesh	166	151	29	650
7	Haryana	699	849	116	3540
8	Jammu and Kashmir	102	49	32	168
9	Karnataka	1170	1280	166	5460
10	Kerala	753	850	161	3510
11	Madhya Pradesh	989	823	265	3890
12	Maharashtra	2960	3270	426	13700
13	Manipur	32	29	7	126
14	Orissa	532	554	139	2280
15	Puducherry	40	43	6	191
16	Punjab	724	661	192	2800
17	Rajasthan	950	1100	185	4660
18	Tamil Nadu	1600	1840	303	7720
19	Tripura	55	60	9	260
20	Uttar Pradesh	1980	1740	584	7610
21	West Bengal	1510	1440	393	6420

Source:- EPWRF (Figures in Rupees Billion)

There are many measures of income into gross and net measures both at current and constant prices. We use the Net State Domestic Product (NSDP) because it is the net income after accounting for depreciation. And we use a constant price measure as it allows us to remove the effect of inflation. The state wise NSDP from 1971 to 2013 shows the highest mean NSDP for Maharashtra, followed by NSDP is Tamil Nadu, Uttar Pradesh and West Bengal (Table 3.5). The lowest

NSDP is in North eastern states Manipur and Tripura. The NSDP does not project the true sense of well being. Maharashtra, Uttar Pradesh has high NSDP but the incidence of the poverty is also high as is the size of the population. Therefore the per capita NSDP gives a fairer picture of individual well being for the states in India.

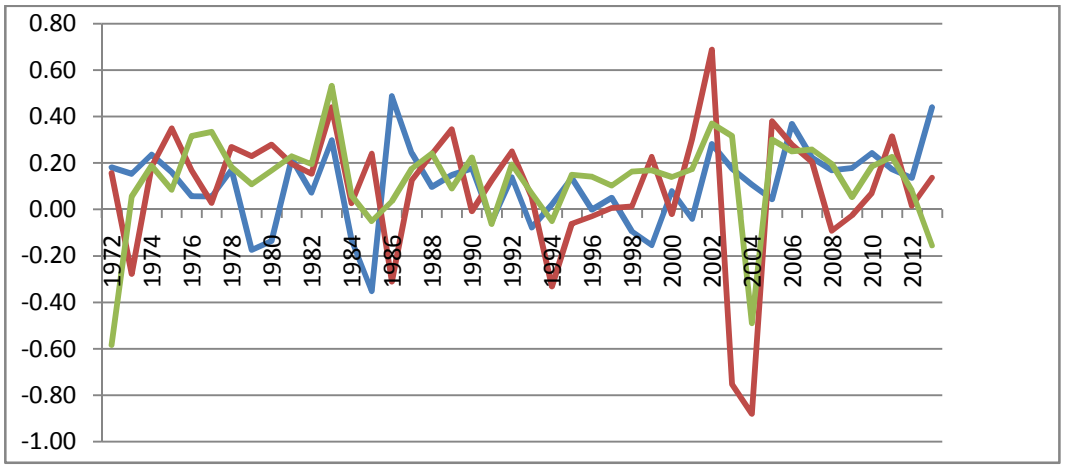
Figure 3.1 Growth rate of Credit in Andhra Pradesh



Agriculture (Blue), Industry (Red) and Services (Green)

Andhra Pradesh is a state with the highest credit deposit ratio in the country (above 100 percent). The growth rate of credit in Andhra Pradesh in services is positive during the study period except in 2012. A similar positive trend is noticed for agriculture credits which showed negative growth rate in 1989. The highest average credit to agriculture is disbursed in Andhra Pradesh. Industrial sector credit is also positive (but remained negative in 2000 and 2004).

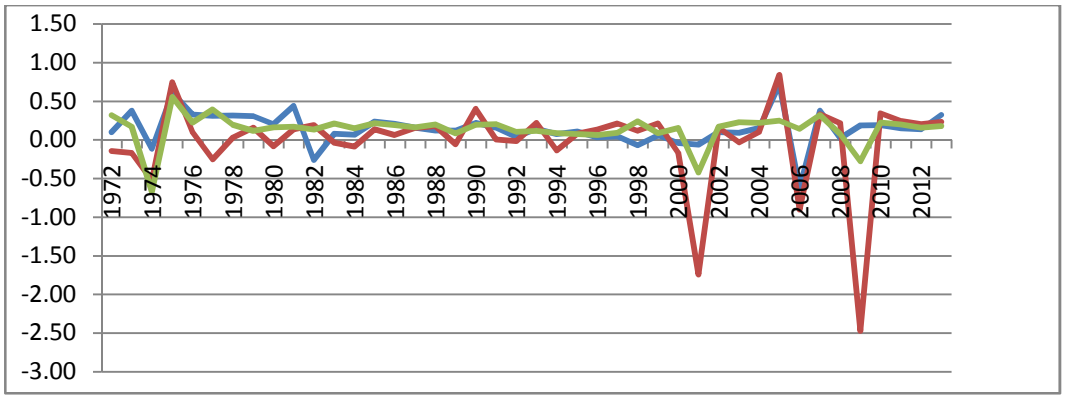
Figure 3.2 Growth rate of Credit in Assam



Agriculture (Blue), Industry (Red) and Services (Green)

In Assam growth rate of credit is not stable. On many occasions the credit growth is negative for all the three sectors. Industrial sector credit growth has declined to more than 50 percent in period 2002 to 2004. The agricultural credit growth from 2001 is positive and increasing above other two sectors in the state. Services credit has seen positive growth in post reforms period, but there was a drastic fall in 2004 of about 50 percent.

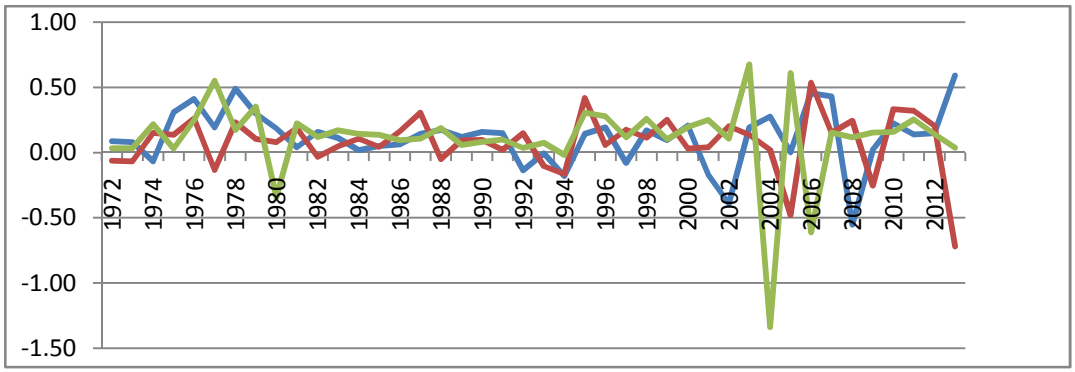
Figure 3.3 Growth rate of Credit in Bihar



Agriculture (Blue), Industry (Red) and Services (Green)

In Bihar credit to the industrial sector is highly negative in 2000 to 2010 period, it is the backward state in terms of industrial sector development in the country. The credit growth in agriculture and services looks stable but not highly

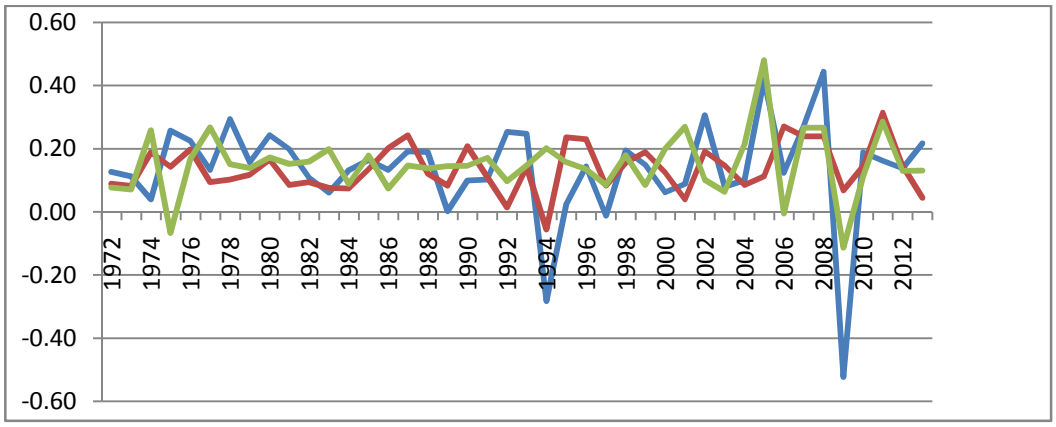
Figure 3.4 Growth rate of Credit in Goa



Agriculture (Blue), Industry (Red) and Services (Green)

Goa is one of the financially developed states. RBI has declared it as a state with 100 percent financial inclusion. The growth rate of the credit is highly unstable from 2000 till recent period of the study. In 2012 the industrial sector has seen a severe fall in the credit growth where as growth in agriculture has shown a raise. This could be due to the closure of mining industry and its effect on the ship building business in state.

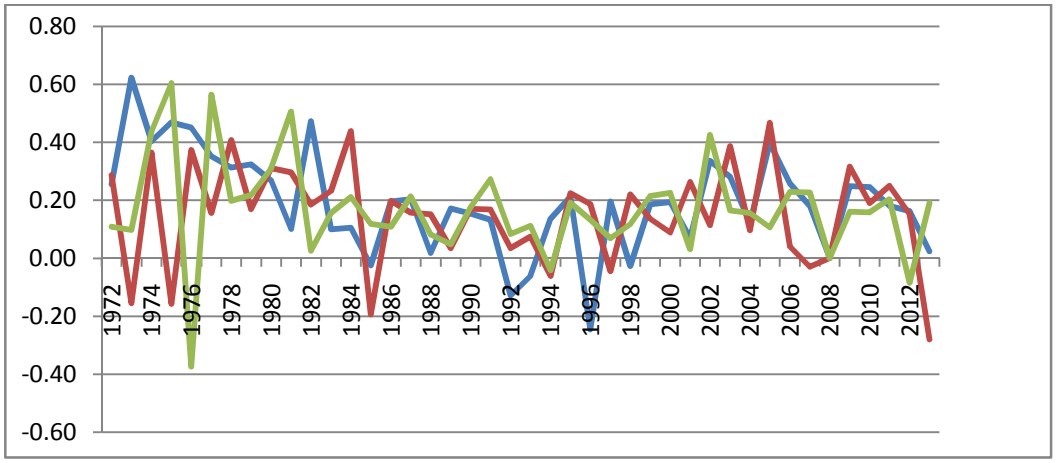
Figure 3.5 Growth rate of Credit in Gujarat



Agriculture (Blue), Industry (Red) and Services (Green)

Gujarat is known as the state with a growing industrial sector due to its reforms and which reflects in the high growth rate of the industrial sector credit. Agricultural credit growth rate is negative in 1994 and 2009; services sector looks stable and positive till 2004.

Figure 3.6 Growth rate of Credit in Himachal Pradesh

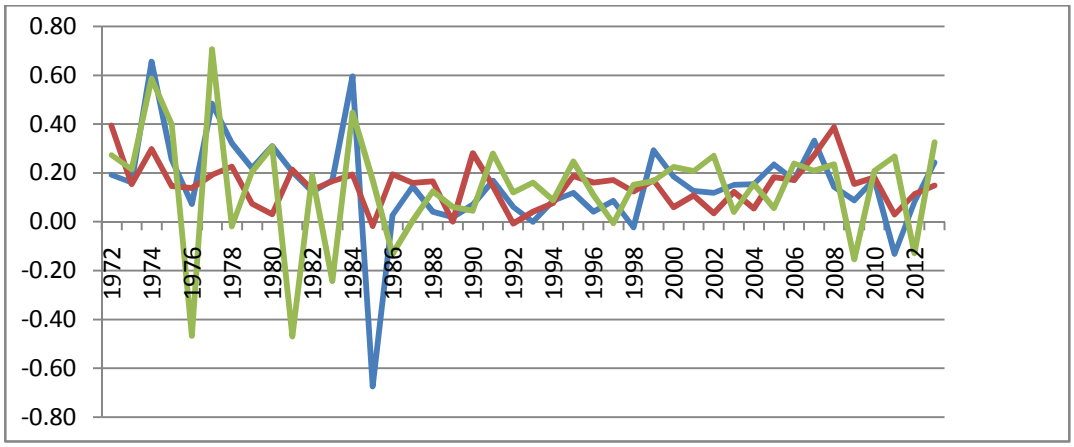


Agriculture (Blue), Industry (Red) and Services (Green)

Himachal Pradesh the credit growth is highly instable, basically a service economy known for its beautiful hill stations. Service sector growth rate of credit looks

positive from 1977 onwards with negative in 1994, 2008 and 2012. Industrial credit growth is negative on many occasions and in 2012 it showed a sever fall in credit growth.

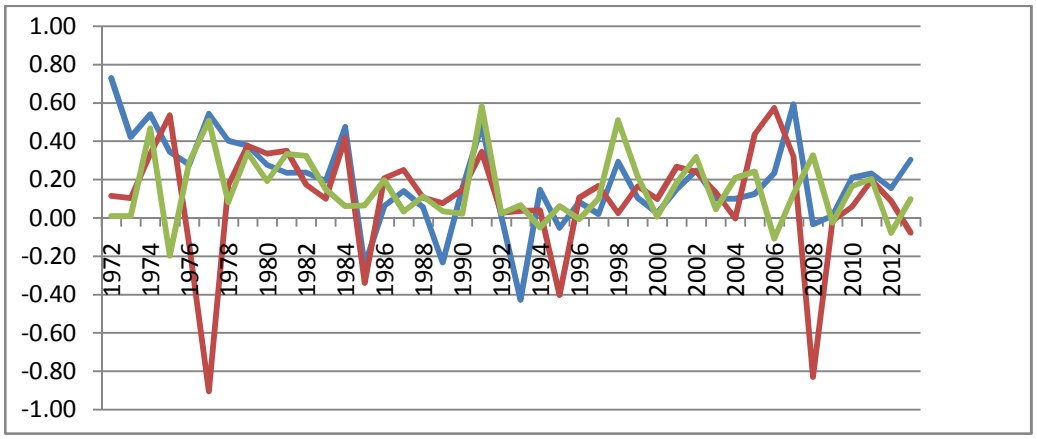
Figure 3.7 Growth rate of Credit in Haryana



Agriculture (Blue), Industry (Red) and Services (Green)

It is interesting to note that the industrial credit growth in Haryana is positive for the entire study period with some deviations. This state is known for its agricultural sector, the growth rate of agricultural credit was negative in 1985 and in 2011. The Services sector has been negative in pre reform period and in 2009 and 2012.

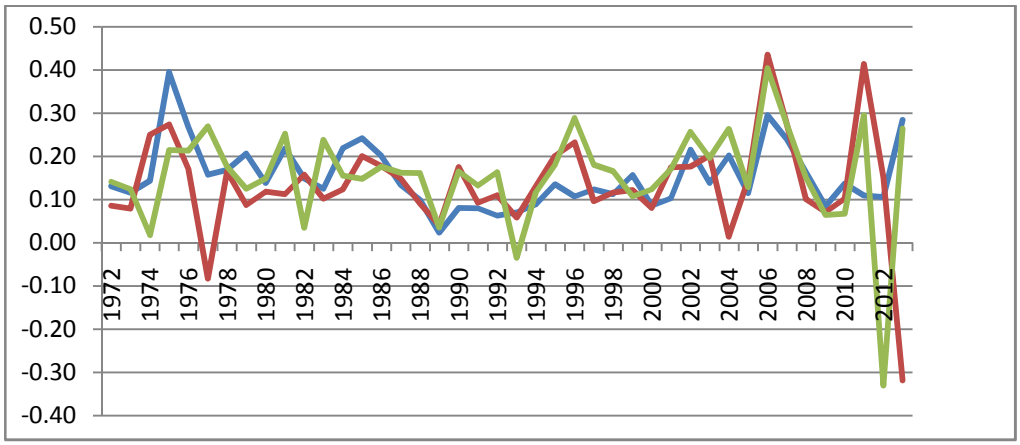
Figure 3.8 Growth rate of Credit in Jammu and Kashmir



Agriculture (Blue), Industry (Red) and Services (Green)

Jammu and Kashmir has been the region of conflict. This has reflected on its industrial development, which can be seen from the high fluctuations in the industrial credit growth. Agricultural and services credit is more stable and positive in post reform period.

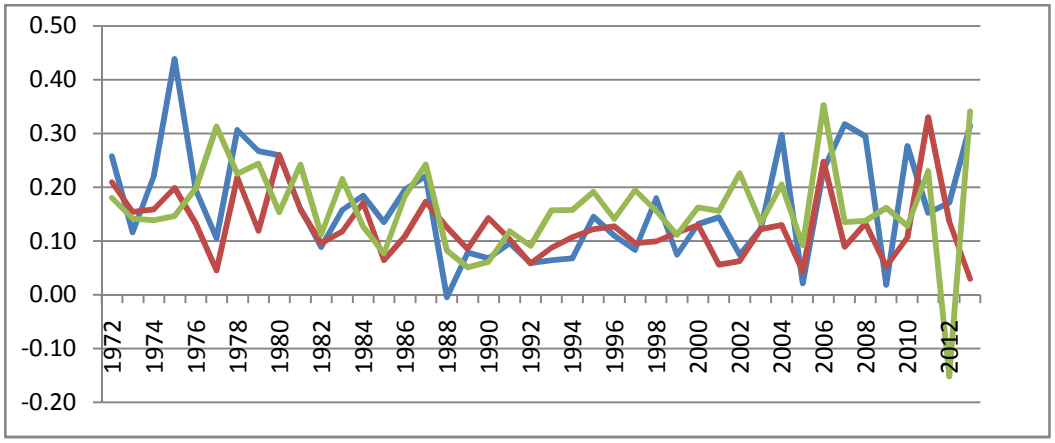
Figure 3.9 Growth rate of Credit in Karnataka



Agriculture (Blue), Industry (Red) and Services (Green)

In Karnataka the agricultural credit growth is throughout positive and steady. Industrial and services sector is also positive accept at few occasions. They both showed a rise in growth rates in 2011 followed a drastic fall in 2012.

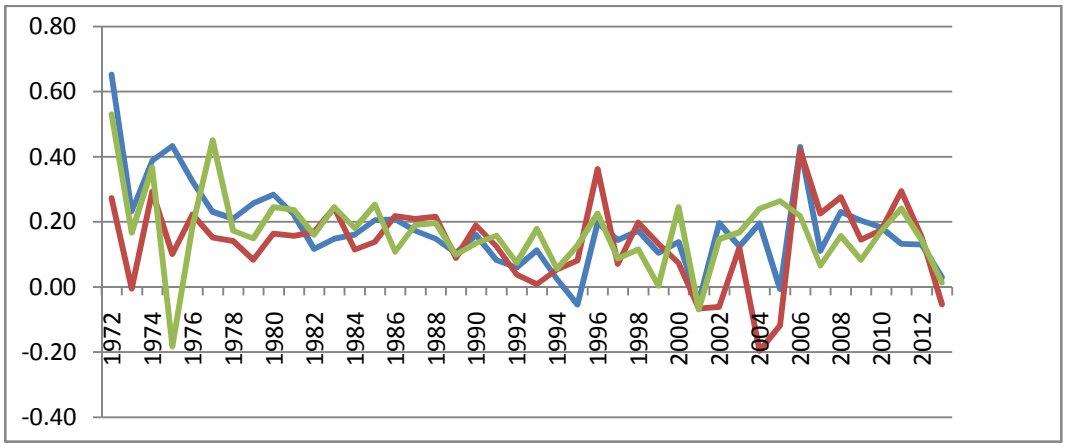
Figure 3.10 Growth rate of Credit in Kerala



Agriculture (Blue), Industry (Red) and Services (Green)

Kerala showed positive growth for all three sectors accepts for the services in 2012. Kerala is known for its high human development indicators. It has also made impressive strides in income growth.

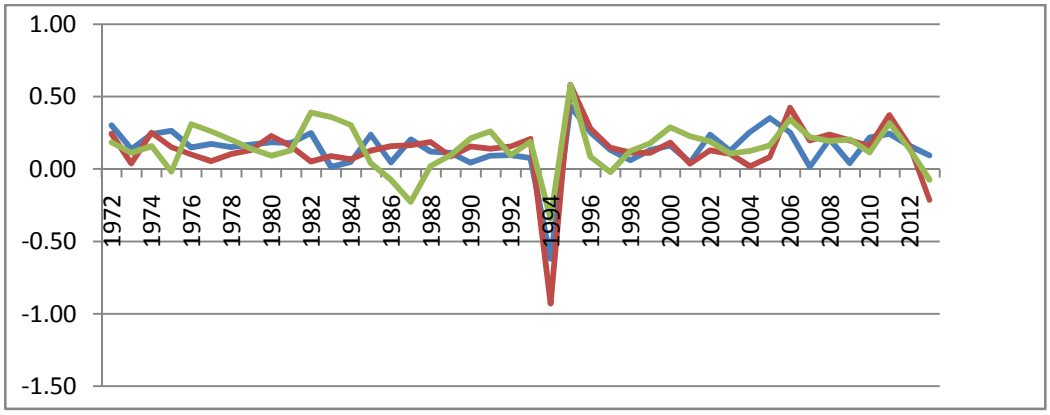
Figure 3.11 Growth rate of Credit in Madhya Pradesh



Agriculture (Blue), Industry (Red) and Services (Green)

Madhya Pradesh showed a steady growth in credit in the pre liberalisation period in all three sectors. Since 1994 there are huge fluctuations in all three sectors, especially in the industrial sector.

Figure 3.12 Growth rate of Credit in Maharashtra

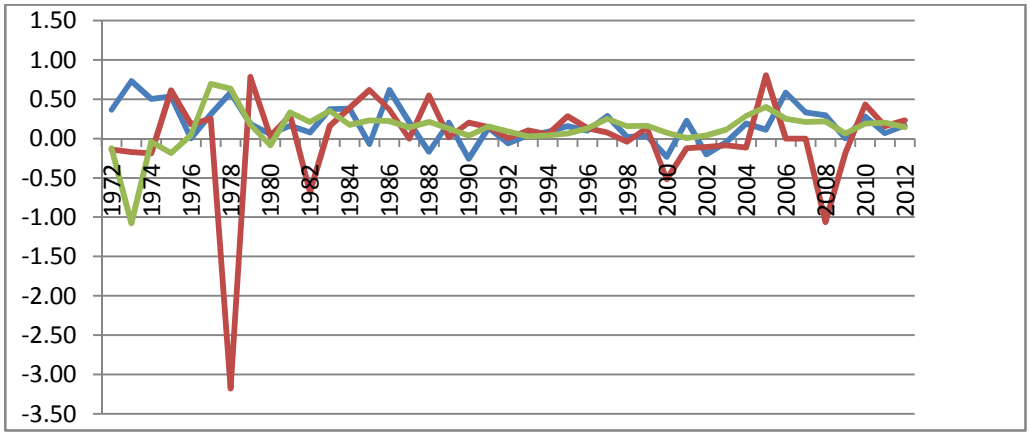


Agriculture (Blue), Industry (Red) and Services (Green)

Maharashtra is home to the financial capital of the country, Mumbai. The credit growth in the state for all the three sectors is positive and stable almost throughout

the period except 1992 to 1995 between when there is a fall in growth rate of the all three sectors.

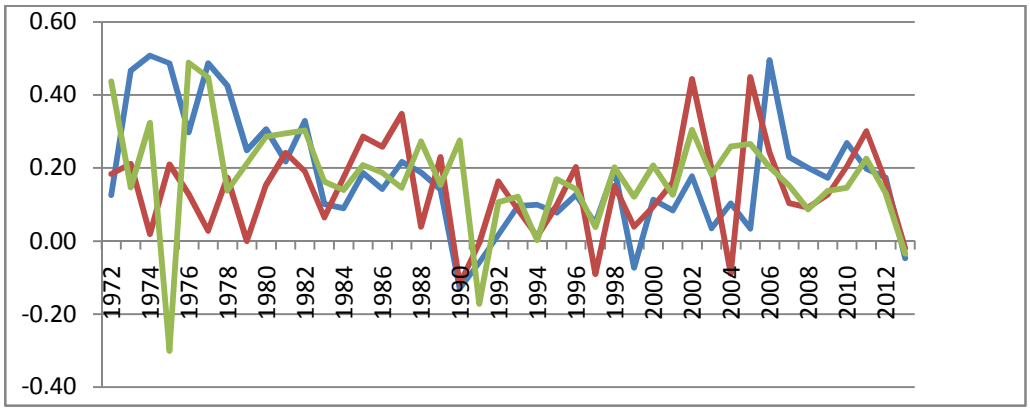
Figure 3.13 Growth rate of Credit in Manipur



Agriculture (Blue), Industry (Red) and Services (Green)

Manipur is the part of the north eastern region of the country, part of special category hill states. The credit growth in services is stable and positive from 1981 onwards. The growth of the industrial credit is negative in 1978, 1982 and most of the years from 2000 to 2010. The growth rate in agriculture credit also showed fluctuations.

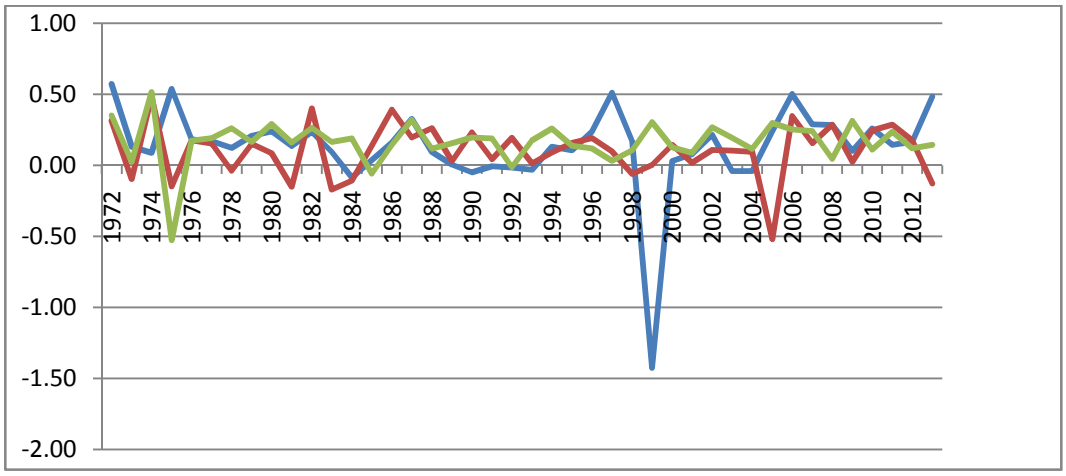
Figure 3.14 Growth rate of Credit in Orissa



Agriculture (Blue), Industry (Red) and Services (Green)

The growth rate of credit for all three sectors in Orissa looks highly unstable. However on many occasions the growth rate of credit was above 20 percent for all the three sectors.

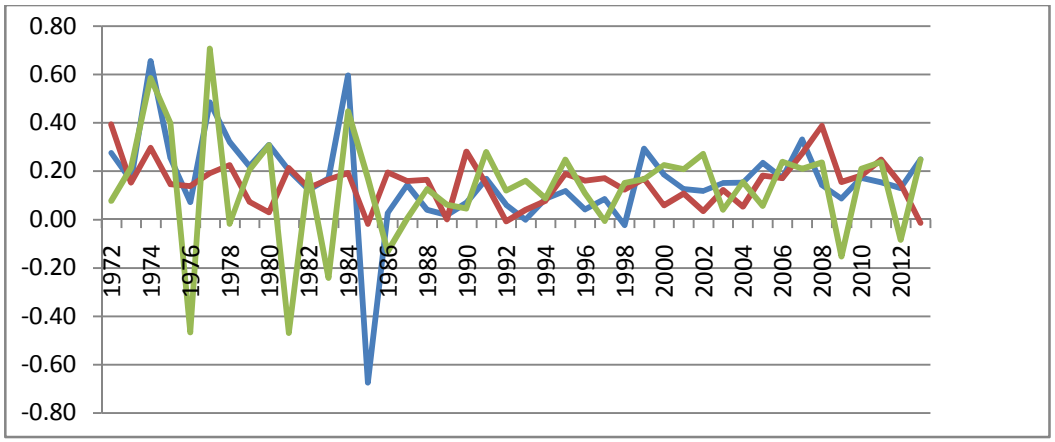
Figure 3.15 Growth rate of Credit in Puducherry



Agriculture (Blue), Industry (Red) and Services (Green)

Puducherry is small union territory in the country. All the sectors credit growth followed similar trend for study period.

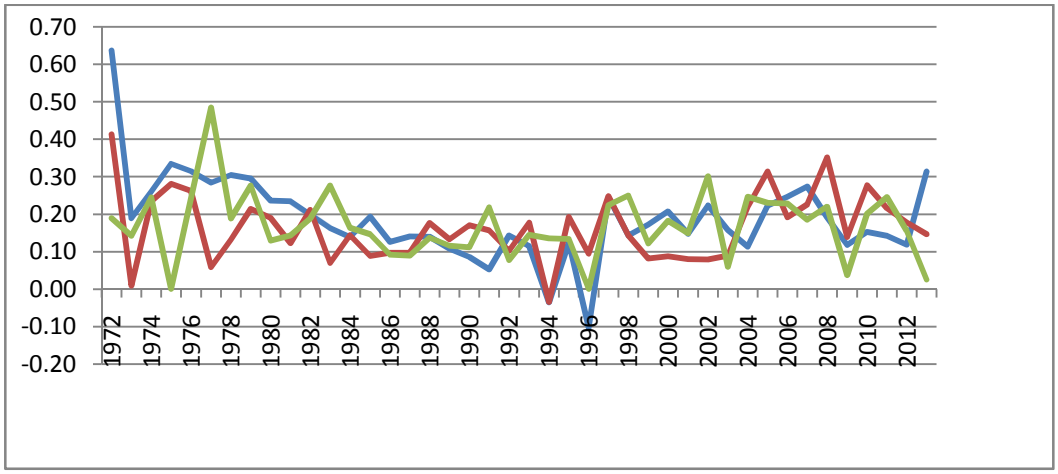
Figure 3.16 Growth rate of Credit in Punjab



Agriculture (Blue), Industry (Red) and Services (Green)

Punjab is known for its high per capita income and its contribution in the agricultural sector. The growth rate of credit to the industrial sector remained positive throughout the study period. Credit to the agriculture maintained its stability from 1998. Services sector was the most unstable sector for the growth rate of credit.

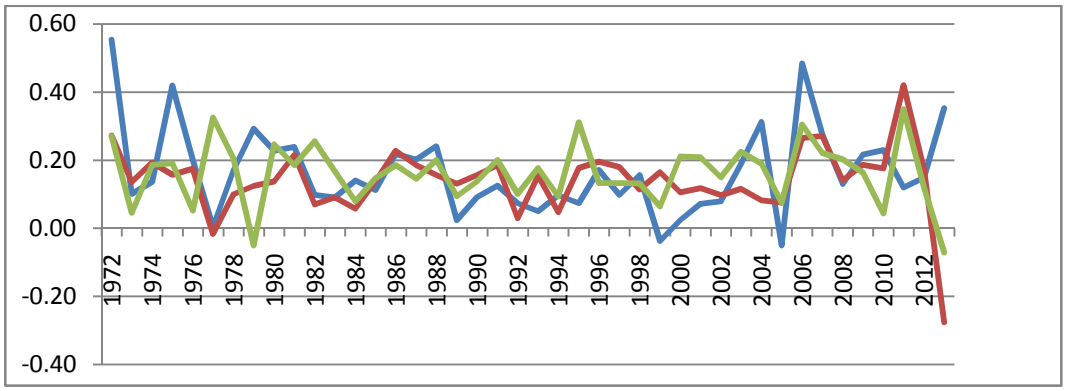
Figure 3.17 Growth rate of Credit in Rajasthan



Agriculture (Blue), Industry (Red) and Services (Green)

This is the desert state in India. It has made significant efforts to industrialise in the last two decades. The service sector credit growth in Rajasthan was positive in entire study period. The agriculture and industry showed stable and positive growth accept in 1994 and 1996.

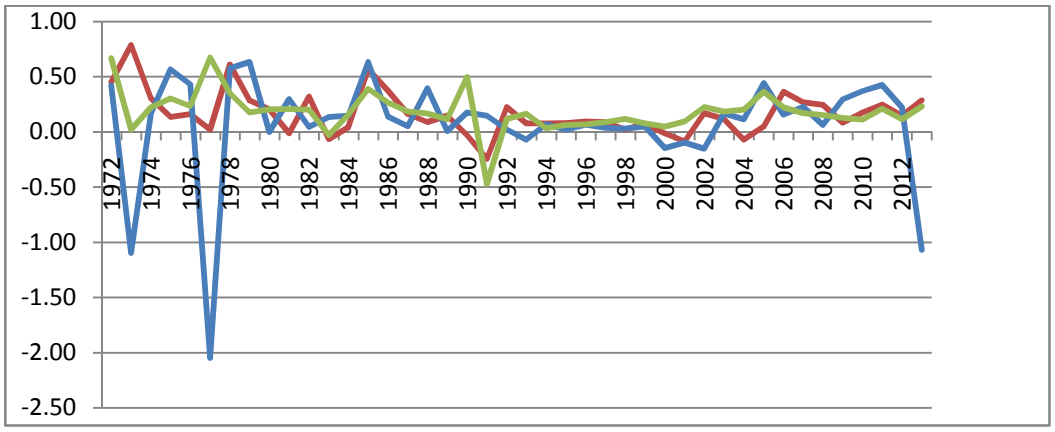
Figure 3.18 Growth rate of Credit in Tamil Nadu



Agriculture (Blue), Industry (Red) and Services (Green)

Tamil Nadu showed stability in the credit growth from 1980 onwards and growth rate of above 20 percent from 2006 to 2011. In 2012 industrial and services sector growth rate showed a drop of more than 10 percent, however agriculture growth rate was above 20 percent for same period.

Figure 3.19 Growth rate of Credit in Tripura

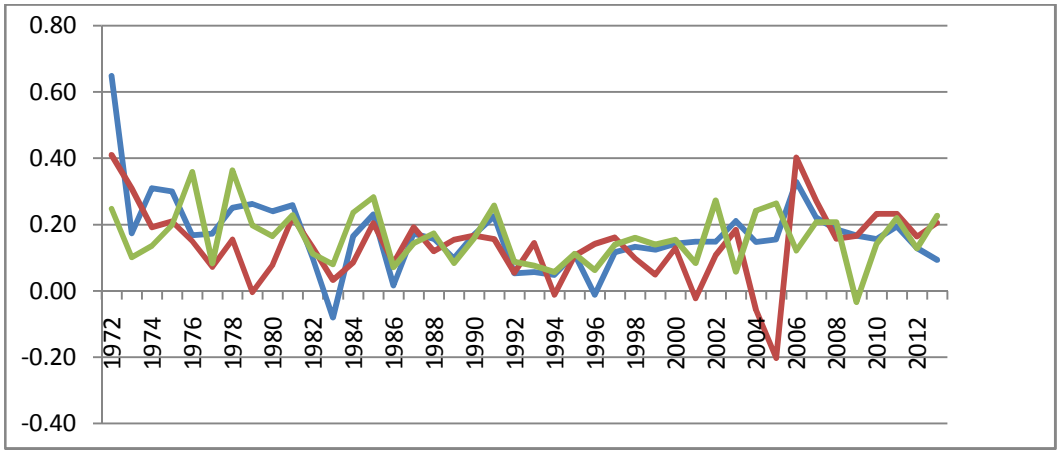


Agriculture (Blue), Industry (Red) and Services (Green)

Tripura is also a north eastern state which falls under the special category states of India. Services and Industry have followed a similar trend. The credit to the

agriculture sector is however unstable with huge negative growth rate in 1973, 1977 and 2012.

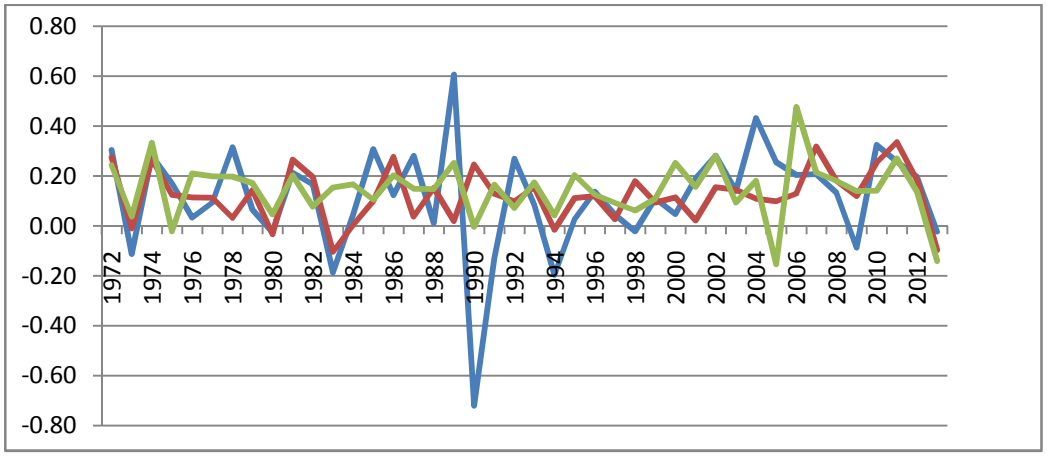
Figure 3.20 Growth rate of Credit in Uttar Pradesh



Agriculture (Blue), Industry (Red) and Services (Green)

Uttar Pradesh is the biggest state in India in terms of population. The credit growth rate in services is positive for entire period of the study except in 2009. Industry and agriculture followed similar trend in state for credit growth rate.

Figure 3.21 Growth rate of Credit in West Bengal



Agriculture (Blue), Industry (Red) and Services (Green)

West Bengal shows fluctuations in the growth rate of credit for all three sectors. The growth rate of agriculture credit seems highly fluctuating, in 1989 a 60 percent rise and in 1990 60 percent fall. All three sectors showed negative growth in 2012.

3.4 Indian industrial units:

One of the primary reasons for undertaking financial liberalisation is to provide easy access to credit for firms. This is expected to positively impact on investment and growth. Reduced market interest rates will enable more investment. In the Indian financial system, bank borrowings play an important role, as the equity and bond market are under developed. Banks remain top financers for the industrial sector. The data related to India industrial sector is taken from CMIE Prowess database.

Prowess covers listed companies, large and medium public limited companies, government owned companies, some privately held companies, some cooperatives and even some business entities that are not companies. Prowess contains time-series data beginning 1998-99 relating to the finances of the company and ratios based on these.

We draw on the Prowess database for the period 1998 to 2014. This is the period during which the financial markets have enjoyed the greatest freedom in post-1969

phase. The data is compiled for 7007 non financial industrial units for period of 16 years which provides 1, 12,112 observation points. Non financial units are those units whose basic economic activity is to produce goods and borrows funds externally for the investment. Since the objective is to look how borrowings have affected investments we have excluded financial units from our study. The variables which we have chosen are:

1. Physical Investment: This is computed by calculating the Change in Net fixed assets. It is derived by taking one lag of Net Fixed Asset (NFA). The Net fixed asset in the Prowess database is the sum of intangible assets, net land and buildings, net plant and machinery, computers and electrical assets, net transport and communication equipment and infrastructure, net furniture, social amenities and other fixed assets and net lease adjustment reserves. Investment in't' is NFA_t - $NFA_{t-1,}$ this change in investment is influenced by borrowing.
2. Borrowings: these are created when a company takes finance from lenders, with a plan to repay the same with interest over a future time span.
3. Financial Investments: Companies often buy financial assets like shares, debentures, bonds, mutual funds, etc. The sum of all such investments outstanding at the end of the balance sheet date is captured in this data field and treated as financial investment.
4. Inventories: These are materials held to be consumed in the production process or for sale. These include all goods that are purchased and held for processing or for resale or in the form of materials or supplies to be

consumed in the production process or in the rendering of services This represents to a large extent unsold stock of output.

5. Profits: It is the net profits calculated after deducting the profits tax of the companies. The profit is difference between the revenue and cost of the company.

Table 3.6 Statistical table for variables of Industrial data

Variable	Number of observations	Mean	Std. Dev.	Min	Max
dNFA	66824	60.89	3320.09	-289840	135368.6
BORR	66824	1630.04	13820.89	.1	899680
PRO	66824	178.41	2802.89	-51032.6	219840
INVES	40990	895.14	12099.96	0	860620
INVEN	66824	743.56	7807.13	.1	647037.4

Source: CMIE

We divide these companies into broad operational categories such as Transportation, food and agriculture, construction, machinery, metal, chemicals textile and consumer goods. Classification of firms is also done on the basis of size, for this we have used the classification provided by the ministry of Commerce and Industry.

Table 3.7 Classification of Industries

Sr. No	Industry Type	Capital Invested in rupees
1	Micro Enterprises	Less than twenty five lakh
2	Small Enterprises	twenty five lakh to five crore
3	Medium Enterprises	five crore to ten crore
4	Big Enterprises	More than ten crore

Source: Ministry of Commerce and Industry

In the next chapter we discuss the methodology used for the study. The methodologies discussed in the chapter are panel regressions, dynamic panel regression, quantile regression and panel quantile regression.

Chapter IV: Methodology

In the previous chapter we examined datasets at different levels for long period of time in panel form. We looked at state-level and firm level data including sectorwise data. In this chapter we will examine the various econometrics tools suitable for the dataset and methodology which is able to analyze the objectives of the study.

4.1 Panel data analysis:

Panel data also known as longitudinal data, consists of time component and cross sectional units, this combination makes dataset with multiple dimensions. This pooling of time component across a variety of cross sectional units which could be, states, firms, countries, regions or randomly sampled households or individuals gives advantage of large dataset for analysis. Hsiao, (2014) has listed number of advantages of using panel data over cross sectional or time series data. The large datasets are more informative, due to pooling of time series and cross section, estimates are more reliable and with less restrictive assumptions, which permits to test more sophisticated models.

There are benefits of more variability and less collinearity among the variables, than in the case of cross section or time series data. An added advantage of panel

dataset is ability to control for individual heterogeneity. A bias may arise in the resulting estimates for not controlling these unobserved individual effects. In case of pure cross section or pure time series data it is impossible to identify and estimate effects which is possible in a panel dataset. In particular, to study complex issues of dynamic model, panel data sets are better equipped. For example, with a cross sectional dataset one can estimate the credit disbursed by banks at a particular point in time. This cross-section when repeated over time can show how credit disbursed by banks changes over time. Only panel datasets can estimate changes in credit disbursed across the states and firms over a period of time. The limitation of the panel dataset is that it is sometimes costly to collect the data; and difficult to get data for both time dimensions and cross section. Other limitations (which are also applicable incase of cross section and time series data) are measurement and data entry errors.

Panel data deals with two or more dimension. The simple panel consists of a cross sectional dimension indicated by subscript *i* and time component by subscript *t*. Panel data could have a more complicated structure. For instance, variable X may be the measurement of the credit disbursed at Bank 'j' of state 'i' at time t. The primary advantage of using a panel dataset above a cross section is that it allows great flexibility to study differences in behavior of credit lending across states. We set up a simple model below:

$$Y_{it} = X_{it}\beta + Z_i\alpha + \varepsilon_{it} \qquad 4.1$$

$$Y_{it} = X_{it}\beta + C_i + \varepsilon_{it} \qquad 4.2$$

where X_{it} includes k regressors without including a constant term. The individual effect is captured in $Z_i\alpha$ where Z_i contains a constant term and a set of group specific or individual variables, which are observable, (such as gender, race, caste, region, etc.) or unobserved, (such as, preferences or skills showing individual heterogeneity) which are considered to be constant over time t. The model is treated as a linear ordinary least square model if Z_i is observed for all individuals.

The problem arises when C_i is unobserved, which will be the case in most studies. For example, analyses of the effect of availability of credit on industrial output, from which "ability to channelise" will always be a missing and unobservable variable. The consistent and efficient estimation of the partial effects will be the main objective of the analysis. Therefore the coefficient "β" represents

$$\beta = \partial E[Y_{it} \mid X_{it}]/\partial X_{it} \qquad 4.3$$

The assumptions about the unobserved effects will define whether consistent and efficient estimation is possible. First we see assumption of strict exogeneity for the independent variables,

$$E[\varepsilon_{it} \mid x_{i1}, x_{i2},...,] = 0 \qquad 4.4$$

By this assumption, the current error term is uncorrelated with the independent variables over the time period. The fundamental aspect of the model concerned is

the heterogeneity i.e the differences across the states are captured in the model. A principally suitable assumption would be mean independence, which means the independent variables are uncorrelated with each other.

$$E[C_i \mid X_i1, X_i2,...] = \alpha \qquad 4.5$$

The disturbance term of the model captures the effect of missing variables if these variables are uncorrelated with the included explanatory variables. This assumption motivates the random effects model (discussed in 4.2), it is, however, a predominantly strong assumption it would be unlikely in the case of credit as a function of state output example mentioned previously. The alternative would be

$$E[C_i \mid X_i1, X_i2,...,] = h(X_i1, X_i2, \ldots) \qquad 4.6$$
$$= h(X_i)$$

This model is more general, but considerably more complicated, as it may need further assumptions concerning the nature of the function.

4.2 Panel Data Models:

There are different types of models that can handle panel data. We briefly discuss these below.

1. Pooled Regression: It is also called ordinary least square, method because, it ignores the panel data structure and estimates coefficients like a cross-section model. In terms of our equation 4.1 the ordinary least squares provide efficient and consistent estimates of α and β if Z_i includes only a constant term. However this is unlikely to be constant in most longitudinal data. The most popular ways to deal with this are the Fixed Effect and Random Effect models.

2. Fixed Effects: If the Zi group specific individual effect is unobserved, but correlated with X_{it}, an omitted variable bias will result if a least squares method used to estimate β. The "β" will be biased and inconsistent. However, in this model

$$Y_{it} = \alpha_i + X_{it}\beta + \varepsilon_{it} \qquad 4.7$$

where $\alpha_i = Z_i\alpha$, represents all the observable effects and states an estimable conditional mean. In case of fixed effects model it takes α_i to be a group-specific constant term in the panel regression model. The term "fixed" does not mean that C_i is nonstochastic but indicates the correlation of C_i and X_{it}.

3. Random Effects: In panel data models if the unobserved individual heterogeneity, is assumed to be uncorrelated with explanatory variables included, then the model may be stated as

$$Y_{it} = X_{it}\beta + E\,[Z_i\alpha] + Z_i\alpha - E[Z_i\alpha] + \varepsilon_{it} \qquad 4.8$$

$$= X_{it}\beta + \alpha + U_i + \varepsilon_{it} \qquad 4.9$$

that is, as a linear regression model with a compound disturbance term, which may be consistent (estimator is consistent if sample size gets large the estimate gets converged to the true value of the parameter), although inefficient (inefficient estimator do not follow minimum variance), estimated by ordinary least squares. This panel random effect approach states that U_i is a group specific random element in the model, similar to ε_{it} except for each group, in each period there is a single draw that enters the regression identically.

The fundamental distinction between random and fixed effects is whether the unobserved individual effect represents elements that are correlated with the regressors in the panel model, not whether these effects are stochastic or not. If we think there are no omitted variables or if we believe that the omitted variables are uncorrelated with the explanatory variables that are in the model then a random effects model is probably best. It will produce unbiased estimates of the coefficients, use all the data available, and produce the smallest standard errors. If there are omitted variables, and these variables are correlated with the variables in the model, then fixed effects models may provide a means for controlling for omitted variable bias and we should use fixed effect model.

4.3 Panel Data Structure:

Panel data can be structured in two ways- balanced and unbalanced panel. The panel dataset consist of cross sectional entities denoted by i = 1, 2... n and time component which is denoted by t = 1,2,…T. In a balanced panel data set, all cross sectional entities is observed in all time periods. In a panel data table consisting of cross sectional and time series variables, will have only one frequency in each cell. Where, the total number of observations in panel is calculated by multiplying n by t.

An unbalanced panel dataset is one where each entity "i" has different numbers of observations. If some cells in the panel data table have zero frequency, the total number of observations is not n multiplied by t as this is an unbalanced panel. This means that there are missing entries in the panel data set. Unbalanced panel data may lead to a problem in estimation if these missing entries are not random, i.e. it is related to the idiosyncratic errors U_{it} (error term which changes across space over time), then this unbalanced panel may give biased estimates. The researcher has often no prior method to choose between Random Effect and Fixed Effect unless the units of observation remain unchanged. For this we rely on some model selection tests. We discuss this next.

4.4 Model Selection Test:

To choose between fixed effect and random in the panel data model, researchers often use Hausman specification test. The Hausman test compares between random effect and fixed effect models under the null hypothesis that the individual effects has no correlation with any regressor in the panel regression model (Hausman, 1978). If the null hypothesis of no correlation between individual effect and regressos is not violated, fixed effect and random effect are consistent, but fixed effect is inefficient. If the null hypothesis is rejected, then the fixed effect is consistent and the random effect is inconsistent and biased (Greene, 2008).

The Hausman specification test states that, "the covariance of an efficient estimator with its difference from an inefficient estimator is zero" (Greene, 2008).

$$LM = (\beta_{fixed} - \beta_{random})' \hat{w}^{-1} 1 (\beta_{fixed} - \beta_{random}) \sim \chi^2 (k), \qquad 4.10$$

$$\hat{w} = \text{Var}[\beta_{fixed} - \beta_{random}] = \text{Var}\,(\beta_{fixed}) - Var(\beta_{random})$$

Where $\hat{w}$ is the difference in the estimated covariance matrices of fixed effect and random effect. The equation 4.10 examines if "the random effect model estimate is insignificantly different from the unbiased fixed effect model estimate" (Kennedy, 2003). If the null hypothesis of no correlation between individual effect and regressors is rejected, we may conclude that individual effects *Ui* (in equation 4.9) are significantly correlated with one of the regressors in the model and thus the random effect model is inefficient to use. Therefore, we need to use a fixed effect

model over random effect model. The limitation of the Hausman specification test is, that the difference of covariance matrices *W* may not be a positive definite; in that case, we may conclude that the null is not rejected assuming similarity of the covariance matrices renders such a problem (Greene, 2008).

4.5 Dynamic Panel GMM Methodology:

In the context of panel data, we usually must deal with unobserved heterogeneity by applying the within (demeaning) transformation, as in one-way fixed effects models (a model which considers only individual effects, including time effect), or by taking first differences if the second dimension (time) of the panel is a proper time series. The ability of first differencing to remove unobserved heterogeneity also underlies the family of estimators that have been developed for dynamic panel data (DPD) models. These models contain one or more lagged dependent variables, allowing for the modeling of a partial adjustment mechanism. A serious difficulty arises with the one-way fixed effects model in the context of a dynamic panel data (DPD) model particularly in the "small T, large N" context. As Nickell, (1981) shows, this arises because the demeaning process which subtracts the individual's mean value of y and each X from the respective variable creates a correlation between the regressor and error. The mean of the lagged dependent variable contains observations 0 through (T − 1) on y. The mean error which is being conceptually subtracted from each ε_{it} contains contemporaneous values of ε for t = 1 . . . T. The resulting correlation creates a bias in the estimate of the coefficient of the lagged dependent variable which is not mitigated by increasing

N, the number of individual units. The demeaning operation creates a regressor which cannot be distributed independently of the error term.

$$Y_{it} = \beta + h y_{it-1} \sum_j \beta_j x_{ijt} + f_i + \varepsilon_{it} \qquad 4.11$$

$$Y_{it} = \beta + \sum_j \beta_j x_{ijt} + f_i + u_{it} \qquad 4.12$$

Where f_i is fixed parameters and $h < 1$

Nickell, (1981) demonstrates that the inconsistency of $\hat{h}$ as $N \to \infty$ is of order 1/T, which may be quite sizable in a “small T" context. If $h > 0$, the bias is invariably negative, so that the persistence of y will be underestimated. For reasonably large values of T, the limit of $(\hat{h} - h)$ as $N \to \infty$ will be approximately $-(1 + h)/(T - 1)$: a sizable value, even if T = 10. With h = 0.5, the bias will be -0.167, or about 1/3 of the true value. The inclusion of additional regressors does not remove this bias. Indeed, if the regressors are correlated with the lagged dependent variable to some degree, their coefficients may be seriously biased as well.

Note also that this bias is not caused by an autocorrelated error process ε. If the error process is autocorrelated, the problem is even more severe given the difficulty of deriving a consistent estimate of the auto regressive parameters in that context. The same problem affects the one-way random effects model. The u_i error

component enters every value of y_{it} by assumption, so that the lagged dependent variable cannot be independent of the composite error process.

One solution to this problem involves taking first differences of the original model. Consider a model containing a lagged dependent variable and a single regressor X:

$$y_{it} = \beta_1 + \rho y_{i,t-1} + X_{it}\,\beta_2 + u_i + \varepsilon_{it} \qquad 4.13$$

The first difference transformation removes both the constant term and the individual effect:

$$\Delta y_{it} = \Delta\rho y_{i,t-1} + \Delta X_{it}\,\beta_2 + \Delta\,\varepsilon_{it} \qquad 4.14$$

There is still correlation between the differenced lagged dependent variable and the disturbance process (which is now a first-order moving average process, or MA(1)): the former contains $y_{i,t-1}$ and the latter contains $\varepsilon_{i,t-1}$.

The Dynamic Panel Data approach is usually considered the work of Arellano & Bond, (1991), but they in fact popularized the work of Holtz-Eakin, Newey, & Rosen, (1988). The Dynamic Panel Data approch is based on the notion that the instrumental variables approach noted above does not exploit all of the information available in the sample. By doing so in a Generalized Method of Moments (GMM) context, we may construct more efficient estimates of the dynamic panel data model.

Arellano & Bond, (1991) argue that the Anderson-Hsiao estimator (Dynamic panel data estimator proposed by Anderson-Hsiao, (1981)), while consistent, fails to take all of the potential orthogonality conditions into account. A key aspect of the Arellano and Bond strategy, echoing that of Anderson & Hsiao, (1981), is the assumption that the necessary instruments are 'internal': that is, based on lagged values of the instrumented variable. The estimators allow the inclusion of external instruments as well. Consider the equations

$$y_{it} = X_{it}\beta_1 + W_{it}\beta_2 + v_{it} \qquad 4.15$$

$$v_{it} = u_i + \varepsilon_{it}$$

where X_{it} includes strictly exogenous regressors, W_{it} are predetermined regressors (which may include lags of y) and endogenous regressors, all of which may be correlated with u_i , the unobserved individual effect. First-differencing the equation removes the u_i and its associated omitted-variable bias.

The Arellano and Bond approach, and its extension to the 'System GMM' context, is an estimator designed for situations with:

- 'small T, large N' panels: few time periods and many individual units
- a linear functional relationship
- one left-hand variable that is dynamic, depending on its own past realizations

- right-hand variables that are not strictly exogenous: correlated with past and possibly current realisations of the error
- fixed individual effects, implying unobserved heterogeneity
- heteroskedasticity and autocorrelation within individual units' errors, but not across them

Unlike static panel data models, dynamic panel data models include lagged levels of the dependent variable as regressors. Since lags of the dependent variable are necessarily correlated with the idiosyncratic error, traditional static panel data model estimators such as the fixed effects and random effects estimators are inconsistent, due to presence of endogenous regressors.

Anderson & Hsiao, (1981) first proposed a solution by utilising instrumental variables estimation. By taking the first difference of the regression equation to eliminate the fixed effect, deeper lags of the dependent variable can be used as instruments for differenced lags of the dependent variable which are endogenous. Since increasing the number of instruments always increases the asymptotic efficiency of the estimator, it was proposed that all instruments in each time period should be used.

However, the Anderson–Hsiao estimator is asymptotically inefficient, as its asymptotic variance is higher than the Arellano–Bond estimator, which uses the same set of instruments, but constructs moment conditions from them and

uses generalized method of moments estimation rather than instrumental variables estimation.

Consider the static linear unobserved effects model for N observations and T time periods:

$$y_{it} = x_{it}\beta + \alpha_i + \mu_{it} \text{ for } t - 1, \ldots., T \text{ and } i = 1, \ldots.., N \qquad 4.16$$

where y_{it} is the dependent variable observed for individual i at time t, x_{it} is the time-variant 1 x k regressor matrix, α_i is the unobserved time-invariant individual effect and μ_{it} is the error term. Unlike x_{it}, α_i cannot be observed. Common examples for time-invariant effects α_i are innate ability for individuals or historical and institutional factors for countries.

Unlike a static panel data model, a dynamic panel model also contains lags of the dependent variable as regressors, accounting for concepts such as momentum and inertia. In addition to the regressors outlined above, consider a case where one lag of the dependent variable is included as a regressor, y_{it-1}.

$$y_{it} = x_{it}\beta + \rho\, y_{it-1} + \alpha_i + \mu_{it} \text{ for } t - 1, \ldots., T \text{ and } i = 1, \ldots.., N \qquad 4.17$$

Taking the first difference of this equation to eliminate the fixed effect,

$$\Delta y_{it} = y_{it} - y_{it-1}$$

$$\Delta y_{it} = \Delta x_{it}\beta + \rho\, \Delta y_{it-1} + \Delta \mu_{it} \qquad 4.18$$

$$\text{for } t - 1, \ldots., T \text{ and } i = 1, \ldots.., N$$

This equation can be re-written as,

$$\Delta y = \Delta R\pi + \Delta \mu \, . \qquad 4.19$$

$$(\Delta R\pi = \Delta x_{it}\beta + \rho\, \Delta y_{it-1})$$

Applying the formula for the Efficient Generalized Method of Moments Estimator, which is,

$$\pi GMM = [\Delta R`Z\,(Z`\Omega\, Z)^{-1}Z`\Delta R]^{-1}\, \Delta R`Z(Z`\Omega\, Z)^{-1}\, Z`y \qquad 4.20$$

where Z is the instrument matrix for ΔR.

The matrix Ω can be calculated from the variance of the error terms, μ_{it} for the one-step Arellano–Bond estimator or using the residual vectors of the one-step Arellano Bond estimator for the two-step Arellano–Bond estimator, which is consistent and asymptotically efficient in the presence of heteroskedasticity.

In this section we have described GMM methodology, how common panel methodologies will be biased if data is small time component over cross section.

In the next section we examine the quantile regression methodology and more specifically the panel quantile regression.

4.6 Quantile Regression Methodology:

The linear regression is a method to find the relationship between a group of predictor variables and a dependent or response variable. The regression model provides the mean value of the response variable for the given predictor variables based on the conditional mean function E(y|x). Similarly we may consider the relationship between a group of predictor variables and a dependent or response variable using the conditional median function Qq(y|x), where the median is the 50^{th} quantile q, of the distribution.

Suppose we are interested to find out the relationship between the total output of the state or industry and credit disbursed. This model estimates how, on average total credit disbursed will affect the total output, the model can address the question "is credit important to define output?" But it cannot answer an important question: "does credit influence output differently for states with low credit availability than those with high credit availability ". The answer to such a question with broader picture of the relationship between the predictors on the response variable can be efficiently obtained by using Quantile regression approach. It estimates the relation between a set of predictor variables and particular quantiles of the response variable. It estimates the changes in the quantiles of the response variable. The effect of credit on output in a particular quantile can be compared to its effect on the other quantiles of output.

The linear regression coefficient represents the change in the response variable produced by a one unit change in the predictor variable associated with that coefficient. The quantile regression estimates the change in a particular quantile of the response variable produced by a one unit change in the predictor variable. This allows comparing how some quantiles of the output of the state may be more affected by certain level of credit than other quantiles. These changes are reflected in the size of the regression coefficient.

If ε_i is the model prediction error term, ordinary least square minimizes mean sum of square $\sum_i e^2_i$. Quantile regression estimates for median, also known as least absolute deviations regression, minimizes $\sum_i |e_i|$. Quantile regression minimizes a sum that gives asymmetric penalties $(1- q)|e_i|$ for over prediction and $q|e_i|$ for under prediction. Quantile regression is semi parametric as it avoids assumptions about the parametric distribution of the error process. Quantile estimates are more robust in presence of outliers than least squares regression estimates.

Just as regression models conditional moments, such as predictions of the conditional mean function, we may use quantile regression to model conditional quantiles of the joint distribution of y and x.

Let $\hat{y}(x)$ denote the predictor function and $e(x) = y - \hat{y}(x)$ denote the prediction error. Then

$$L(e(x)) = L(y - \hat{y}(x)) \qquad 4.21$$

denotes the loss associated with the prediction errors. If $L(e) = e^2$, we have squared error loss, and least squares is the optimal predictor. If $L(e) = |e|$, the optimal predictor is the conditional median, med(y|x), and the optimal predictor is that $\hat{B}$ which minimizes $\sum_i |y_i - x_i B|$.

The advantage of quantile regression analysis is that while ordinary least square estimates can be inefficient if the errors are highly non normal, quantile regression is more robust to non normal errors and outliers. Quantile regression also provides a richer characterization of the data, allowing us to consider the impact of a covariate on the entire distribution of y, not merely at its conditional mean.

4.7 Panel Quantile Regression:

Recently, there has been a growing literature on estimation and testing of dynamic panel data models. Consistency of estimators in conventional dynamic panel data models depends critically on the assumptions about the initial conditions of the dynamic process. Anderson and Hsiao (1981, 1982) and Arellano and Bond (1991) have shown that instrumental variables methods are able to produce consistent

estimators that are independent of the initial conditions. Koenker, (2004) introduced a general approach to estimation of quantile regression models for longitudinal data. Individual specific (fixed) effects are treated as pure location shift parameters common to all conditional quantiles and may be subject to shrinkage toward a common value as in the Gaussian random effects paradigm. If the random effect modeled as Gaussian process, the distribution of various derived quantities can be explicitly. Such quantities include the average value of the process over a range of time.

Controlling for individual specific heterogeneity via fixed effects while exploring heterogeneous covariate effects within the quantile regression framework offers a more flexible approach to the analysis of panel data than that afforded by the classical Gaussian fixed and random effects estimators. Recent work by Lamarche, (2006) and Geraci & Bottai, (2007) have elaborated on this form of penalized quantile regression estimator.

Abrevaya & Dahl, (2008) have introduced an alternative approach to estimating quantile regression models for panel data employing the "correlated random effects" model of Chamberlain, (1982). In econometric applications the modeling of dynamic relationships and the availability of panel data often suggest dynamic model specifications involving lagged dependent variables. Conventional quantile regression estimation of dynamic panel data models with fixed effects suffers from

similar bias effects to those seen in the least squares case when "T" is modest. Reliance on the existing least squares strategies for bias reduction is unsatisfactory in the quantile regression setting for at least two reasons. First, differencing is inappropriate, either temporally, or via the usual deviation from individual means (within) transformation. Linear transformations that are completely innocuous in the context of conditional mean models are highly problematic in the conditional quantile models since they alter in a fundamental way what is being estimated. Expectations enjoy the convenient property in that they change with linear transformations; quantiles do not. Secondly, the implementation of the instrumental variables method needs to be rethought. Fortunately, neither problem is insurmountable. There is no need to transform the quantile regression model to compute the fixed effects estimator. This is a computable convenience in the least squares case, but even when the number of fixed effects is large, interior point optimization methods using modern sparse linear algebra make direct estimation of the quantile regression model quite efficient.

The instrumental variables estimator for quantile regression introduced by Chernozhukov & Hansen, (2006) can be adapted to the dynamic panel data setting and serves as an effective bias reduction device. Monte Carlo simulations show that the quantile regression fixed effects estimator is significantly biased in the presence of lagged dependent variables, while the instrumental variables method sharply reduces the bias even in short panels. In addition, the Monte Carlo experiments suggest that the quantile regression instrumental variables approach

for dynamic panel data performs better than ordinary least squares instrumental variables in terms of bias and root mean squared error for non-Gaussian heavy-tailed distributions. Tests based on the fixed effects quantile regression dynamic panel instrumental variables turn out to be especially advantageous when distributions are heavy-tailed. There is also an emerging literature on forecasting with panel data, Baltagi, (2008).

Galvao, (2009) investigates estimation and inference in a quantile regression formulation of the dynamic panel data model with individual specific intercepts. They found that conventional fixed effects estimation of the quantile regression specification suffers from similar bias problems to those of the least squares estimation. To reduce the dynamic bias in the quantile regression fixed effects estimator, Galvao, (2009) suggest the use of the instrumental variables quantile regression along with lagged or lagged differences of the regressors as instruments. Thus, the estimator combines the usual instrumental variables concept for dynamic panel data and the quantile regression instrumental variables framework.

4.8 Conclusion:

Panel data methodology brings in many advantages over time series or cross sectional data. Major problems faced in Ordinary Least Square method technique

are taken care of in the panel methodology. The quantile regression estimation helps in understanding the effect of specific quantile on the dependent variable which gives better insight instead of looking at the average effect.

In the next chapter we are going to examine the effect of the financial liberalisation on economic growth using panel data cross country analysis. Financial liberalisation debate show is not able to conclude on causality between the financial liberalisation and economic growth, we try to address this issue by using the panel granger causality test.

Chapter V: Financial Liberalisation and Cross Country Analysis

In the last chapter we discussed the methodology we will be using in analyzing the data which we discussed in the third chapter. In this chapter we look at the impact of the financial liberalisation across 98 countries from the period of 1970 to 2012.

5.1 Background:

Financial liberalisation is being pursued by many countries for the past four decades; however its impact on growth remains debatable. There are many instances of financial crises which increase concerns about the nature and extent of financial liberalisation pursued by the countries. The concerns related to financial liberalisation is on multiple grounds partly due to its impact on economic growth as well as on distribution of incomes.

The primary focus of financial liberalisation is on the banking sector, because most of the economies are the bank based economies (Beck, Demirgüç-Kunt, & Levine, 2009). The neoclassical school (McKinnon, 1973; Shaw, 1973), in its standard model assumes interest rates influence savings and investments. Influencing interest rates through the removal of reserve constraints on banks gives incentive to save in the form of banking deposits. These generate resources

for banks to offer credit for investment. The availability of credit at market rate will increase investment quality and help in better monitoring and screening. Eventually, high savings and enhanced investment credit will help the economy to generate greater economic growth.

There are other types of financial reforms which are followed in many of the developing economies more recently. The removal of barriers for entry of new domestic and foreign banks, bank ownership from government to private sector, changing prudential norms, development of security markets and lifting of capital accounts restrictions Abiad et al., (2010), Agenor and Montiel, (2008), Ghosh, (2005).

The degree of financial reforms differs across economies. Our study focuses on the financial reform followed by countries in reducing reserves requirement and freeing of interest rates and examines the impact on economic growth.

The literature on financial liberalisation is divided on the outcome for countries Beck et al., (2009), Levine, (2005), Rajan & Zingales, (1996), Levine, (2001), Bhaduri & Nayyar, (2000) Chandrasekhar, (2008). Theoretically, financial liberalisation may contribute to increased growth in different ways. The improved risk sharing could lower the cost of capital, and also lead to investment in riskier

projects that have higher expected returns (Obstfeld and Rogoff 1994). Contrarily it may reduce precautionary savings and lower growth (Devereux and Smith 1994). Opening capital markets may lead to more efficient domestic capital markets, and usually increases financial development. There is a large literature showing how improved financial intermediation can increase growth (Bencivenga & Smith, 1991; Bencivenga, Smith, & Starr, 1995; Greenwood & Jovanovic, 1990). The implementation of liberal policies and development of institutions permits economies to benefit from frontier technology (Klenow and Rodriguez-Clare 1997). If one were to distinguish between financial development and financial liberalisation we find that there is substantial research on the relation between financial development and economic growth. The literature however lacks much analysis of the effects of the financial liberalisation on economic growth.

This study tries to address the gap in literature on financial liberalisation and its impact on economic growth. We take the total credit issued to the private sector as a measure of financial liberalisation. We examine its impact on per capita growth. We also examine the dual link between the financial development and per capita growth. We also test for causality to see whether growth causes financial development or vice-versa. We use a panel Granger causality test for this.

5.2 Data:

We use an international cross country dataset to study financial liberalisation and its impact on growth created by the Beck et al. (2013). This database of indicators of financial development and structure across countries and over time includes a range of indicators (31 indicators in total), starting from 1960, that measures the size, activity, and efficiency of financial intermediaries and markets. The Financial Development and Structure dataset updated in November 2013 contains data from 1960 through 2012 for. For the analysis time period of 1970 to 2012 and 98 countries is used.

This dataset permits the construction of financial structure indicators to measure whether, for example, a country's banks are larger, more active, and more efficient than its stock markets. These indicators can then be used to investigate the empirical link between the legal, regulatory, and policy environment and indicators of financial structure. They can also be used to analyze the implications of financial structure for economic growth.

We use per capita income at constant prices 2004 in US dollars (see Table 5.1) and Credit disabused to the private sector by the banking institutions as a proportion of the GDP (see Table 5.2).

Table 5.1 Average PCI US $ constant prices 2004 for period 1970 to 2012

Code	Country	Mean	Std.Dev	Min	Max
DZA	Algeria	2164	1224	331	5404
ARG	Argentina	4904	2784	1317	11558
AUS	Australia	20564	15348	3300	67036
AUT	Austria	21567	14493	2038	49679
BGD	Bangladesh	310	158	91	747
BRB	Barbados	6704	4066	761	14656
BLZ	Belize	2425	1422	436	4804
BEN	Benin	373	171	113	752
BOL	Benin	943	489	241	2576
BRA	Brazil	3606	2951	441	12576
BFA	Burkina Faso	288	143	81	650
BDI	Burundi	166	53	70	251
CMR	Cameroon	751	291	171	1211
CAN	Canada	20938	13073	4047	52219
CAF	Central African Republic	325	113	103	511
TCD	Chad	309	206	129	885
CHN	China	1049	1470	112	6091
COL	Colombia	2198	1820	337	7752
CRI	Costa Rica	3131	2196	540	9391
CIV	Cote d'Ivoire	832	256	278	1282
CYP	Cyprus	11330	9507	71	31928
DNK	Denmark	26929	17600	3366	62596
ECU	Ecuador	2161	1173	444	5456
EGY	Egypt, Arab Rep.	1013	758	211	3187
FJI	Fiji	2181	1061	422	4438
FIN	Finland	21709	14093	2436	51186
FRA	France	20164	12110	2822	43992
GAB	Gabon	4932	2496	550	11789
GMB	Gambia, The	433	201	117	774
DEU	Germany	20803	12637	2672	44132
GHA	Ghana	505	358	233	1605
GRC	Greece	11120	8288	1425	30399
GTM	Guatemala	1431	780	352	3368
GUY	Guyana	1025	805	372	3584
HND	Honduras	935	534	264	2264
ISL	Iceland	24776	15699	2538	65566
IND	India	474	372	114	1534
IDN	Indonesia	928	837	84	3557
IRN	Iran, Islamic Rep.	2466	1557	370	7205
IRL	Ireland	20159	18283	1460	59287
ISR	Israel	12979	8734	1806	33009
ITA	Italy	17127	11165	2030	38563
JAM	Jamaica	2465	1448	752	5472
JPN	Japan	23828	14500	2004	46720
JOR	Jordan	1919	1081	424	4945
KEN	Kenya	412	181	142	862

KWT	Kuwait	19244	15137	1373	64434
MDG	Madagascar	299	81	169	471
MWI	Malawi	187	70	64	364
MYS	Malaysia	3462	2608	392	10381
MLI	Mali	298	178	63	739
MLT	Malta	8310	6284	828	21964
MRT	Mauritania	558	243	182	1154
MEX	Mexico	4093	2803	671	9742
MAR	Morocco	1228	784	247	3044
NPL	Nepal	234	153	75	707
NLD	Netherlands	21957	14591	2711	52951
NZL	New Zealand	14186	9192	1963	32228
NIC	Nicaragua	830	379	244	1754
NER	Niger	258	74	147	430
NGA	Nigeria	545	384	160	1555
NOR	Norway	34344	27951	3284	99558
OMN	Oman	7849	6241	354	24727
PAK	Pakistan	465	285	98	1290
PAN	Panama	3153	2089	666	9534
PNG	Papua New Guinea	822	361	265	2184
PRY	Paraguay	1447	861	221	3957
PER	Peru	1982	1466	548	6573
PHL	Philippines	921	569	187	2588
PRT	Portugal	9308	7221	922	23716
QAT	Qatar	29287	23177	2760	90524
RWA	Rwanda	264	131	58	620
SAU	Saudi Arabia	9602	4758	864	20778
SEN	Senegal	613	220	243	1094
SLE	Sierra Leone	275	108	133	635
SGP	Singapore	16889	13944	925	51709
ESP	Spain	13339	10088	1177	34977
LKA	Sri Lanka	787	709	184	2923
KNA	St. Kitts and Nevis	5483	4819	363	14407
LCA	St. Lucia	3101	2197	97	6762
VCT	St. Vincent and the Grenadines	2521	2118	204	6515
SDN	Sudan	557	363	151	1580
SUR	Suriname	2709	2182	664	8864
SWZ	Swaziland	1344	846	252	3274
SWE	Sweden	25191	14795	4402	57071
SYR	Syrian Arab Republic	1318	690	336	3289
TGO	Togo	333	107	120	574
TTO	Trinidad and Tobago	6735	5127	869	21283
TUN	Tunisia	1936	1189	281	4350
TUR	Turkey	3565	3076	457	10666
UGA	Uganda	264	111	99	547
ARE	United Arab Emirates	31866	7822	15958	46310
GBR	United Kingdom	18910	13154	2242	46330
USA	United States	25033	14151	4998	49965

URY	Uruguay	4532	3364	761	14450
VEN	Venezuela, RB	4476	3084	1212	13559
ZMB	Zambia	564	297	236	1469
ZWE	Zimbabwe	640	175	345	1084

Source World Bank

Highly developed economies have mean per capita income above US $ 20,000. Low income economies having mean per capita income below US $ 300. For India mean Per capita GDP is US $ 474 in category of Low middle income countries.

Table 5.2 Average Credit as proportion of GDP for period 1970 to 2012

Code	Country	Mean	Std.Dev	Min	Max
ARG	Argentina	34	11	20	80
AUS	Australia	78	38	38	160
AUT	Austria	107	26	53	140
BGD	Bangladesh	30	19	9	70
BRB	Barbados	74	33	39	147
BLZ	Belize	42	18	6	73
BEN	Benin	16	8	4	32
BOL	Benin	37	19	6	71
BRA	Brazil	76	38	37	213
BFA	Burkina Faso	11	4	1	20
BDI	Burundi	19	7	4	30
CMR	Cameroon	19	7	7	38
CAN	Canada	121	55	47	225
CAF	Central African Republic	18	5	10	32
CHN	China	86	44	4	155
COL	Colombia	40	11	23	70
CRI	Costa Rica	36	11	16	57
CIV	Cote d'Ivoire	31	10	18	51
CYP	Cyprus	148	81	68	344
DNK	Denmark	93	63	43	222
ECU	Ecuador	19	6	11	35
EGY	Egypt, Arab Rep.	83	17	49	111
FJI	Fiji	54	39	15	140
FIN	Finland	64	20	39	104
FRA	France	103	18	38	136
GAB	Gabon	18	7	2	41
GMB	Gambia, The	24	19	0	67
DEU	Germany	108	26	62	146
GHA	Ghana	26	6	16	39
GRC	Greece	81	32	26	153
GTM	Guatemala	28	8	15	39
GUY	Guyana	129	91	27	334

HND	Honduras	38	9	23	58
ISL	Iceland	83	73	28	314
IND	India	47	14	22	77
IDN	Indonesia	34	17	8	62
IRN	Iran, Islamic Rep.	44	17	17	76
IRL	Ireland	88	62	32	232
ISR	Israel	99	37	48	232
ITA	Italy	102	20	84	168
JAM	Jamaica	52	15	26	94
JPN	Japan	247	62	132	346
JOR	Jordan	78	28	22	117
KEN	Kenya	41	9	16	53
KWT	Kuwait	61	37	1	185
MDG	Madagascar	21	10	9	41
MWI	Malawi	23	10	9	40
MYS	Malaysia	103	40	22	163
MLI	Mali	23	12	10	49
MLT	Malta	87	45	23	157
MRT	Mauritania	65	25	28	114
MEX	Mexico	43	8	32	66
MARi	Morocco	59	23	27	114
NPL	Nepal	30	18	1	69
NLD	Netherlands	134	40	83	223
NZL	New Zealand	78	50	14	173
NIC	Nicaragua	70	48	23	249
NER	Niger	12	5	4	20
NOR	Norway	65	15	47	94
OMN	Oman	23	12	6	47
PAK	Pakistan	48	6	37	58
PAN	Panama	73	14	39	99
PNG	Papua New Guinea	25	8	11	39
PRY	Paraguay	23	6	14	37
PER	Peru	22	6	11	34
PHL	Philippines	43	14	20	79
PRT	Portugal	105	43	54	209
QAT	Qatar	39	22	6	80
RWA	Rwanda	11	5	3	28
SEN	Senegal	29	9	13	46
SLE	Sierra Leone	30	19	7	90
SGP	Singapore	60	23	16	100
ESP	Spain	121	45	71	234
LKA	Sri Lanka	39	8	22	50
LCA	St. Kitts and Nevis	71	22	50	135
VCT	St. Vincent and the Grenadines	54	7	40	71
SUR	Suriname	47	42	5	151
SWZ	Swaziland	15	5	2	27
SWE	Sweden	97	34	47	145
SYR	Syrian Arab Republic	52	20	25	107

TGO	Togo	23	7	5	38
TUN	Tunisia	63	10	41	82
TUR	Turkey	37	13	19	72
UGA	Uganda	18	10	4	38
GBR	United Kingdom	107	58	36	228
USA	United States	167	43	115	244
URY	Uruguay	44	20	16	99
VEN	Venezuela, RB	32	14	11	57

Source World Bank

Table 5.2 credit disbursed to private sector by the banking institutions as a proportion of the GDP from 1970 to 2012. Some of the developed economies average credit disbursed is above 100 percent of the GDP. In India the average credit disbursed for the private sector is 47 percent of the GDP. The table 5.3 list average per capita income for country groups. North American group has highest average per capita income of 24632 US $ followed by OECD group with 19873 US $. Lowest is for Low income countries with per capita income 282 US $ India belongs to the South Asian countries Group with per capita income of 453 US $.

Table 5.3 PCI at constant prices 2004 for period 1970 to 2012

Code	Year	Mean	Std.Dev	Min	Max
ARB	Arab World	2526	1669	317	7288
CSS	Caribbean small states	3912	2552	743	9645
EAS	East Asia & Pacific (all income levels)	3024	2225	314	9026
EMU	Euro area	17996	11610	2211	41070
ECS	Europe & Central Asia (all income levels)	10396	7082	1352	25309
EUU	European Union	15488	10334	1912	36410
HPC	Heavily indebted poor countries (HIPC)	375	145	155	777
HIC	High income	17250	10776	2445	37703
OEC	High income: OECD	19873	12231	2847	42108
LCN	Latin America & Caribbean (all income levels)	3418	2360	613	9693
LAC	Latin America & Caribbean (developing only)	3289	2263	582	9353
LMY	Low & middle income	1119	948	193	3958
LIC	Low income	282	104	132	592

LMC	Lower middle income	630	446	149	1919
MEA	Middle East & North Africa (all income levels)	2885	2006	336	9190
MIC	Middle income	1252	1094	204	4537
NAC	North America	24632	13994	4908	50198
OED	OECD members	17494	10662	2599	36944
SST	Small states	2304	1495	413	5871
SAS	South Asia	453	338	121	1410
SSF	Sub-Saharan Africa (all income levels)	641	299	218	1440
SSA	Sub-Saharan Africa (developing only)	638	294	218	1422
UMC	Upper middle income	1860	1776	249	7283
WLD	World	4406	2639	786	10171

Source World Bank

5.3 Methodology:

We use a well accepted causality test developed by Granger, (1969) and Sims, (1972) for time series data and which is now also used for panel data studies. Granger causality test is used to determine whether one time series variable is significant in forecasting another series (Granger, 1969). The basic test tries to determine association between past values of a variable and whether these values helps in predicting changes in another variable (Granger, 1988). Greene, (2003) defines it as, the conditional distribution of lagged values of Y_t provides no information to explain the movements of X_t beyond the information provided by the lagged values of X_t. The series *Y* is Granger-caused by series *X* if series *X* helps in predicting the value of series *Y*. In this case, it means the lagged values of series *X* are statistically significant in explaining series *Y*.

Our study tests for causality between per capita growth (demand) and credit disbursed to private sector (supply) using Granger, (1969) notion, with the premise that Granger noncausality corresponds to lack of predictability; a variable *Y* is G-noncausal for *X* when we are unable to predict *X* better with the past history of *Y* in the information set than when it is excluded. The finite-order panel vector autoregression of order p would take the form:

$$\text{Zit} \quad = \sum_{j=1}^{\rho} \Gamma ijtZi, t-j + \mu it + \varepsilon it, i = 1, \dots, N \ \& \ t = 1, \dots, T \qquad 5.1$$

The vector μ_{it} contains country-specific and period fixed effects; $\mu_{it} = \alpha_i + \beta_t$, accounting for both common shocks and general growth differences between countries. Accordingly, we allow for at most period effects. The disturbances ε_{it} are assumed to be independently distributed across countries and time, with means 0 and variances σ_i^2, permitting cross-country heteroscedasticity. The Granger causality test is effective tool to find the causal relationship between the time series variables.

Where Z_{it} K-dimensional. For the bivariate models K=2 with

$$Z_{it} = [\text{LnPCI}_{it} \ \text{LnCredit}_{it}] \qquad 5.2$$

Where LnPCI = Natural log of per capita income at constant prices 2004 US $ and LnCredit is Natural log of credit disbursed to the private sector by the banking institutions as proportion of the GDP.

We also present three cross sectional results for following model

$$LnPCI_{it} = a + \beta LnCredit_{it} \qquad 5.3$$

The relationship between the per capita income and credit disbursed to the private is tested using cross sectional regression. We use three different periods for the regression, 1970 where study period starts, 1991 where liberalisation took place and 2012 is latest year data is available.

5.4 Results:

The OLS regression data analysis is based on a set of assumptions, violation of these assumptions influence the correct estimation of the parameters using OLS method. In time series regression the OLS estimation method may produce vary high R-square value with no meaningful relationship between the variables. This problem is known as spurious regression generated by a non-stationary process. The precondition for running Granger Causality test is examining variables for stationarity. The time series is said to be stationary if the mean and variance are time invariant, a non stationary time series will have time variant mean and

variance. A time series whose fluctuations around mean will have constant amplitude and tends to return to its mean showing stationarity.

Unit root test for the Log of per capita income growth and log of credit to the private sector are stationary which is primary requirement for the running of the Granger causality test (see Table 5.4, 5.5). The panel Granger causality test states that credit is not causing per capita income growth, but shows causality between per capita income growth and credit to the private sector (see Table 5.6). These results show that benefits of the financial liberalisation are realized by the economies which have high per capita income like in case of USA and Japan (see Figure 5.1). The countries with high per capita income are countries with well developed financial markets. It is true if we look at the movement of economies in the scatter plots. Developing economies are trapped in low per capita income, they have not moved from their position in 1970 to 2012 (see Figure 5.1).

Table 5.4 Unit root test results for LPCINIC

Null Hypothesis: Unit root present in the data
Series: LnPCI
Sample: 1970 2012
Total number of observations: 9699

Method	Statistic	Prob.**
Levin, Lin & Chu t*	-12.5050	0.0000

** Probabilities are computed assuming asympotic normality

Table 5.5 Unit root test results for LCREDIT

Null Hypothesis: Unit root present in data
Series: LnCREDIT
Sample: 1970 2012
Total number of observations: 8204

Method	Statistic	Prob.**
Levin, Lin & Chu t*	-8.94224	0.0000

** Probabilities are computed assuming asympotic normality

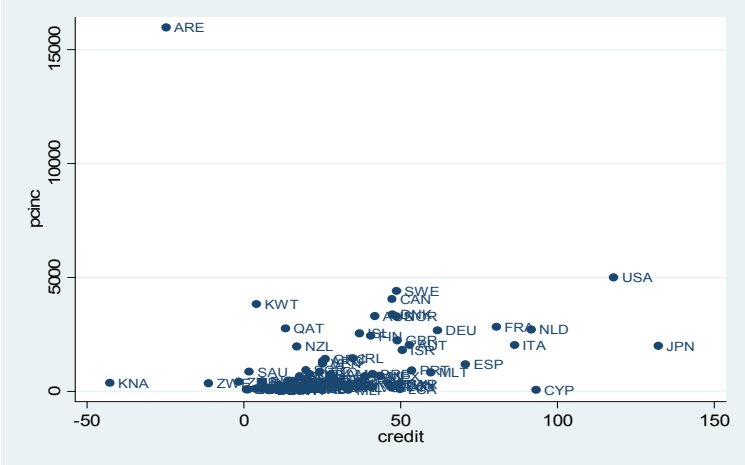
Table 5.6 Panel Granger Causality test

Pairwise Granger Causality Tests
Sample: 1960 2012

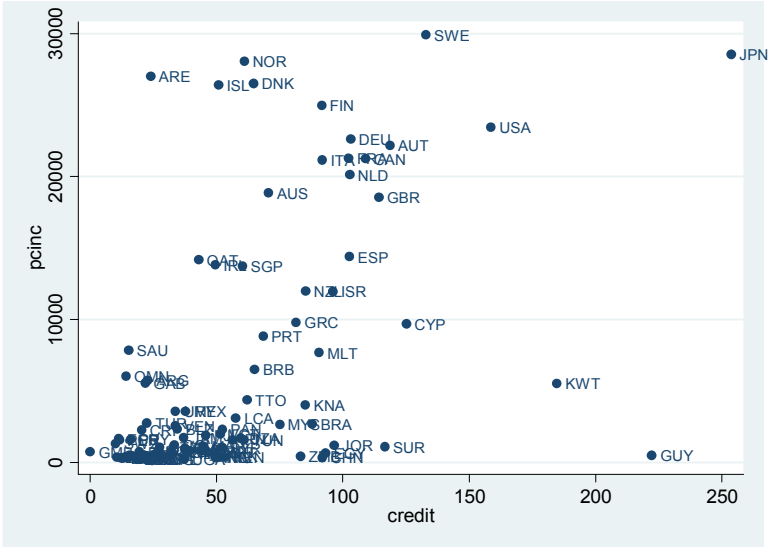
Null Hypothesis:	Obs	F-Statistic	Prob.
LCREDIT does not Granger Cause LPCINC	7806	1.51635	0.2196
LPCINC does not Granger Cause LCREDIT		68.3402	0.0030

Figure 5.1 The Scatter plot 1970, 1991 and 2012 (all countries)

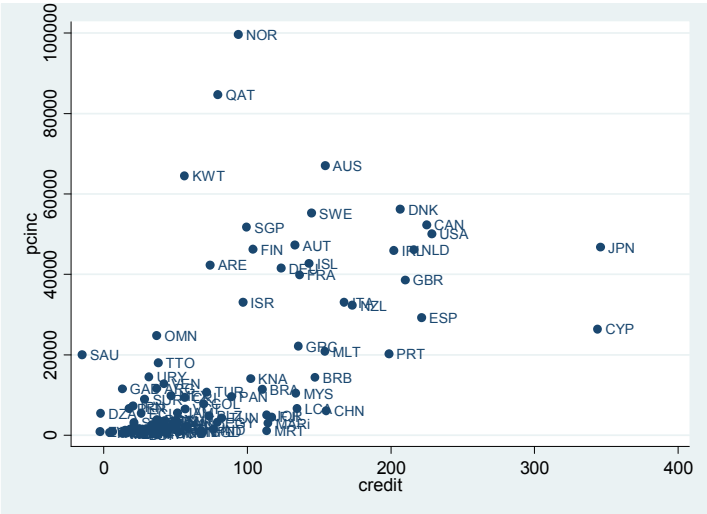
1970



1991



2012

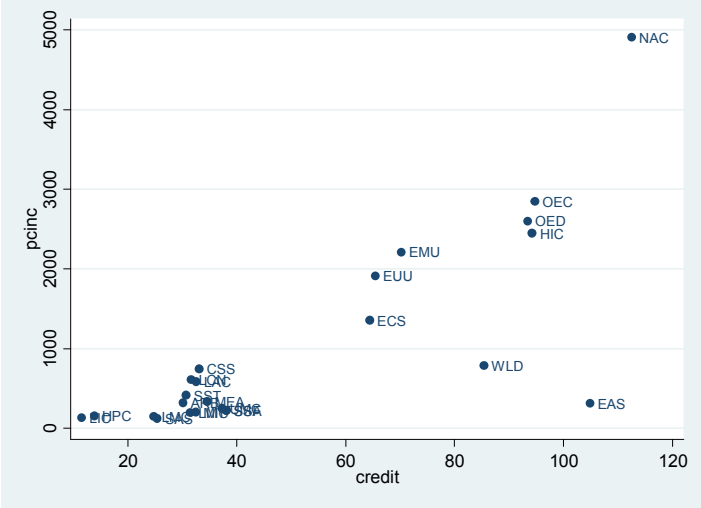


The scatter plots (Figure 5.1) show credit disbursed to private sector as proportion of the GDP against per capita income for the period 1970, 1991 and 2012 for all countries. If we look at the 1970 figure most of the countries are close to zero. The exceptions are Japan and USA which have high credit and high per capita income. The outlier is United Arab Emirates which has very high per capita income. Kuwait is another country with high per capita income. But these are oil exporting countries with high export revenue. In 1991 many countries performed well and moved away from the cluster. Most of them are European high income countries, (Finland, Denmark, Switzerland, Norway etc.). The USA and Japan continued with high credit and high per capita income. The cluster of countries which have low per capita income and low credit is still densely concentrated near the origin.

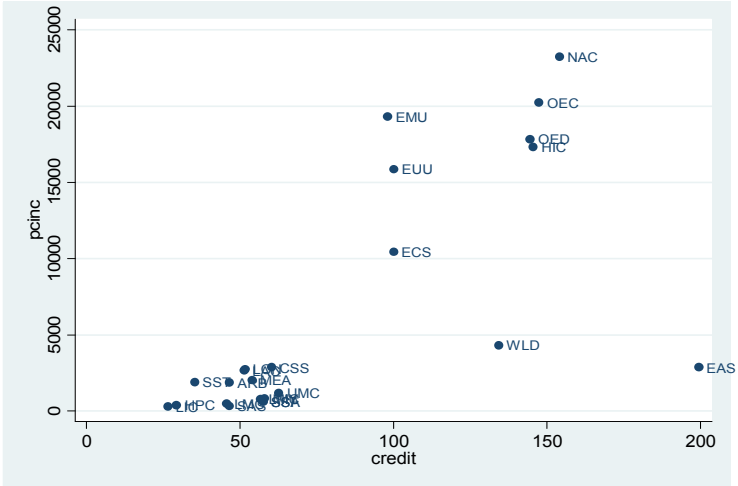
Interestingly in 2012 we can see more countries have spread out from that dense cluster close to the origin in 1991 and India is still part of that cluster.

Figure 5.2 The Scatter plot 1970, 1991 and 2012 (country groups)

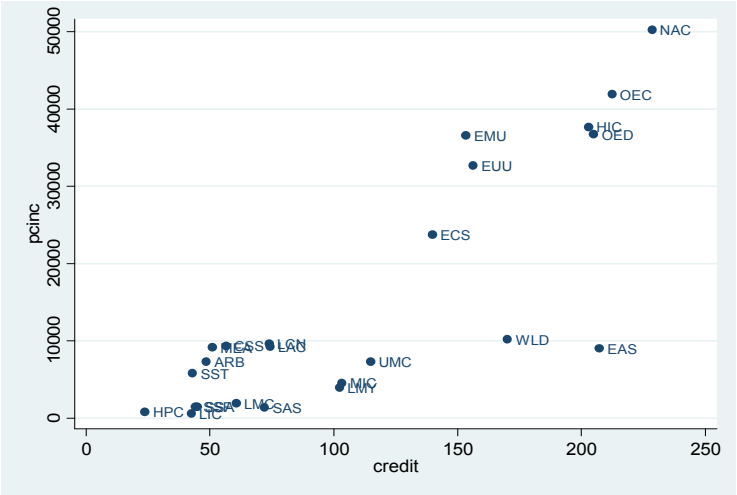
1970



1991



2012



The above figure (5.2) shows the same scatter plots but with country groupings. We exhibit the credit to the private sector as proportion to the GDP on per capita income for country groups. In 1970 the North American countries, and OECD countries showed high credit and per capita income. We also notice a cluster of countries close to the origin represented by low income countries. The 1991 picture is similar to 1970, however the scale of credit and per capita income has changed. In 2012 the country groups are more spread out.

5.5 Conclusion:

In this chapter we tried to explore the relation between the financial development and per capita income, specifically the long debated issue of the causation between

the financial development and growth. The granger causality test showed that per capita income causing financial development but financial development is not causing per capita income growth, concluding uni-directional causality. This is also seen through the scatter plots for the countries.

In the next chapter we examine the impact of the financial liberalisation on Indian Economy using state level dataset from 1971 to 2013. Impact of financial liberalisation is looked from the point of states of Indian and three main sectors of the economy.

Chapter VI: Financial Liberalisation and Indian Economy: Regional Analysis

In the last chapter we examine the impact of financial liberalisation on economic growth using panel granger causality test across countries. We conclude there is uni directional causality, economic growth leading to financial development.

In this chapter we examine the impact of financial liberalisation across the three sectors (agriculture, services and industry). We also look into regional (states of India) impact of financial liberalisation using panel quantile regression.

6.1 Introduction:

Financial Liberalisation has been a vital component of policy reforms initiated in 1991 in India. To understand its effect on the Indian economy, we need to analyse whether there has been an improvement over pre-liberalisation period and examine the extent of financial liberalisation in India. Economies across the globe have permitted different levels of financial liberalisation. India deregulated interest rates, eased the entry norms for new banks and opened up private banking. The reserves requirements for banks were reduced in 1992. The banks are required to follow prudential norms in line with the Basle Accord with effect from 1996. Yet the financial sector in India is not seen as liberalised in line with other big economies such as United State of America Rajan & Zingales, (2003). The chief

merit of reform in India has been the cautious sequencing of reforms and consistent and mutually reinforcing character of the various measures taken Pathak, (2007). Introduction of prudential norms, widening of the capital base and strengthening of the organizational infrastructure have all gone hand in hand. Pathak, (2007).

6.2 The Extent of Financial Liberalisation in India:

In the post 1991 period, the RBI decontrolled the interest rate in sequential manner. The time deposit interest rates were decontrolled initially for longer term deposits and then extended to the short term maturity deposits. The interest rates on all time deposits were freed from October 1997, including fifteen day deposits. The RBI however still controls the interest rate on savings deposits. Table 6.1 shows interest rate on deposits and lending from 1971 to 2015.

Table 6.1 Interest Rates on Deposits and Lending in India

Year	Call Rate	Term Deposits			Lending rate
		1-3 Years	3-5 Years	Above 5 Years	
1971-72	5.16	6.00	6.50	7.25	12.00
1976-77	10.84	8.00	9.00	10.00	14.00-15.00
1981-82	8.96	8.00-9.00	10.00	10.00	17.50-19.50
1986-87	9.99	8.50-9.00	10.00	11.00	16.50-17.50
1991-92	19.57	12.00	13.00	13.00	19
1996-97	7.84	11.00-12.00	12.00-13.00	12.50-13.00	14.50-15.00
2001-02	7.16	7.50-8.50	8.00-8.50	8.00-8.50	11.00-12.00
2006-07	7.22	6.75-8.50	7.75-9.50	7.75-8.50	12.25-14.75
2011-12	8.22	9.25	9.00-9.25	8.50-9.25	10.00-10.75
2015-16	7.04	8.00-8.50	8.00-8.50	8.00	9.70-10.00

Source: Basic Statistical Returns (2015-16)

The purpose of interest rate liberalisation in the banking system was to give banks flexibility and enhance competition. This was meant to allow banks to charge competitive rates according to their cost of raising funds. The banks were now able to vary nominal interest rates offered on deposits to match the changes in inflation so that real returns are maintained Reddy, (1998).

Reserve requirement is another essential area where some reforms have taken place. The cash reserve ratio (CRR) is a specific minimum portion of the total deposits with banks, which are hold as reserves with the central bank. The statutory liquidity ratio (SLR) certain percentage of the deposits that banks have to maintain in the form of gold, cash, and other securities approved by RBI. The CRR applicable to incremental deposits was as high as 15 percent and the SLR was 40 percent, thus pre-empting 55 percent of incremental deposits. These ratios were reduced in a series of steps after 1992 (See Table 6.2).

Table 6.2 Cash Reserve Ratio and Statutory Liquidity Ratio

Year	CRR	SLR
1971-72	6.00	29.00
1976-77	6.00	34.00
1981-82	7.50	35.00
1986-87	10.00	38.00
1991-92	14.50	38.50
1996-97	12.00	25.00
2001-02	8.50	24.00
2006-07	5.25	24.00
2011-12	4.50	23.00
2015-16	4.00	21.50

Source: Basic Statistical Returns (2015-16)

The Banking Regulation Act of 1993 permitted the entry of new private banks in the Indian Banking System. This increased competition in the banking sector. Despite these reforms in the Indian banking sector, some areas are still controlled by the RBI and government. The priority sector lending continues to be mandatory: 40 percent of total credit is to be disbursed to the agriculture, micro industries and weaker section of the society in different proportions, for the banks in India including private and foreign banks. The increase in number of banks is evident from 1969 till 2000 (See Table 6.3) in 2010 there was decline in number of banks.

Table 6.3 Banking sector in India

Year	No. of Commercial Banks	Scheduled Commercial Banks	Regional Rural Banks	Non-Scheduled Commercial Banks
1969	89	73	-	16
1992	276	272	196	4
2000	298	297	196	1
2010	167	163	82	4
2013	155	151	64	4

Source Basic Statistical Returns (2014)

However, the most significant changes in banking have occurred in the post reform period. Till 1990, the entire banking system was government-owned with a few foreign banks with limitations on their expansion. Between 1994 and 2004, a dozen new private banks were given licenses. Their performance has been mixed but they have brought in significant technological changes leading to

transformation in the banking sector (Shah & Patnaik, 2011). The Banking sector reforms have been driven by recommendations of various committees starting with the Narasimhan Committee (GoI, 2013).

6.3 Literature on Financial Liberalisation:

In India the pre-reform period was looked as period of financial repression by some commentators Shaw, (1973) and McKinnon, (1973). In India the pre-reform period was, marked by nationalization of banks in 1969 to 1991. This was the era of 'Social Control' of banks (RBI, 1981). The nationalization of banks was much needed in India at that time to stabilise the system and put banking sector on track for faster economic growth. Sen and Vaidya (1997) found that in the period between 1969 and 1994 there was a substantial increase in the deposits mobilized and that positive returns were available on term deposits. The nationalization has build trust among the depositors, it has been able to channelize the deposits to the organised sector of the economy, and it has enhanced public confidence in the financial system. The effect of financial liberalisation on economic growth is highly debatable as financial reforms did not have favourable outcomes in all the countries.

In an early contribution Schumpeter (1911), argued that financial transactions will take centre stage in economic growth. Finance and inventions would be central for the capitalist engine of growth. In the 1960s and 1970s the financial system of

most economies (specifically countries which achieved freedom from their colonial masters) was highly controlled by central authorities, by setting of interest rate, high reserve requirements and quantitative restrictions on credit allocation. Financial repression as a measure of controlled development was challenged by Goldsmith (1969) and later by Mckinnon (1973) and Shaw (1973), they argued, that it was the cause for low savings, low investment and credit rationing. The period from 1973 to 1993 saw limited research on this topic until the contribution of King and Levine (1993) that did an extensive study on the relationship between financial development and economic growth using data for 80 countries for the period 1960 to 1989. A number of studies followed like Rajan and Zingales (1998) Beck, Levine and Loayza, (1999) but they analyzed the relationship between financial development and not financial liberalization on economic growth. There is however a difference between financial liberalisation and financial development. Financial liberalisation is not the by-product of financial development but it is an exogenous event which enhances the financial development. A number of empirical studies like DeGregorio (1999), Levine (2001), Geert Bekaert (2002), Alessandra Bonfiglioli (2005) studied cross country time series data to test the relationship between financial liberalization and growth. Financial liberalization is expected to lead to growth by stimulating savings and investment by efficient allocation of resources and minimizing the control of central bank and government. Another benefit an economy could potentially realize because of financial liberalization is availability of finance for technological development (Durmus and Erbil 2008), **(**Gallego and Loayza 2002) and reduced liquidity risk (Levine 1997).

In India there are a number of studies that test the relation between financial reforms and economic growth. Mohan, (2008), Acharya (2009), Chakraborty (2009) all studied financial reforms and its effect using time series analysis for country level data. Richard & Shashanka (2000), M. Ahluwalia (2000), R. Dholakia (2009) did regional study. These studies did not focus on whether financial liberalisation has been able to influence regional (states) growth; they analyzed the effect of financial liberalisation on country. Rupayan and Rajendra (2011) have demonstrated that the reform in the banking sector has lead to regional imbalance. They examined the geographical penetration by the number of bank branches per 1000 sq km and demographic penetration number of bank offices per 10 lakhs people. They also ranked states based on the outreach of banking. In order to capture the effect of financial liberalization on economic growth one needs to see how the industrial sector has developed since, this sector needs external finance. The industrial sector is seen to develop faster in countries with more-developed financial markets (Rajan & Zingales, 1996). If the financial liberalization is to have significant impact on economic growth, then the industrial sector shows faster growth.

If we look at the developed countries like the USA and UK, the financial development in the country followed financial liberalization (Levine, 2002). On the other hand, in developing countries, financial liberalization followed financial development. In Indian context most of the financial innovations took place after financial liberalization in 1991 (Chandrasekhar, 2008). Therefore, if we are interested in studying the impact of financial liberalization and economic growth

in developing countries, then we need to identify and study the factors affecting financial development in the country.

It is King & Levine's, (1993) study, which is quoted by many in their research. The methodology used by King and Levine (1993) is applied for India using time series data. They used three different dependent variables, real per capita GDP growth, real per capita capital growth and productivity growth. All these variables are calculated for India by using data from RBI for the period of 1982 to 2013. Real per capita GDP at factor cost and net capital stock, both at constant prices at 2004 is taken from RBI. Productivity growth is calculated using the methodology followed by King and Levine (1993). The use of formula: productive growth = real per capita GDP growth – (0.3) * real per capita capital stock growth.

$$RPCGDP_t = \alpha_1 + \beta_1 DEPTH_t + \beta_2 BANK_t + \beta_2 PRIVY_t + u_t \quad 6.1$$

$$RPCCG_t = \alpha_1 + \beta_1 DEPTH_t + \beta_2 BANK_t + \beta_2 PRIVY_t + u_t \quad 6.2$$

$$PG_t = \alpha_1 + \beta_1 DEPTH_t + \beta_2 BANK_t + \beta_2 PRIVY_t + u_t \quad 6.3$$

Where

RPCGDP = Real per capita GDP at factor cost constant price at 2004

RPCCG = Real per capita capital growth = net capital stock (constant price at 2004)/Population

PG = Productivity Growth = real per capita GDP growth – (0.3) * real per capita capital stock growth.

DEPTH = M1/ GDP at factor cost

BANK = Credit allocated by the commercial banks

PRIVY = BANK / GDP at factor cost

The three explanatory variables used are DEPTH, BANK and PRIVY. DEPTH measures the extent of financial liabilities as a proportion of GDP and is a ratio that signifies the amount of liquid holding by the public. A higher ratio means public has more liquid assets with financial institutions. In developed countries two third of assets are in the form of liquid assets with the financial institutions, while in developing countries the ratio is less than one fourth (King & Levine, 1993). The DEPTH is calculated using RBI's measure of money supply (M1) divided by GDP at factor cost. BANK is credit allocated by the commercial banks. Bank has some limitation commercial banks are not only institution landing money; some banks may land to government. Bank credit as proportion of GDP is above 90 percent for developed countries, in developing countries, commercial banks and central banks land proportionate amount. PRIVY is the ratio total credit allocated by the commercial banks as a proportion of GDP. A higher ratio indicates banks are well developed and are able to reach direct supply of credit in the economy. The real per capita capital growth is significant for all three variables and DEPTH is significant for real per capital GDP growth.

Table 6.4 Regression results for India

	DEPTH	BANK	PRIVY
Real per Capita GDP Growth (RPCGDP)	0.074	0.113	0.017
t statistics	(2.13)*	1.95	1.17
R-squared	0.13	0.11	0.04
Real per Capita Capital Growth (RPCCG)	0.168	0.248	0.064
t statistics	(13.62)**	(8.10)**	(10.42)**
R-squared	0.86	0.69	0.78
Productivity Growth (PG)	0.023	0.038	-0.002
t statistics	0.67	0.67	-0.16
R-squared	0.01	0.01	0

The regressions results presented above (Table 6.4) shows that financial development (PRIVY) does not have any impact on GDP growth (RPCGDP) or productivity growth (PG). However it has a positive impact on Capital growth (RPCCG). This suggests that financial development has helped in capital growth but has not translated into either growth in income or productivity.

The empirical analysis by earlier work in this area often uses indices and estimation using regression. Some studies have created a financial liberalization index to measure financial development and banking penetration like (Laeven, 2003; Ranciere, Tornell, & Westermann, 2006; Sen & Vaidya, 1997). However these studies could fail to measure the impact of financial development. The use of indices as a measure of financial development, (like number of bank branches, per capita deposits) fails to explain its impact on output. The studies running regression to measure financial development use private credit disbursed by the bank as explanatory variable. These studies would not be able to measure the productive use of private capital. Credit could be easily diverted to unproductive activities or other expenditures rather than investment.

6.4 Data and Methodology:

To test the effect of the financial liberalization on the economy, we use banking development as an indicator. There are number of ways banks remove market frictions and thereby advance competition, diversification, and ease the mobilization and pooling of savings. But, such empirical proxy variables do not exist for a broad cross-section of states over the last few decades in India. We then have to fall back on standard measures of the size and activity of banks. As a measure financial liberalization, total credit sanctioned by scheduled commercial banks is taken as proxy. We have data statewise from RBIs Basic Statistical Returns, (various issues) from 1971 to 2013 by sector agriculture, service and industry. This is used to try and pick up sectorwise effect. A number of studies used credit sanctioned as proxy to measure the financial liberalization and they showed positive and significant relationship with growth (Acharya, Amanulla, & Joy, 2009; Arestis & Demetriades, 1997; Levine, 1997). An important objective of financial liberalization in most of the countries is to make available credit at a lower rate by increasing competition between banks. There are various sources of financing; banks are still top financier in developing economies (Beck & Levine, 2004; Levine, 2002). In India in 2013-14 total bank credit to industry was Rs. 25228.76 billion against new capital issues by public limited companies was Rs. 116.81 billion. As a measure of economic growth, the natural Log of Real NSDP per capita, (at constant price 2004) is used. The constant price NSDP per capita was calculated using a deflator to construct constant series for our analysis. Our data for 21 states spans 43 years from 1971 to 2013 giving us a balanced panel.

To assess the relationship between per capita NSDP growth and financial development (bank credit), quantile regression techniques introduced by Koenker and Bassett (1978) was used. Ordinary least squares (OLS) analyses the data at the average level (mean value) of economic growth. But, OLS does not provide information on how the relationship between economic growth and bank development differs for states which are at different levels of economic growth. Quantile regression models the relation at a desired quantiles of economic growth. The argument in favour of panel quantile regression is that states at different levels of growth will experience different impacts of credit availability. For example, the estimated coefficient at the 50th percentile is a median regression, yielding the estimated relationship between economic growth and bank development at the median level of economic growth. By computing the quantile regression for each of the 5th to the 95th quantiles, it assesses how the relationship between economic growth and bank development differs across distinct levels of economic growth. For panel data, the penalized quantile regression method proposed by the Roger Koenker (2004) fixed effect model was used for estimating results.

6.4.1 The Simple Model:

The expectation from reforms is, increased organized credit availability for the development of economy. To assess how the relationship between economic activity and credit change as states develop, begin with panel regression with fixed effect. Panel data models examine fixed and random effects of entity or time.

$$\text{LnNSDP}_{it} = \alpha_i + \beta_1 \text{LnTotal}_{it} + u_{it} \qquad 6.4$$

In the above equations LnNSDP is log of real NSDP (Net State Domestic Product) per capita at constant prices 2004 in measure of economic growth. The LnTotal is log of total credit sanctioned by schedule commercial banks to the private sector.

The expectation is that as reforms takes place, more foreign and private banks in business will increase competition, reduced profits and increase efficiency. Further dummy variable is included in the model to see the effect of pre liberalization and post liberalization. The dummy variable takes a value of 0 prior to liberalization from 1971 to 1990 and 1 after liberalization from 1991 to 2013. The econometric model tested is:

$$\text{LnY}_{it} = \alpha_1 + \alpha_2 \text{D}_{it} + \beta_1 \text{LnT}_{it} + \beta_2 \text{LnT*D}_{it} + u_{it} \qquad 6.5$$

$$\text{LnY}_{it} = 6.666 + 0.746\text{D}_{it} + 0.2334\text{LnCr}_{it} + 0.00046\text{LnT*D}_{it} \qquad 6.6$$

Where

LnY = Log of per capita NSDP
LnT = Log of Toatl Credit sanctioned
LnT*D = Log of per capita NSDP * Log of Total Credit sanctioned
D = Dummy for Liberalisation 1971 – 1990 = 0 and 1991 – 2013 = 1

6.4.2 Extended Model:

We now extend the simple model of 6.4.1 to include credit sectioned to three different sectors (Agriculture, Services and Industry). Reasons for doing this is to examine the differentiated impact of sectoral credit on output.

$$LnPCNSDP_{it} = \alpha_1 + \beta_1 Lnagcredit_{it} + \beta_2 Lnsrcredit_{it} + \beta_2 Lnincredit_{it} + u_{it} \quad 6.7$$

Where

LnPCNSDP = Log of per capita NSDP
Lnagcredit = Log of Credit sanctioned to agriculture
Lnsercredit = Log of Credit sanctioned to services
Lnindcredit = Log of Credit sanctioned to industries

6.5 Results:

We now present the results:

Pre Liberalization 1971 – 1990

$LnY_{it} = 6.666 + 0.2334 LnCr_{it}$

Post Liberalization 1991 – 2013

$LnY_{it} = 7.412 + 0.2338 LnCr_{it}$

In above model α_2 is the differential intercept, and $\beta 2$ is the differential slope coefficient, indicating by how much the slope coefficient of the post liberalization differ from the pre liberalization. The introduction of the dummy variable *D* in the

interactive form enables us to differentiate between slope coefficients of the two periods, just as the introduction of the dummy variable in the additive form enabled to distinguish between the intercepts of the two periods. As these regression results show, both the differential intercept and slope coefficients are statistically significant, strongly suggesting that the regression for the two time periods is different.

In the second model credit sanctioned to three different sectors are considered. Our findings show statistically significant results for all three sectors. The signs for industry and service sectors are positive and significant while agriculture shows negative and significant relationship between per capita NSDP and credit sanctioned. The results do not diverge for random effect model, coefficients appearing similar to fixed effect models. This shows the models used are consistent and robust standard errors are used to take care of heteroscedasticity in both the models. To select between the random and fixed effects the Hausman specification is used. The Hausman test compares the fixed versus random effects under the null hypothesis that the individual effects are uncorrelated with the other regressors in the model. If correlated null is rejected, a random effect model produces biased estimators, violating one of the Gauss-Markov assumptions; so a fixed effect model is preferred. For both the models Hausman tests null was rejected hence fixed effect is used for the analysis.

6.6 Quantile Results:

We also analysed the data using panel quantile regression model (6.6). For purpose of our analysis, the 21 states are divided into four groups. All 21 states (group one) which include small and big states of India, (second group) of 15 big states, were small states are excluded, (third group) of eight states which have ports. Logic behind selecting states with sea ports is, countries with sea route will develop ports to encourage development of industrial estates around because of cheap means of transportation of industrial goods. Final group of thirteen states in which two states of 15 big states are dropped (Bihar and Manipur) these states fall in lower percentile of income, dropping them from regression produces better results. Table 6.7 reports results for 21 states of India, quantiles for 25^{th}, 50^{th}, 75^{th} and 99^{th}, at 25^{th} quantile agriculture is significant and negative, services is significant and positive but industry is insignificant. Interestingly industry is insignificant for all the quantiles. Implying that credit to industry is not influencing growth for the entire distribution.

Table 6.8 reports the quantile regression results for the 15 big Indian states; at lower quantile (25 percent) agriculture is significant and negative. Industry which is expected to be significant is still insignificant for all the quantiles. Interestingly the services which was significant for all the states at 25 percent, 50 percent and 75 percent is now insignificant. Group of eight states which have sea ports (see Table 6.9), The regression results for the eight states with sea ports, indicates that all the three sectors are highly significant at 25 percent and 50 percent quantiles. But at higher quantitles all three sectors becomes insignificant. Table 6.10 reports

group of 13 states from 15 big states, two states are dropped, output of this regression is again similar to eight states regression, that all three sectors are significant at the 25 percent and 50 percent and insignificant at the higher quantiles. These results suggest that bank credit influences growth at lower levels of growth but growth in per capita income makes bank credit less significant.

6.7 Conclusion:

The primary rationale for this paper has been to explore the impact of financial liberalization (banking development) which is measured using credit given by banks, on economic growth of the states of India. When we see bank credit divided sectorally (Agriculture, Services and Industry) we find significant relationship using OLS methodology. However when quantile regression technique is used, the three sectors were insignificant at higher quantiles, implying bank credit was not influencing economic growth at higher levels of growth. Bank credit was significantly impacting on economic growth at lower quantiles, that is at lower levels of economic growth. There seems to be a threshold suggesting that as economic growth surpasses particular levels economic growth is influenced by factors different from banking credit. Some studies have cited such observations in the US economy and UK economy (Arestis & Demetriades, 1997; Rajan & Zingales, 1996).

Table 6.5 Fixed and Random effect panel regression results using dummy

	LNSDP RE	LNSDP FE	LNSDP RE	LNSDP FE	LNSDP RE
LogTotalcredit	0.213	0.214	0.186	0.189	0.155
	(63.19)**	(63.83)**	(31.85)**	(32.22)**	(25.11)**
Dummy			0.13	0.123	-0.712
			(5.58)**	(5.26)**	(-9.02)**
Logtotal*Dummy					0.068
					(11.09)**
Constant	6.818	6.808	7.082	7.057	7.414
	(71.66)**	(162.30)**	(66.92)**	(112.13)**	(67.81)**
Observations	882	882	882	882	882
Number of code	21	21	21	21	21
R-squared		0.83		0.83	

Absolute value of t-statistics in parentheses

* significant at 5 percent; ** significant at 1 percent

Table 6.6 Random effect and Fixed effect model for sector-wise credit

	LNSDP RE	LNSDP FE
LnAgcredit	-0.169	-0.167
	(-12.34)**	(-12.24)**
LnIncredit	0.103	0.109
	(6.01)**	(6.37)**
LnSrcredit	0.26	0.253
	(15.24)**	(14.86)**
Constant	7.063	7.041
	(80.14)**	(143.74)**
Observations	882	882
Number of code 21		21
R-squared		0.86

Absolute value of t-statistics in parentheses * significant at 5 percent; ** significant at 1 percent

Table 6.7 List of States selected for study

Sr.No	All States	Fifteen states	Eight States	Thirteen States
1	Andhra Pradesh	1	1	1
2	Assam			
3	Bihar	1		
4	Goa			
5	Gujarat	1	1	1
6	Himachal Pradesh			
7	Haryana	1		1
8	Jammu and Kashmir			
9	Karnataka	1	1	1
10	Kerala	1	1	1
11	Madhya Pradesh	1		1
12	Maharashtra	1	1	1
13	Manipur	1		
14	Orissa	1	1	1
15	Pondicherry			
16	Punjab	1		1
17	Rajasthan	1		1
18	Tamil Nadu	1	1	1
19	Tripura			
20	Uttar Pradesh	1		1
21	West Bengal	1	1	1

Table 6.8 Quantile regression for all 21 states

	β	Std. Error	t value	Pr(>|t|)
(Intercept)[0.25]	7.574	0.324	23.344	0.00***
ag[0.25]	-0.198	0.081	-2.447	0.015***
se[0.25]	0.324	0.102	3.174	0.002***
id[0.25]	-0.002	0.096	-0.023	0.982
(Intercept)[0.5]	7.832	0.285	27.45	0.00***
ag[0.5]	-0.29	0.129	-2.257	0.024**
se[0.5]	0.459	0.128	3.596	0.00***
id[0.5]	-0.054	0.068	-0.802	0.423
(Intercept)[0.75]	8.072	0.396	20.405	0.00***
ag[0.75]	-0.308	0.179	-1.716	0.086*
se[0.75]	0.449	0.164	2.729	0.006***
id[0.75]	-0.022	0.1	-0.225	0.822
(Intercept)[0.99]	9.884	1.755	5.632	0.00***
ag[0.99]	-0.362	0.379	-0.955	0.34
se[0.99]	0.402	0.333	1.21	0.227
id[0.99]	0.07	0.534	0.132	0.895

Notes: Number of observations: 882. *The null hypothesis that each coefficient is equal to zero is rejected at the 10 percent level of significance.**The null hypothesis that each coefficient is equal to zero is rejected at the 5 percent level of significance. *** The null hypothesis that each coefficient is equal to zero is rejected at the 1 percent level of significance. ag [0.25] banking credit to agricultural sector at 25^{th} quantile, se[0.25] banking credit to service sector at 25^{th} quantile and id[0.25] banking credit to industrial sector at 25^{th} quantile. Similarly 0.5 is 50^{th} quantile which median, 0.75 is 75^{th} quantile and0.99 is 99^{th} quantile.

Table 6.9 Quantile regression for 15 states

	β	Std. Error	t value	Pr(>|t|)
(Intercept)[0.25]	6.87	0.53	12.84	0.00***
ag[0.25]	-0.2	0.07	-2.64	0.01***
se[0.25]	0.18	0.13	1.33	0.18
id[0.25]	0.2	0.13	1.62	0.11
(Intercept)[0.5]	7.06	0.73	9.68	0.00***
ag[0.5]	-0.16	0.13	-1.25	0.21
se[0.5]	0.25	0.19	1.29	0.20
id[0.5]	0.1	0.18	0.54	0.59
(Intercept)[0.75]	8.31	0.99	8.4	0.00***
ag[0.75]	-0.1	0.18	-0.55	0.58
se[0.75]	0.39	0.22	1.78	0.08
id[0.75]	-0.17	0.2	-0.84	0.40
(Intercept)[0.99]	9.92	3.2	3.1	0.00***
ag[0.99]	-0.08	0.52	-0.15	0.88
se[0.99]	0.45	0.94	0.48	0.63
id[0.99]	-0.29	0.97	-0.3	0.77

Notes: Number of observations: 630.

Table 6.10 Quantile regression for eight states

	β	Std. Error	t value	Pr(>|t|)
(Intercept)[0.25]	6.6	0.16	41.151	0.00***
ag[0.25]	-0.145	0.05	-2.867	0.004***
se[0.25]	0.173	0.082	2.103	0.036**
id[0.25]	0.19	0.075	2.525	0.012**
(Intercept)[0.5]	6.847	0.19	35.998	0.00***
ag[0.5]	-0.145	0.074	-1.966	0.05**
se[0.5]	0.229	0.094	2.431	0.016**
id[0.5]	0.123	0.088	1.394	0.164
(Intercept)[0.75]	6.914	0.185	37.39	0.00***
ag[0.75]	-0.104	0.094	-1.116	0.265
se[0.75]	0.178	0.116	1.527	0.128
id[0.75]	0.141	0.097	1.454	0.147
(Intercept)[0.99]	7.623	0.712	10.704	0.00***
ag[0.99]	-0.029	0.325	-0.09	0.929
se[0.99]	0.216	0.282	0.769	0.443
id[0.99]	0.018	0.289	0.061	0.952

Notes: Number of observations: 168.

Table 6.11 Quantile regression for thirteen states

	β	Std. Error	t value	Pr(>|t|)
(Intercept)[0.25]	6.894	0.239	28.886	0.00***
ag[0.25]	-0.188	0.072	-2.597	0.01***
se[0.25]	0.162	0.084	1.939	0.053*
id[0.25]	0.217	0.069	3.145	0.002***
(Intercept)[0.5]	7.007	0.242	28.948	0.00***
ag[0.5]	-0.156	0.101	-1.546	0.123
se[0.5]	0.221	0.078	2.843	0.005***
id[0.5]	0.131	0.079	1.661	0.097*
(Intercept)[0.75]	7.419	0.247	29.987	0.00***
ag[0.75]	-0.046	0.14	-0.326	0.745
se[0.75]	0.252	0.103	2.453	0.014**
id[0.75]	-0.013	0.094	-0.142	0.888
(Intercept)[0.99]	8.279	3.3	2.509	0.012**
ag[0.99]	0.053	0.991	0.053	0.957
se[0.99]	0.113	0.907	0.125	0.901
id[0.99]	0.029	0.716	0.04	0.968

Notes: Number of observations: 546.

Chapter VII: Financialisation and its Impact on Industrial Accumulation of Physical Capital

In the last chapter we examined the impact of the financial liberalisation on 21 states of India. We also analysed the impact of the financial liberalisation on the three sectors using quantile regression.

In the present chapter we look into the effect of borrowings on accumulation of physical capital. We use data of non financial industrial units in India to study this relation.

7.1 Introduction:

The past two decades in India has seen lot of changes in growth of income, increased role and use of the financial market and financial instruments, and moreover the changes in investment from physical assets to financial assets. Financialisation is a term related to the financial development, globalization and liberalisation. Financialisation affects the economy through giving relatively more significance to financial sector than real sector; it transfers income from real sector to financial sector and leads to increased inequality of income and wage stagnation (Palley, 2007). Financialisation is amplifying operations of the domestic and foreign economies through enhancing the role of, financial markets, financial actors and financial institutions (Epstein, 2005). The arguments in favour of

financialisation are linked to increased growth and financial development, whereas arguments against financialisation are that it adversely affects physical capital formation and increases unemployment. Some argue that there are thresholds below which financial development is necessary for growth and if it crosses this limit then there are adverse consequences Arcand, Berkes, and Panizza (2012). The current state of global economic slowdown is attributed by some to the financialisation of the global economy. The issue of financialsation therefore raises the core issues in economics – equity and efficiency, agency, role of state and markets in promoting human wellbeing (Minsky 1995).

The critique of financialisation may seem contrary to what emerging countries anticipate from the increased role of finance in their economies. After all finance has played an important role in industrial development and growth of economies. Availability of credit makes the wheels of industry move forward as they are able to undertake investment which would otherwise be unfeasible.

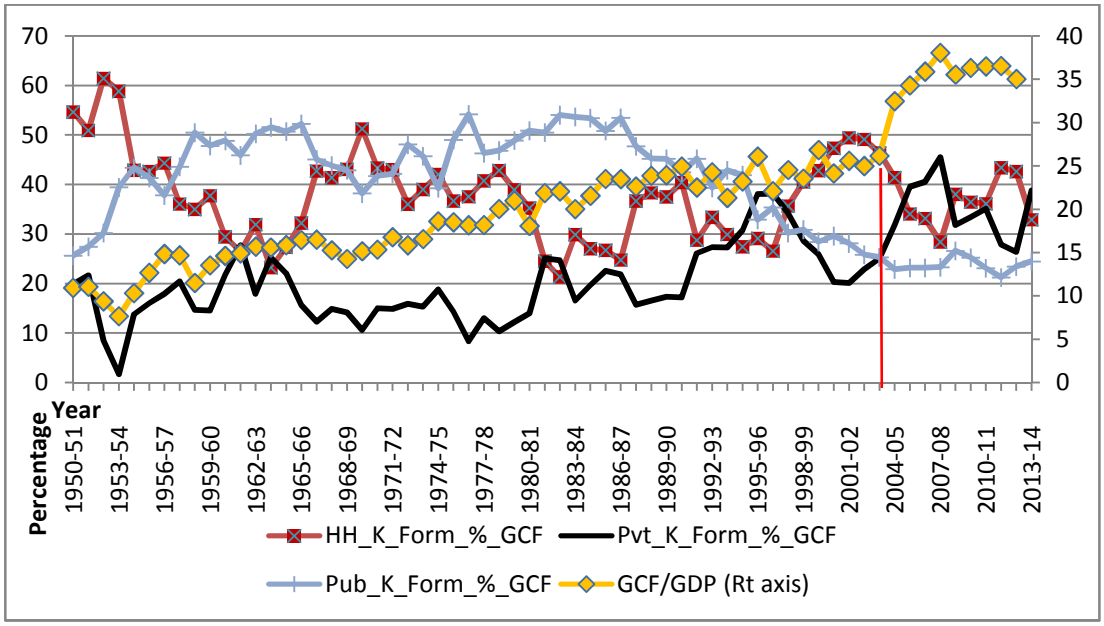
If one were to examine the case of India, domestic credit constraint has been cited as one of the primary factors responsible for slow industrial growth in the initial years post-Independence (Thomas, 2008). At the time of Independence, availability of credit was one of the major bottlenecks to industrial investment that led the government to envision large scale industrialisation through state-controlled credit creation and disbursement (Thomas, 2008). The state took-over

the responsibility for planned investment through the 5-year plans and the private sector played a secondary role. It is widely acknowledged that there was little finance available for private investment in the pre-reform period. However, there have been attempts to examine if the same holds true for the post reform period as that would then have other implications.

In a study of Indian firms during the period 1991-92 to 1997-98 Bagchi et al. (2002) found that there is evidence of credit constraint for fixed investment. Evidently, Indian firms still continue to function in an imperfect credit market. This chapter focuses on how financialisation has affected the Indian economy.

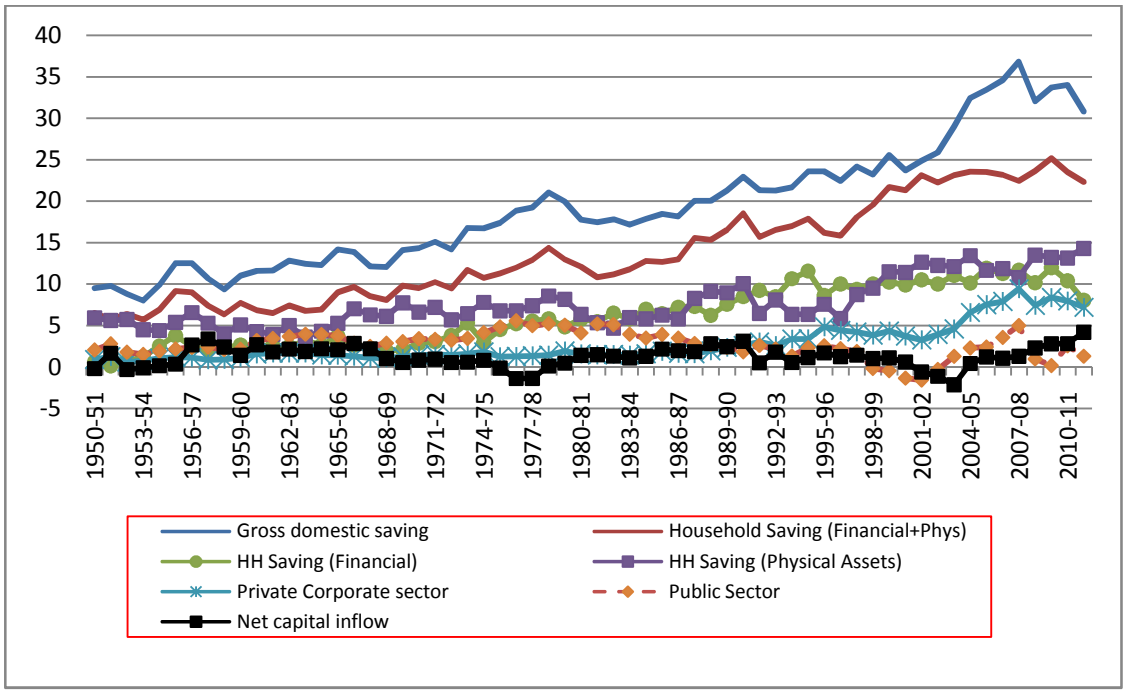
The growth of the market sector and precedence of state-led development process is evident in the secular decline in the public sector capital formation (since 1986-87 (see Figure 7.1). The household sector overtook it in 1994-95 and the private corporate sector in 2003-4. This has of course been accompanied by an increase in the gross capital formation as a proportion of GDP (all current prices in Indian rupees) especially from 2003-4 onwards and stayed above 35 percent for nearly decade now.

Figure 7.1 Capital Formation in the Indian Economy



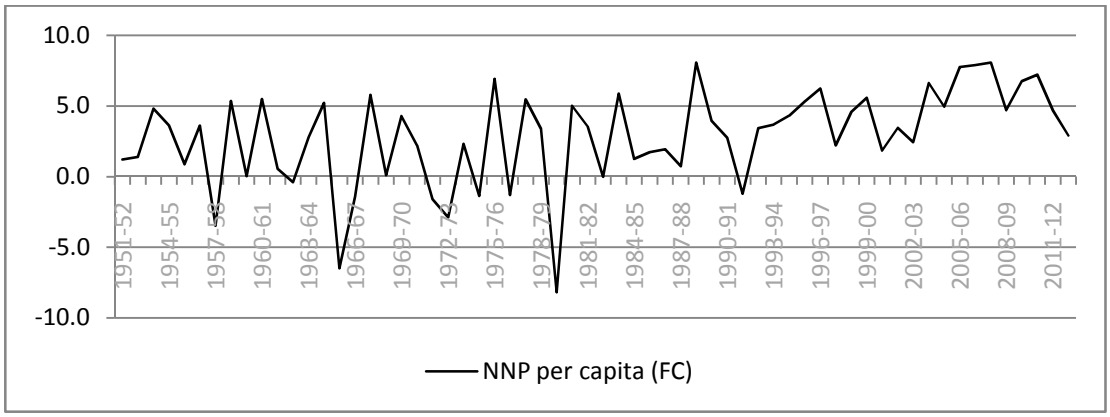
If we look at the savings side of the story then we would see that gross domestic saving as a proportion of GDP at market prices has risen secularly and is now at a level which has been above 30 percent for a decade now (see Figure 7.2). Households continue to be the largest contributors to savings (both in Physical Assets and in Financial Assets). Savings in Physical Assets (by households) has for most of the years after independence been above the level of financial savings, however the gap between them has narrowed. What has shown significant increase is the private corporate sector savings in the period after liberalisation. Also interesting to note is that even though net capital inflows have been low in India, there has been a significant increase in the period from 2004-5 (led by FDI inflows and non-aid debt, see Shah and Patnaik 2011a).

Figure 7.2 Indian Savings as a proportion of GDP



The growth rate in the India economy had for a long period of time post-Independence stagnated and was nicknamed the Hindu Rate of growth. In the entire 4 decade period between 1951 till 1990, only on two occasions had the rate of growth of per capita NNP crossed 6 percent (see Figure 7.3). However, after 2003-4 this rate has stayed above 6 percent except on three occasions. It is now well accepted that the post liberalisation period has a structural shift in the rate of growth of the economy (Govt. of India).

Figure 7.3 Growth in per capita NNP



The question before us therefore is what role has finance played in India's growth story? The link between output and finance has been widely discussed in India. Prior to 1990, the role of finance was rather limited as production itself was restricted by licensing policies. Expectedly credit would follow licenses and license holders would have access while others would not. Therefore the causal linkages between credit and output are rather uninformative in the pre-reform period. However, post-1990 with the greater play of market forces, the credit-output linkage Banerjee (2011) finds that there while causality from output to credit is significant, from credit to output is not. This could imply that credit creation at the macro-level alone would not have output effects and that credit is demand-determined. This is not to contradict initiatives in credit policy where preferential access to select industries may actually help capital formation and growth of those sectors.

7.2 Impact of credit on Growth in India:

In the first stage, we use a simple model where we regress growth in per capita income on credit sanctioned, state-wise (21 states), from 1971-2013 (43 years) giving us 21x42 observations and allows us to create a panel dataset. The reason for using state-level data is to allow for disaggregation of a large geographical area which has exhibited differential growth. The data for credit sanctioned by schedule commercial banks is taken from RBI's Basic Statistical Returns (various issues).

Growth is measured using the Log Real NSDP per capita (constant price 2004-5). The NSDP per capita constant price series was created by using deflator on the NSDP at current prices. In the post reform period increased credit availability to the private sector due to financial liberalisation would be a good predictor for growth. We use a log-log panel regression model with fixed effect to estimate the elasticity of output with respect to total private credit sanctioned.

In the post reforms period with the entry of foreign and private banks increased competition, reduced profits and increased efficiency. Further dummy variable is included in the model to see the effect of pre liberalisation and post liberalisation. The dummy variable takes a value of "0" prior to liberalisation (for years from 1971 to 1990) and "1" after liberalisation (from 1991 to 2013). In the model below α_1 is the common intercept, α_2 is the differential intercept, β_1 is the common slope

and β_2 is the differential slope coefficient (by using an interactive dummy). The dummy variable (D) in the interactive form enables us to differentiate between slope coefficients of the two periods, just as the introduction of the dummy variable in the additive form enabled to distinguish between the intercepts of the two periods.

$$\text{LnPCNSDP}_{it} = \alpha_1 + \alpha 2 Dummyit + \beta_1 \text{LnTotalCredit\_Private}_{it} + \text{LnTotalCredit\_Private*Dummy}_{it} + u_{it} \quad 7.1$$

Ln_PCNSDP = Log of per capita NSDP
Ln_Ag_credit = Log of Credit sanctioned to agriculture
Ln_Ser_credit = Log of Credit sanctioned to services
Ln_Ind_credit = Log of Credit sanctioned to industries

For the simplicity above model is specified below.

$$\text{LnY}_{it} = \alpha_1 + \alpha_2 \text{D}_{it} + \beta_1 \text{LnT}_{it} + \beta_2 \text{LnCr*D}_{it} + u_{it} \quad 7.2$$

The regression results of the panel fixed effects model give us the following:

$$\text{LnY}_{it} = 6.666 + 0.746\text{D}_{it} + 0.2334\text{LnCr}_{it} + 0.00046\text{LnT*D}_{it}$$

Pre Liberalisation 1971 – 1990

$$\text{LnY}_{it} = 6.666 + 0.2334\text{LnCr}_{it}$$

Post Liberalisation 1991 – 2013

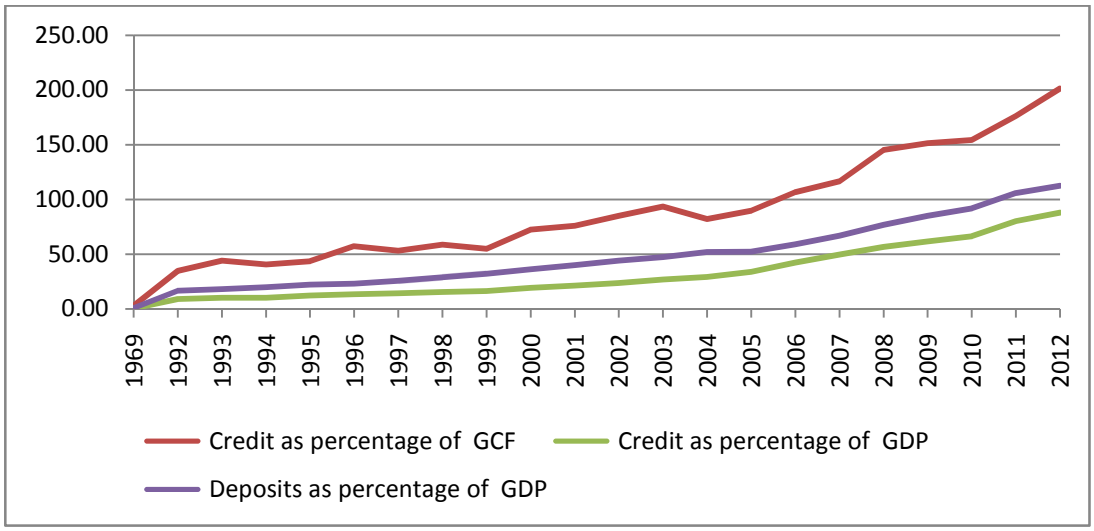
$LnY_{it} = 7.412 + 0.2338LnCr_{it}$

Evidently both the differential intercept and slope coefficients are statistically significant, suggesting that the regression for the two time periods is different and the impact of credit on growth has been positive and far more pronounced.

7.3 Impact of Credit on Investment:

In the USA, credit as percentage of GDP was 140 percent in 1973 and rose to 328 percent in 2005 (world indicators). In India this ratio was below 1 percent in 1969 and by 2012 had risen to about 112 percent (see Figure 7.4). Credit as a percentage of gross capital formation was very low in 1969 and less than 100 percent until 2006 but by 2012 it had doubled to 200 percent. This implies that credit sanctioned was twice as much as gross capital formation in 2012. Firms apart from undertaking accretion to their fixed asset also borrow to finance inventory holding and making financial investments.

Figure 7.4 Credit as percentage of GDP and GCF



We use the CMIE dataset of about 7007 non-financial industries categorized into eight broad sectors: transportation, food and agriculture, construction, machinery, metal, chemicals, textiles and consumer goods. We also use data on firm size and classify them as per Ministry of Industries Government of India size specifications for micro, small, medium and big units. According to CMIE database classification Net fixed assets is derived as the sum of intangible assets, net land and buildings, net plant and machinery, computers and electrical assets, net transport and communication equipment and infrastructure, net furniture, social amenities and other fixed assets and net lease adjustment reserves. Change in net fixed assets is estimated using borrowings, profit, financial investment and inventories. Borrowings are created when a company takes loans. Financial Investment is defined as the expenditure by firms on buying shares, debentures,

bonds and mutual funds, etc. The sum of all such investments outstanding at the end of the balance sheet date is captured in this data field. Inventories are materials held to be consumed in the production process or for sale. These include all goods that are purchased and held for processing or for resale or in the form of materials or supplies to be consumed in the production process or in the rendering of services.

There have been a number of variants of the investment functions and the literature going back to early 19th century and is too large to recall here. However, it is claimed that one of the determinants of investment is some notion of profit gap (A. Bhaduri & Marglin, 1990; Richardson & Romilly, 2008). The empirical estimations in India have considered issues of liquidity and return on investment as determinants of investment (see (S. N. Bhaduri, 2008; Ganesh-Kumar, Sen, & Vaidya, 2002; Lensink, van der Molen, & Gangopadhyay, 2003; Pentecost & Moore, 2006) use cash flow and sales as a predictor for net investment.

Investment financing as we know is possible in three ways, issue of equity, re-investment of profits or by raising loans (borrowings). In India banks are still top financier of firms (Ramasastri & Samuel, 2006). For example, in year 2013-14, total bank credit to industry was Rs 25,229 billion against new capital issues by public limited companies amounting to Rs 117 billion (RBI). India is still a debt-instrument driven economy, where equity instruments are in developing stage.

This motivates us to examine the linkage between borrowing and credit needs of firms. We presume that firms raise funds not only to finance investment but also to put money in financial assets (in CMIE terminology called “Investment”, and we adopt it for our discussion in this section) or finance inventories which can be quite substantial in India firms.

In a simple version of the investment function we examine the effect of borrowing and profit on physical investment (the change in net fixed assets), and the effect of borrowing on financial investment and inventories. This implies the use of four simple log linear models as stated below. The data draws on the CMIE database for the period 1998 to 2014. This is the period during which the financial markets have enjoyed the greatest freedom in post-1991 phase. The dataset is fairly large and therefore the usual problems associated with regressions using small number of observations are unlikely to occur in this situation.

The panel data structure is having large cross sectional component 7007 industrial units and time component of 16 years, which makes data a dynamic panel data. The Dynamic Panel Data approach is well know work of Arellano and Bond (1991), intial work in this area was done by Holtz-Eakin, Newey and Rosen(1988). The usual panel data test fixed effect and random effect methods will not exploit all of the information available in the sample. The Generalized Method of

Moments (GMM) in this context, construct more efficient estimates of the dynamic panel data model.

Arellano and Bond methodology take in to account all of the potential orthogonality conditions. A key aspect of the Arellano and Bond strategy is the assumption that the necessary instruments are 'internal': that is, based on lagged values of the instrumented variable. The estimators allow the inclusion of external instruments as well. Consider the equations

$$Y_{it} = X_{it}\beta 1 + W_{it}\beta 2 + V_{it} \qquad 7.3$$

$$V_{it} = u_i + \varepsilon_{it}$$

where X_{it} includes strictly exogenous regressors, W_{it} are predetermined regressors (which may include lags of Y) and endogenous regressors, all of which may be correlated with u_i , the unobserved individual effect. First-differencing the equation removes the u_i and its associated omitted-variable bias.

The Arellano and Bond approach, and its extension to the 'System GMM' context, is an estimator designed for situations with:

- 'small T, large N' panels: few time periods and many individual units
- a linear functional relationship
- one left-hand variable that is dynamic, depending on its own past realizations

- right-hand variables that are not strictly exogenous
- fixed individual effects, implying unobserved heterogeneity
- heteroskedasticity and autocorrelation within individual units' errors

Unlike static panel data models, dynamic panel data models include lagged levels of the dependent variable as regressors. Since lags of the dependent variable are necessarily correlated with the idiosyncratic error, traditional static panel data model estimators such as the fixed effects and random effects estimators are inconsistent, due to presence of endogenous regressors.

As discussed earlier in the pre-liberalisation period the causality of finance in promoting investment and growth was constrained by policy restrictions. In equation 2, we allow for a lagged impact of profit on investment – firms decide how much to invest depending on what was their profit in the previous period. Apart from the all the other three equations involve borrowing. We anticipate that the impact of borrowings on NFA, Fin_INVES and INVEN.

Model A

1. $\text{LndNFA}_{it} = \alpha_1 + \beta 1 LnBORR_{it} + u_{it}$
2. $\text{LndNFA}_{it} = \alpha_1 + \beta 1 LnPRO_{it-1} + u_{it}$
3. $\text{LnFin\_INVES}_{it} = \alpha_1 + \beta 1 LnBORR_{it} + u_{it}$
4. $\text{LnINVEN}_{it} = \alpha_1 + \beta 1 LnBORR_{it} + u_{it}$

Where

NFA = Net Fixed Assets; dNFA= Net Investment; LndNFA= Natural log of dNFA

BORR = Borrowing; LnBORR= Natural log of BORR

PRO= Profits; LnPRO= Natural log of PRO

LnFin_INVES= Natural log of Financial Investment

Ln_INVEN= natural log of Inventories

The summary statistics of these variables is interesting (see Table 7.1). Investment in physical assets (dNFA) had a mean of Rs 60 billion and was significantly smaller than both INVES and INVEN implying that physical asset expansion was much smaller than expenditure of financial investments and inventory holding in this period. This is something we will come back to later in this discussion.

Table 7.1 Summary statistics

Variable	Number of observations	Mean	Std. Dev.	Min	Max
dNFA	66824	60.89	3320.09	-289840	135368.6
BORR	66824	1630.04	13820.89	.1	899680
PRO	66824	178.41	2802.89	-51032.6	219840
INVES	40990	895.14	12099.96	0	860620
INVEN	66824	743.56	7807.13	.1	647037.4

Source: CMIE Database and Authors' calculation

Since the CMIE database provides at the firm level, it is possible to track each firm and given the nature of the data that has both time series and cross section elements to it, we used panel regression model estimation with fixed effects (see Table 7.2). In all the four models the explanatory variable coefficients are positive and significant.

Table 7.2 Panel regression fixed effects model A

	LndNFA	LndNFA	LnFin_INVES	LnINVEN
LnBORR	0.202		0.372	0.431
T_statistic	(6.34)***		(47.09)***	(135.34)***
LnPRO		0.151		
T_statistic		(5.32)***		
Constant	0.603	1.609	0.336	2.108
T_statistic	(3.55)***	(15.93)***	(7.77)***	(130.26)***
Observations	30990	24870	40344	66824
R-squared	0.01	0.02	0.06	0.23
	*** significant at 1percent			

A similar results are also shown using GMM methodology with better coefficient values. All the variables are significant and positive (See Table 7.4).

Table 7.3 Panel regression model A GMM method

	LndNFA	LndNFA	LnFin_INVES	LnINVEN
L.LndNFA	0.252***	0.234***		
	(0.0263)	(0.0284)		
LnBORR	0.404***		0.0516***	0.140***
	(0.0734)		(0.0112)	(0.00497)
LnPRO		0.167**		
		(0.0662)		
L.lINVES			0.531***	
			(0.0345)	
L.lINVEN				0.763***
				(0.0103)
Constant	-0.841**	1.071***	0.939***	0.377***
	(0.426)	(0.273)	(0.0913)	(0.0394)
Observations	10,501	9,026	29,161	50,370
Number of code	2,972	2,613	4,033	6,347
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

L.LndNFA = first lag of LndNFA

We also tested for these variables as a ratio of total capital of the firm (Model B).

Model B

1. $$\frac{\text{dNFA } it}{\text{TOTALCAP } it} = a1 + b1\frac{\text{BORR}it}{\text{TOTALCAP } it} + uit$$

2. $$\frac{\text{dNFA } it}{\text{TOTALCAP } it} = a1 + b1\frac{\text{PRO}it}{\text{TOTALCAP } it} + uit$$

3. $$\frac{\text{INVES } it}{\text{TOTALCAP } it} = a1 + b1\frac{\text{BORR}it}{\text{TOTALCAP } it} + uit$$

4. $$\frac{\text{INVEN } it}{\text{TOTALCAP } it} = a1 + b1\frac{\text{BORR}it}{\text{TOTALCAP } it} + uit$$

Table 7.4 Panel regression fixed effect model B

	dNFA/Totcap	dNFA/Totcap	INVES/Totcap	INVEN/Totcap
PRO/Totcap	0.837			
T_statistic	(32.08)***			
BORR/Totcap		0.143	0.198	0.526
T_statistic		(17.39)***	(52.37)***	(163.70)***
Constant	-3.052	-3.574	0.535	0.541
T_statistic	(-21.63)***	(-22.43)***	(6.63)***	(8.67)***
Observations	66824	66824	40990	66824
Number of code	6900	6900	4720	6900
R-squared	0.02	0.01	0.07	0.31
	*** significant at 1percent			

Table 7.5 Panel regression GMM model B

	dNFA/Totcap	dNFA/Totcap	INVES/Totcap	INVEN/Totcap
L.dNFA/Totcap	0.00251***	0.000805		
	(0.000906)	(0.000992)		
PRO/Totcap	0.874***			
	(0.00930)			
BORR/Totcap		0.116***	0.0998***	0.678***
		(0.00404)	(0.00242)	(0.00465)
L.INVES/Totcap			0.0182***	
			(0.00164)	
L.INVEN/Totcap				0.209***
				(0.00479)
Constant	-0.116***	-0.321***	1.502***	-1.944***
	(0.0302)	(0.0493)	(0.0338)	(0.0605)
Observations	50,370	50,370	29,821	50,370
Number of code	6,347	6,347	4,105	6,347
Standard errors in parentheses				
*** p<0.01, ** p<0.05, * p<0.1				

These results confirm the findings of Model A that there is a positive and significant effect of profits and borrowing on investment (physical and financial) and inventory holding of firms. Next we tested lagged variables, lag of profit to total capital and lag of investment to total capital

Model C

$$(PRO/Totcap)_{it} = a1 + b1\,(INVES/Totcap)_{it-1} + u_{it}$$

$$(PRO/Totcap)_{it} = a1 + b1\,(PRO/Totcap)_{it-1} + u_{it}$$

$$(dNFA/Totcap)_{it} = a1 + b1\,(PRO/Totcap)_{it-1} + u_{it}$$

Table 7.6 Panel regression results fixed effect model C

	PRO_Totcap	PRO_Totcap	dNFA_Totcap
INVES_Totcap_1	0.042		
	(18.48)**		
PRO_Totcap_1		0.487	0.094
		(129.38)**	(15.30)**
Constant	1.227	0.556	0.679
	(38.53)**	(28.17)**	(21.09)**
Observations	36236	58359	58359
Number of code	4619	6704	6704
R-squared	0.01	0.24	0.004
Absolute value of t statistics in parentheses			
* significant at 5percent; ** significant at 1percent			

Table 7.7 Panel regression results GMM model C

	PRO_Totcap	PRO_Totcap	dNFA_Totcap
L.PRO_Totcap	0.154***	-0.137***	
	(0.00751)	(0.00396)	
INVES_Totcap_1	-0.0395***		
	(0.00234)		
L.dNFA_Totcap			0.00575***
			(0.00101)
PRO_Totcap_1			-0.299***
			(0.00924)
Constant	1.233***	1.149***	1.067***
	(0.0247)	(0.0151)	(0.0326)
Observations	30,609	50,370	50,370
Number of code	4,202	6,347	6,347
Standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

In model c lagged values of profit and financial investment are significant in explaining current period profits and current change in fixed asset.

The investment function used by the Bhaduri Marglin (1990) was also tested. The investment is a function of share of profits and capacity utilization, where share of profit is profit by total income. The degree of capacity utilization is calculated using two methods Net fixed assets by average assets and Net fixed assets by Maximum Net fixed assets. The results show degree of capacity utilization has positive effect on the investment and share profit is also significant and positive (see table 7.9)

Model D

$$LdNFA_{it} = a1 + b1(Profit/Totinc)_{it}\ b2\ (NFA/AveNFA)_{it} + u_{it}$$

$$LdNFA_{it} = a1 + b1(Profit/Totinc)_{it}\ b2\ (NFA/MaxNFA)_{it} + u_{it}$$

Table 7.8 Panel regression results using fixed effect model D

	-1	-2
	LndNFA	LndNFA
share_prof	0.009	0.009
	(4.21)**	(4.21)**
NFA_Av_NFA	0.41	
	(9.18)**	
NFA_maxNFA		0.98
		(9.95)**
Constant	1.3	1.114
	(27.56)**	(17.90)**
Observations	30811	30811
Number of code	6165	6165
Robust t statistics in parentheses		
* significant at 5percent; ** significant at 1percent		

Table 7.9 Panel regression results using GMM model D

	LndNFA	LndNFA
L.ldNFA	0.326***	0.353***
	(0.0263)	(0.0264)
share_prof	0.0452	0.0513
	(0.112)	(0.112)
NFA_Av_NFA	1.015***	
	(0.0971)	
NFA_maxNFA		2.681***
		(0.222)
Constant	0.0710	-0.568***
	(0.147)	(0.173)
Observations	10,460	10,460
Number of code	2,960	2,960
Standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

This raises the issue here whether credit flowing to industries is being used for physical capital creation or being used to finance financial investment and

inventories. There are two different reasons for concern. If more money is being used by firms to invest in financial markets, it implies that their returns from financial markets are higher than their return on investment in physical capital. This is an indicator of financialisation that needs to be watched closely in the Indian economy. The second issue to be flagged is the strong association between inventories and credit. This could imply that there is large accumulation of inventories that is being financed by borrowing. Accumulation of inventory occurs when there is over-production in the economy – where firms' anticipated demand is not fulfilled – implying that the economy is still in a demand constrained situation. The combination of firms investing financial markets and the piling up of inventories by firms seems to indicate that demand for real goods and services in the Indian economy is being adversely affected by financialisation in a deeper sense. So the positive association between credit and per capita income could have been higher than what we currently see.

7.4 Conclusion:

The policy reforms in financial sector, transformed Indian economy through increased private investment. Further developments of financial markets and financial assets have pushed investment from physical assets to financial assets. The banking sector development have made borrowing more easily, it is easy for borrowers to located financers. The findings of the chapter highlights on borrowings are translated into inventories and financial assets. This shows India

remains a demand-constrained economy and policy makers need to be aware that while credit access does ease the formation of capital the onus of growth still depends on demand stimuli in the real goods and services domain.

Table 7.10 Panel regression results using fixed effect model with Industry Size Dummy

	-1	-2	-3	-4
	ldNFA	ldNFA	ldNFA	ldNFA
share_prof_l1	0.009	0.009		
	(13.68)**	(13.62)**		
NFA_maxNFA_l1	-5.724			
	(-36.80)**			
NFA_Av_NFA_l1		-2.456		
		(-31.69)**		
share_prof			0.009	0.009
			(4.26)**	(4.26)**
NFA_Av_NFA				0.18
				(3.48)**
NFA_maxNFA			0.476	
			(4.19)**	
d_big_transport	5.432	5.091	2.439	2.535
	1.69	1.64	1.23	1.27
d_big_textile	7.744	7.512	4.583	4.671
	(5.27)**	(5.41)**	(3.60)**	(3.64)**
d_big_metal	6.707	6.347	1.579	1.68
	(5.32)**	(5.08)**	1.51	1.61
d_big_machinery	7.622	7.364	3.365	3.446
	(8.98)**	(8.57)**	(4.35)**	(4.45)**
d_big_food	8.259	7.789	3.166	3.271
	(8.43)**	(7.93)**	(3.99)**	(4.12)**
d_big_consumer goods	5.972	5.472	2.623	2.716
	(4.27)**	(4.03)**	(2.16)*	(2.23)*
d_big_construction	9.794	9.43	6.38	6.474
	(4.18)**	(4.12)**	(2.96)**	(2.99)**
d_big_ chemicals	6.26	5.994	1.775	1.865
	(10.41)**	(10.10)**	(3.23)**	(3.40)**
d_medium_chemicals	4.039	3.798	1.568	1.631
	(6.80)**	(6.50)**	(2.88)**	(3.00)**
d_medium_construction	7.925	7.661	6.334	6.405

	(3.20)**	(3.16)**	(2.82)**	(2.84)**
d_medium_consumer goods	4.091	3.686	2.579	2.651
	(3.09)**	(2.88)**	(2.24)*	(2.29)*
d_medium_food	6.121	5.71	2.765	2.844
	(6.44)**	(5.99)**	(3.50)**	(3.59)**
d_medium_machinery	5.056	4.88	2.56	2.614
	(5.93)**	(5.63)**	(3.32)**	(3.40)**
d_medium_metal	4.543	4.274	1.261	1.332
	(3.61)**	(3.42)**	1.21	1.28
d_medium_textile	5.467	5.463	4.295	4.342
	(3.76)**	(4.00)**	(3.37)**	(3.38)**
d_medium_transport	3.179	2.971	2.168	2.228
	0.99	0.96	1.09	1.11
d_small_transport	1.051	0.985	1.622	1.653
	0.33	0.32	0.82	0.84
d_small_textile	2.776	2.908	2.491	2.505
	(1.99)*	(2.21)*	(2.08)*	(2.08)*
d_small_metal	2.164	1.99	0.387	0.428
	1.76	1.64	0.38	0.43
d_small_machinery	3.51	3.42	2.367	2.394
	(4.47)**	(4.26)**	(3.32)**	(3.36)**
d_small_food	4.561	4.229	2.703	2.757
	(5.11)**	(4.75)**	(3.65)**	(3.72)**
d_small_consumer goods	2.373	2.195	2.11	2.144
	(2.05)*	1.95	(2.11)*	(2.14)*
d_small_construction	5.55	5.34	5.769	5.817
	(2.56)*	(2.50)*	(2.83)**	(2.85)**
d_small_chemicals	2.225	2.046	0.978	1.02
	(3.98)**	(3.73)**	1.95	(2.03)*
Constant	-0.79	-1.393	-0.953	-0.911
	-1.66	(-3.01)**	(-2.65)**	(-2.52)*
Observations	26996	26996	30811	30811
Number of code	5663	5663	6165	6165
R-squared	0.09	0.07	0.01	0.01
Robust t statistics in parentheses				
* significant at 5percent; ** significant at 1percent				

Interactive dummy are used in the above regression Industry size by industry type Dummy for industry size Micro, Small, Medium and Big and for Type of industry are Transportation, food and agriculture, construction, machinery, metal, chemicals textile and consumer goods. Results are significant for Big industrial and medium industrial units where investment is above 5 crore. For Transport units' interactive dummy is not significant for all three size of transportation industry.

Table 7.11 Panel regression results using fixed effect model with Industy size and indstry type dummy

	-1	-2	-3
	ldNFA	ldNFA	ldNFA
share_prof	0.009	0.009	0.011
	(4.21)**	(4.22)**	(4.62)**
NFA_maxNFA	0.98	0.476	-1.158
	(9.95)**	(4.18)**	(-13.17)**
du_small		2.004	3.286
		(6.18)**	(14.63)**
du_medium		2.673	5.081
		(7.67)**	(21.81)**
du_big		3.015	6.87
		(8.44)**	(30.59)**
du_chemicals			-0.206
			-1.49
du_construction			-0.452
			-1.9
du_consumer goods			0.174
			-0.91
du_food			-0.398
			(-2.58)**
du_machinery			-0.144
			-0.94
du_metal			-0.527
			(3.48)**
du_textile			-0.712
			(-4.61)**
Constant	1.114	-1.102	-2.791
	(17.90)**	(-3.48)**	(-11.11)**
Observations	30811	30811	30811
Number of code	6165	6165	6165
R-squared	0	0.01	
Robust t statistics in parentheses			
* significant at 5percent; ** significant at 1percent			

Table 7.12 Panel regression results using fixed effect model with lagged varibles, Industy size and indstry type dummy

	-1	-2	-3
	ldNFA	ldNFA	ldNFA
share_prof_l1	0.01	0.009	0.011
	(11.38)**	(14.09)**	(7.22)**
NFA_Av_NFA_l1	-1.704	-2.455	-2.649
	(-25.27)**	(-31.65)**	(-37.23)**
du_small		2.973	3.395
		(8.04)**	(13.65)**
du_medium		4.86	5.473
		(12.38)**	(21.19)**
du_big		7.01	8.038
		(17.54)**	(32.18)**
du_chemicals			-0.298
			-1.77
du_construction			-0.971
			(-3.19)**
du_consumer goods			-0.028
			-0.12
du_food			-0.477
			(-2.54)*
du_machinery			-0.303
			-1.57
du_metal			-0.67
			(-3.64)**
du_textile			-1.186
			(-6.18)**
Constant	2.901	-1.678	-2.466
	(49.11)**	(-4.65)**	(-8.75)**
Observations	26996	26996	26996
Number of code	5663	5663	5663
R-squared	0.04	0.07	
Robust t statistics in parentheses			
* significant at 5percent; ** significant at 1percent			

Table 7.13 Panel regression results using fixed effect model with Industy size and indstry type dummy

	-1	-2	-3
	ldNFA	ldNFA	ldNFA
share_prof	0.009	0.009	0.011
	(4.21)**	(4.21)**	(4.55)**
NFA_Av_NFA	0.41	0.177	-0.235
	(9.18)**	(3.42)**	(5.07)**
du_small		2.043	3.26
		(6.30)**	(14.45)**
du_medium		2.742	5.015
		(7.86)**	(21.40)**
du_big		3.115	6.725
		(8.73)**	(29.73)**
du_chemicals			-0.275
			-1.94
du_construction			-0.535
			(-2.20)*
du_consumer goods			0.056
			-0.29
du_food			-0.523
			(-3.32)**
du_machinery			-0.21
			-1.33
du_metal			-0.589
			(-3.78)**
du_textile			-0.789
			(-4.99)**
Constant	1.3	-1.062	-3.17
	(27.56)**	(-3.35)**	(-12.58)**
Observations	30811	30811	30811
Number of code	6165	6165	6165
R-squared	0	0.01	
Robust t statistics in parentheses			
* significant at 5percent; ** significant at 1percent			

Table 7.14 Year-wise regression of change in fixed assets on Borrowing

YEAR	BORR/Totcap	STD ERROR	Constant	STD ERROR	Obs	R-sq
1998	0.140*	(0.0772)	-25.92***	(1.757)	3,408	0.001
1999	-0.0199	(0.0269)	-3.391***	(0.551)	3,949	0.0001
2000	0.0131	(0.0191)	-1.877***	(0.472)	3,971	0.0001
2001	-0.00467	(0.0334)	-3.816***	(0.785)	3,999	0.0001
2002	0.532***	(0.0408)	-9.418***	(0.973)	4,400	0.037
2003	0.120***	(0.0301)	-4.585***	(0.759)	4,582	0.003
2004	-0.104***	(0.0146)	-1.141**	(0.484)	4,689	0.011
2005	0.168***	(0.0136)	-1.702***	(0.461)	4,666	0.032
2006	0.160***	(0.00568)	-0.621***	(0.202)	4,555	0.148
2007	0.0259***	(0.00724)	0.673***	(0.247)	4,532	0.003
2008	-0.0762***	(0.0109)	0.680*	(0.367)	4,448	0.011
2009	0.0570***	(0.00479)	0.131	(0.180)	4,354	0.031
2010	0.0109*	(0.00660)	0.334	(0.259)	4,154	0.001
2011	0.0926***	(0.00370)	0.00321	(0.172)	3,593	0.148
2012	0.108***	(0.00379)	-0.377**	(0.174)	3,124	0.205
2013	0.111***	(0.00765)	-0.192	(0.376)	2,417	0.080
2014	0.0135***	(0.00127)	-0.113*	(0.0601)	1,983	0.054

*** p<0.01, ** p<0.05, * <0.1

Table 7.15 Year-wise regression of change in fixed assets on Profits

YEAR	PRO/Totcap	STD ERROR	Constant	STD ERROR	Obs	R-sq
1998	-0.340	(0.433)	-25.00***	(1.699)	3,408	0.0002
1999	0.0504	(0.121)	-3.525***	(0.527)	3,949	0.0002
2000	-0.0772	(0.0919)	-1.777***	(0.455)	3,971	0.0002
2001	0.168	(0.156)	-3.882***	(0.752)	3,999	0.0003
2002	0.999***	(0.163)	-6.023***	(0.945)	4,400	0.009
2003	1.483***	(0.0573)	-4.732***	(0.682)	4,582	0.128
2004	0.147**	(0.0572)	-2.103***	(0.473)	4,689	0.001
2005	0.847***	(0.0480)	-1.230***	(0.441)	4,666	0.063
2006	0.704***	(0.0309)	0.0158	(0.204)	4,555	0.102
2007	1.127***	(0.0276)	-0.502**	(0.205)	4,532	0.270
2008	-0.209***	(0.0512)	0.130	(0.355)	4,448	0.004
2009	0.191***	(0.0208)	0.410**	(0.177)	4,354	0.019
2010	0.320***	(0.0249)	-0.126	(0.248)	4,154	0.038
2011	0.142***	(0.0155)	1.012***	(0.178)	3,593	0.023
2012	0.0423***	(0.0163)	1.086***	(0.187)	3,124	0.002
2013	0.139***	(0.0280)	1.291***	(0.373)	2,417	0.010
2014	0.0841***	(0.00462)	-0.0423	(0.0548)	1,983	0.144

*** p<0.01, ** p<0.05, * <0.1

Table 7.16 Year-wise regression of change in Inventories on Borrowing

YEAR	BORR/Totcap	STD ERROR	Constant	STD ERROR	Obs	R-sq
1998	0.531***	(0.00469)	-0.0548	(0.107)	3,408	0.790
1999	0.388***	(0.00732)	0.883***	(0.150)	3,949	0.416
2000	0.411***	(0.00666)	0.751***	(0.165)	3,971	0.489
2001	0.565***	(0.00811)	-0.232	(0.191)	3,999	0.548
2002	0.547***	(0.00670)	0.0899	(0.160)	4,400	0.602
2003	0.466***	(0.0119)	0.990***	(0.300)	4,582	0.251
2004	0.326***	(0.00675)	1.794***	(0.224)	4,689	0.332
2005	0.340***	(0.00655)	1.969***	(0.222)	4,666	0.366
2006	0.247***	(0.00553)	2.616***	(0.197)	4,555	0.305
2007	0.369***	(0.00661)	1.888***	(0.226)	4,532	0.407
2008	0.379***	(0.00751)	1.708***	(0.253)	4,448	0.364
2009	0.442***	(0.00753)	1.602***	(0.282)	4,354	0.441
2010	0.641***	(0.00856)	0.356	(0.336)	4,154	0.575
2011	0.939***	(0.0190)	-3.608***	(0.884)	3,593	0.404
2012	1.019***	(0.0217)	-4.873***	(1.000)	3,124	0.413
2013	0.409***	(0.0112)	2.611***	(0.549)	2,417	0.358
2014	0.425***	(0.0131)	2.427***	(0.623)	1,983	0.346

*** p<0.01, ** p<0.05, * p<0.1

Chapter VII: Financial Development in Goa

In the previous chapter we examined the change in credit and how it impacts on the net fixed assets. We found that financial borrowing and investment profits have diverged from financing of fixed assets to favour financial assets and inventories in non financial industries in India.

In this chapter we deviate a bit from the rest of the thesis to look at the financial and growth issues in the state of Goa. There are two reasons for doing this- first Goa is the highest per capita state in India, and it will be interesting to pose the financial growth question in the context of this state and second, there is very little literature which documents this link in Goa.

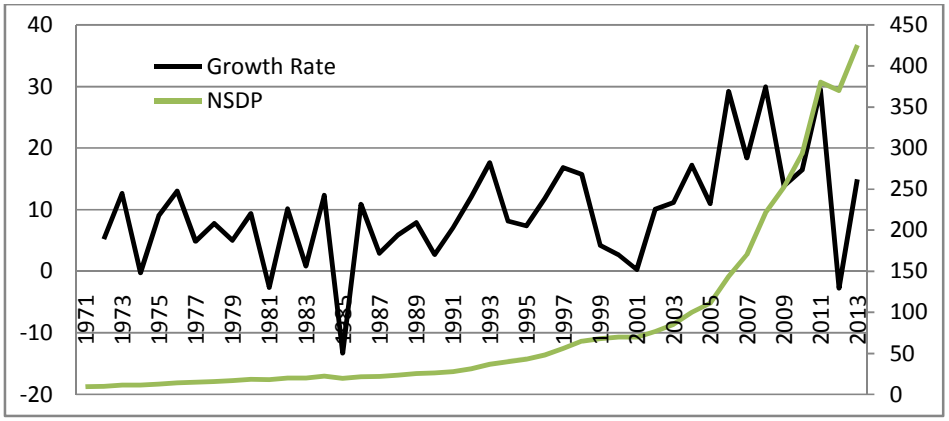
8.1 Goan Economy:

Goa is one of the small states of India and ranked as number one for its socio economic status in India (Planning Commission, 2011). Goa has seen growth rate of more than 10percent and for some years in same period above 20 percent (between 2002 -2011) (Figure 8.1). Goa is blessed with minerals which helps it gain revenue from mining activity along with sea and sand which brings in abundance of tourism revenue. The slowdown of the mining activities in Goa from 2012 has pushed down its growth rates.

Goa joined the Indian union in 1961 after nearly four and half centuries of Portuguese colonization and fourteen years of India's own tryst with freedom.

The state has achieved a growth rate above the national average and structural changes in the state have helped it to develop faster than the rest of the country.

Figure 8.1 Growth rate of NSDP for Goa from 1971 to 2013



Source :- EPWRF

Note figures on primary axis are percentage growth rate of NSDP and figures on secondary axis are NSDP in Rs. Billion.

In Goa the contribution of Banking and insurance has shown exponential growth since 1992 after liberalisation in India in 1991. Banks normally provide two kinds of primary services – receive money from depositors and then lend or provide credit to borrowers. The role of banking in national development is to be adjudged on the basis of these two services. The fact that it has encouraged high levels of deposit is indicative that it has fulfilled its goal of providing safe financial assets to the Goan population. However, when one looks percentage given out as credit it seems rather low especially when one compares with the national average or the neighboring states. Goa's per capita bank deposit (Rs 2, 78,495) is about four times the national average in 2014 but

the per capita bank credit is about one and a half times (Rs 87,486) the national average.

Credit is an engine of growth for regions which are bank based economies. In Goa the banking system is an important source of finance and contributes significantly to meet credit requirements of the state, given that, the other sources of finance are inadequate (Goa Government, 2014a). Credit plays an essential role in creating additional purchasing power and investment in the economy. It helps in capital formation and builds the productive capacity of the state. This reflects on income, employment and output of the state.

In an economy the penetration of credit could be measured in terms of credit deployed against the deposit received, represented by the Credit Deposit Ratio. The Reserve Bank does not stipulate a minimum or maximum level for the ratio. But, a very low ratio indicates banks are not making full use of their deposits. It is also sign that banks have excess liquidity Deepak, (2011). And if the ratio is above a certain level, it indicates high demand for credit. At present, the credit-deposit ratio for the banking sector as a whole is 77.6 percent (RBI 2016). In the case of Indian banks, a credit-deposit ratio of over 73 percent indicates pressure on resources as they have to set aside funds to maintain a cash reserve ratio of 4.0 percent and a statutory liquidity ratio of 22 percent. The ratio gives the first indication of the health of a bank. A very high ratio is considered alarming because, in addition to indicating pressure on resources, it may also hint at capital adequacy issues, forcing banks to raise more capital.

Moreover, the balance sheet would also be unhealthy with asset-liability mismatches. But such a situation is considered extreme as there are not many known instances of banks overstretching themselves. But, the Reserve Bank has voiced concerns over the current ratio of banks as it could have financial stability implication at the systemic level (Deepak, 2011). Moreover, it is straightforward indicator of the performance of scheduled commercial banks and sheds light on the type of society and economy we live in. The importance of disbursing credit out of mobilized saving for productive purpose is well documented in the studies of Finance, and Economic Growth (Levine, 1997).

In the next section we now discuss the banking situation in Goa.

8.2 Structure of Credit and Deposits in Goa:

Table 8.1 Deposits in Goa (1980 – 2014)

Year	Deposits (Rs. In Crore)	percent annual growth rate over previous year	Deposits per branch office branch office (Rs. In crore)	Per Capita Deposits (Rs.)
1980	380.92		1.48	3779
1990	1636.88	7.1	5.35	13993
2000	8415.9	14.8	18.95	62618
2010	35631.1	20.8	59.58	244430
2014	55611.52	14.5	69.6	278495

Source: Basic Statistical Returns

The annual percentage increase shows double digit growth rate from 2000. Goa has the highest per capita deposits highest at Rs 2, 78,495 (2014). This reflects two things one population base of Goa is low as compared to rest of the

country and secondly major contributor to the high per capita deposits is significant inflow of remittances (see Table 8.5).

Annual growth rate of credit was 22.7 in 1990 which came down to 6.5 in 2000, the per capita credit was Rs 87,486 in (2014).

Table 8.2 Credits disbursed in Goa (1980 – 2014)

Year	Credit (Rs. In crore)	percent Annual Growth rate over previous year	Credit per bank branch (Rs. In crore)	Per Capita Credit(Rs.)
1980	171.18		0.66	1698
1990	640.94	22.7	2.09	5479
2000	2405.16	6.5	5.42	17896
2010	11134.52	15.2	18.62	76383
2014	17469.66	8.6	21.86	87486

Source: Basic Statistical Returns

Table 8.3 Taluka-wise Deposits in Goa in 2014

Taluka	Deposits (Rs. In Crore)	Percentage distribution	Per Capita deposits(Rs.)
Tiswadi	16037.82	28.84	661010
Salcete	14379.98	25.86	356696
Bardez	10811.89	19.44	332599
Mormugao	6907.53	12.42	326434
Ponda	3134.96	5.64	138083
Quepem	1091.81	1.96	98150
Bicholim	1080.81	1.94	80593
Pernem	686.67	1.23	66214
Canacona	640.62	1.15	103586
Sanguem	545.49	0.99	61159
Sattari	294.72	0.53	33732

Source : Credit Deposit Ratio in Goa 2014

If we look at geographical distribution of deposits, we find that, Tiswadi had highest deposits of Rs 16,038 crore followed by Salcete with Rs 14,380 crore

in 2014. These two talukas together contributed 55 percent of the total deposits of the state. These two talukas host the major business establishments. Bardez, Mormugao and Ponda are developing talukas in terms of industrialization and they also attracted large number of tourists (Goa Government, 2014b). Six talukas, namely Quepem, Bicholim, Pernem, Canacona, Sanguem and Sattari contributed less than 2 percent to total deposits. These talukas are mainly covered by forest area and mining and agriculture are the main economic activities. The offices of the mining companies however are located in Tiswadi and Salcete, main financial transactions will take place in these two talukas which will not reflect in the main place of mining. Also agricultural activity is not remunerative, accept those engaged in the cashew and areca nut plantation. Therefore, the bank transactions are small.

Table 8.4: Taluka-wise Credit in Goa 2014

Taluka	Credit (Rs. In Crore)	Percentage distribution	Per Capita Credit(Rs.)
Tiswadi	6771.09	38.76	279075
Salcete	3481.52	19.93	86359
Bardez	2788.57	15.96	85783
Mormugao	1941.27	11.11	91740
Ponda	1030.17	5.9	45375
Quepem	429.51	2.46	32027
Bicholim	306.66	1.76	27588
Pernem	230.94	1.32	25892
Canacona	173.72	0.99	19883
Sanguem	173.4	0.99	16721
Sattari	142.81	0.82	23092

Source: Credit Deposit Ratio in Goa 2014

Tiswadi and Salcete talukas together contributes 59 percent of the total credit disbursed by the bank in 2014 (see Table 8.4). About one third of the credit is disbursed in Bardez, Mormugao and Ponda . Remaining 8 percent of the credit

is disbursed in 6 talukas namely Quepem, Bicholim, Pernem, Canacona, Sanguem and Sattari. The reasons why these talukas have low deposits is the same for low credit sanctioned. These talukas are engaged in agricultural as its main income generating activity. The contribution from the services and industry to income is not significant in these talukas. Most of the farming is on marginalized land holdings which do not require much of financial assistance or they prefer subsidized assistance provided by the government agencies.

Most vital component which inflates deposits in Goa is remittances. Non Resident External Accounts in Goa contributes 20 percent of the deposits in 2014 (See Table 8.5). Almost 3.4 lakhs Goan population is working aboard and contributes significantly to the Goan Economy in form of remittances (Goa Government, 2016).

Table 8.5 NRE Deposits in Goa

Year	Domestic Deposits (Rs. In Crore)	N.R.E. Deposits (Rs. In Crore)	Total Deposits (Rs. In Crore)	percent of NRE deposits to the total deposits
1992	1716.29	583.47	2299.76	25.37
1995	2803.72	910.59	3714.31	24.52
2000	5889.52	2526.38	8415.9	30.02
2005	14021.75	3730.91	17752.66	21.02
2010	30584.2	5046.9	35631.1	14.16
2011	36186.31	4912.3	41098.61	11.95
2012	33928.84	7182.59	41111.43	17.47
2013	39446.71	9106.32	48553.03	18.76
2014	44632.68	10978.84	55611.52	19.74

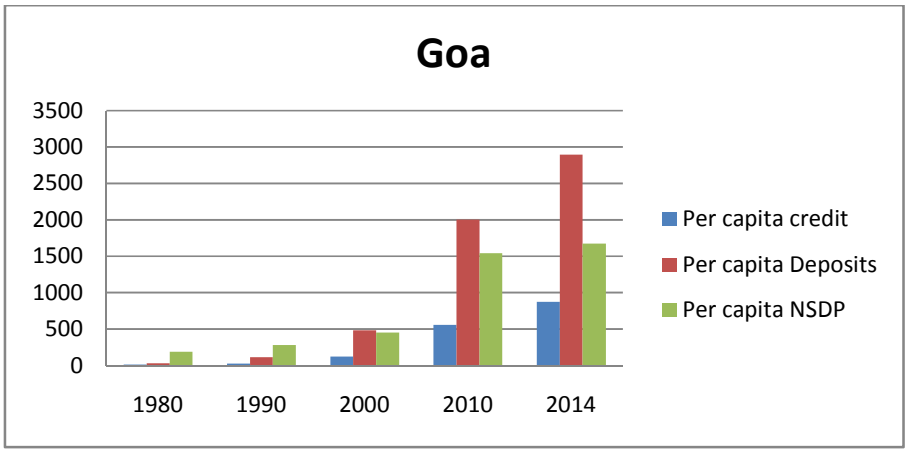
Source: Credit Deposit Ratio in Goa 2014

These remittances not only gave boost to the deposits of the state but also to the residents through increased purchasing power.

8.3 Goa and India Comparison:

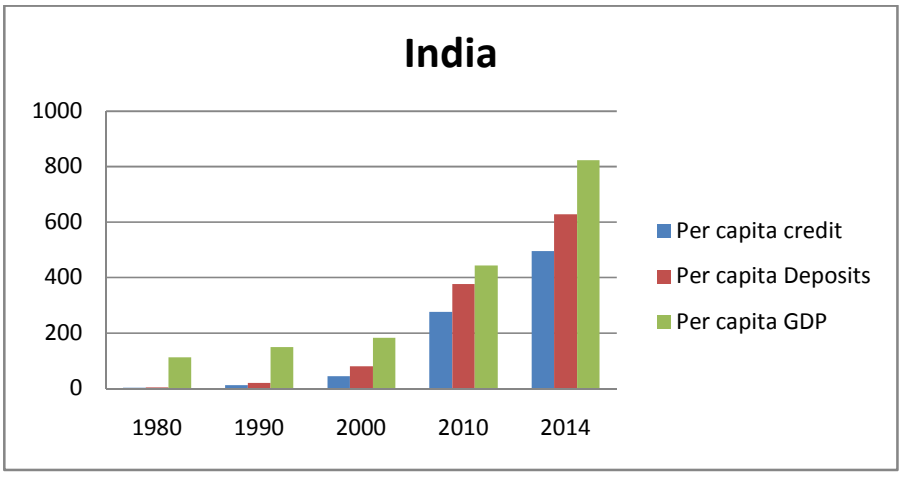
When we compare Goa's the per capita deposit we find it is three times higher than the per capita credit.

Figure 8.2 Per capita credit Rs ('00), deposits & NSDP for Goa



Source: Basic Statistical Returns & EPWRF

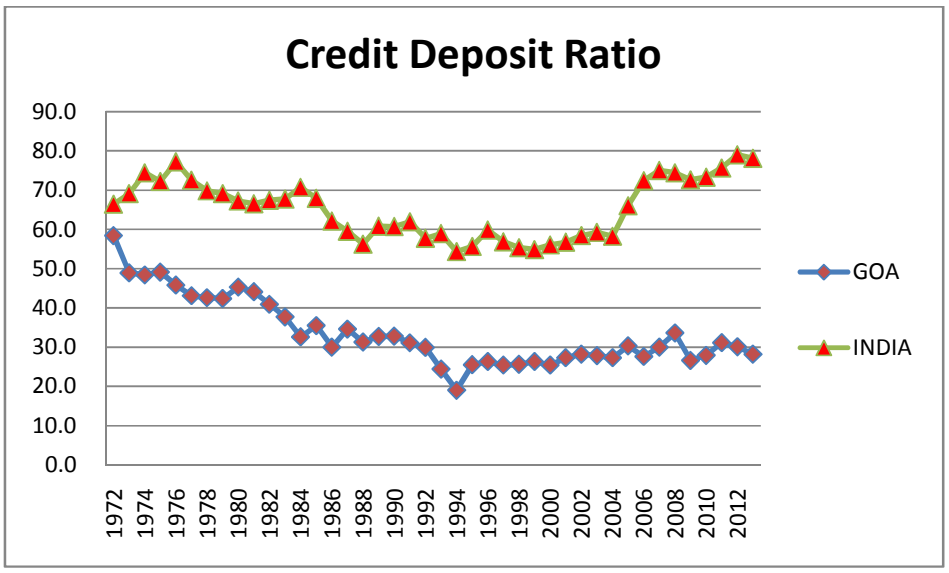
Figure 8.3 Per capita credit Rs ('00), deposits & GDP for India



Source: Basic Statistical Returns & EPWRF

Goa and India share a similar financial structure in some respects. The number of accounts (per capita) is highest for savings accounts followed by term deposit accounts. However, Goa has more than one account per person while the country average is one account between two persons (in 2014). The per capita term deposits stands at Rs 1, 40,000 against Rs 44,000 per capita saving deposits in Goa (in 2010), (Goa Government, 2014a). Interestingly, there was a 3-fold increase in per capita term deposit between 2000 and 2014 (Figure 8.2). Interestingly, when we compare the credit and deposit pattern of Goa with the rest of the country we find that Goa like India has a lower per capita credit than the deposit rate. But unlike the rest of the country, the per capita deposit in Goa is greater than per capita income and it has been this way for more than two decades. This is possibly reflective of two things: (a) there is a large remittance flow into Goa, and (b) the entrepreneurial effort using bank loans in Goa has been lower than the national level. This is clearly demonstrated by the CDR (Figure 8.4). While the rest of the country has a CDR above 70 percent, in Goa it is below 30 percent (Figure 8.4). Three reasons have been suggested to explain the low CDR in Goa. First, major industries such as pharmaceuticals and hotels source credit from their head office locations which are outside the state (Deepak, 2011). Second, internal cash generation in industries such as tourism and iron-ore reduces institutional finance.

Figure 8.4 Credit Deposit Ratio (1972-2013)



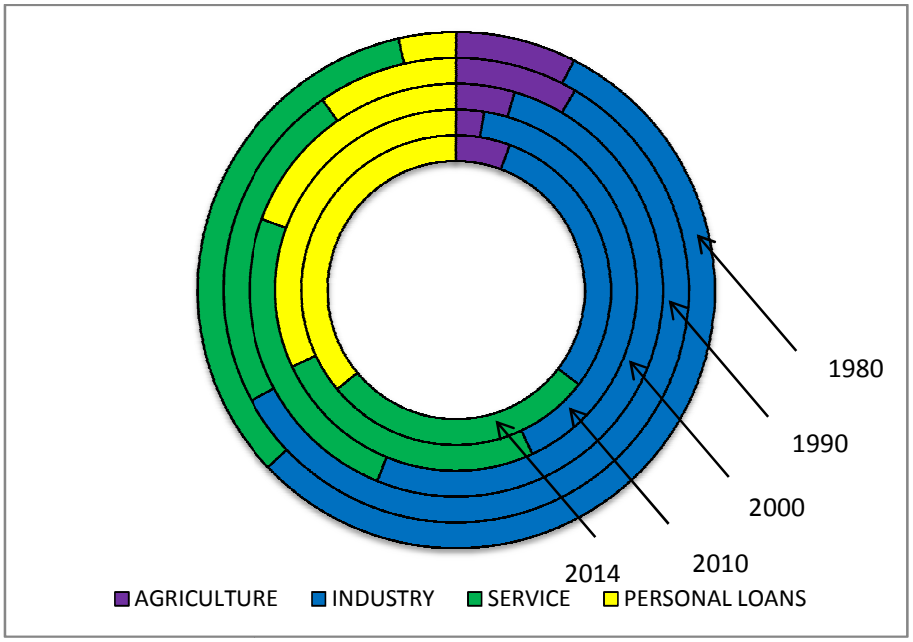
Third, with a substantial share of non-resident deposits, the deposit base is large which imparts a downward bias to the credit-deposit ratio of the state. However, while the first explanation can account for a onetime deviation from the national average it can hardly explain the secularly low rate. The second explanation does not stand up to scrutiny. The third explanation too reflects a lack of demand for credit. Therefore, the reasons low CDR ratio has to be sought elsewhere.

8.4 Credit Allocation in Goa:

The sector-wise allocation of credit in Goa from (1980-2010) has seen an interesting transition (Figure 8.5). Industry which took 59 percent of the credit in 1980 and went up to 79 percent in 1990 has now declined to 39 percent in 2010. Personal Loan has seen a ten-fold rise between1980-2010 and is now the

second most important component of credit. Agricultural credit is now down to a mere 2 percent. Services sector is only the third largest borrower in the Goan economy. Interestingly, the credit-deposit ratio in Goa both sanctioned and utilized has declined drastically from 58 percent in 1972 to less than 30 percent in 2010.

Figure 8.5 Credit Allocation Occupation-wise (1980-2014)



Source: - RBI (various issues)

8.5 Conclusion:

Goa is the smallest state in India and, one of the most developed states. In terms of financial development Goa is the only state with 100 percent financial inclusion in the country. The deposits show its potential in terms of saving and

generation of financial capital. The concern for the state is that there are few takers for the credit for investment purpose.

In the next chapter we conclude the finding we discussed in rest of the chapters.

Chapter IX: Conclusion

In the previous chapter we discussed financial development in Goa and examined the extent of banking sector development in Goa.

In the present chapter we conclude study and also summarise the contribution of this study to the literature.

Our study had the objective of examining the impact of financial liberalisation on economic growth in India. We started by looking at the international experience of financial liberalisation on growth. Then we proceeded to examine the case of India. In Chapter One we discussed the background of the study, giving a brief history of the Indian financial system, over 3 distinct time periods. The post-independence period in India from 1947 to 1968 in banking sector was controlled by the private sector banks followed by a period of nationalisation in 1968 to 1990 and lastly the post-liberalisation period from 1991 onwards. It covers the objectives, research gap and chapter scheme of the study.

In Chapter Two we reviewed the relevant literature, on financial liberalisation and the effect of financial liberalisation and development on economic growth. This was extended to understand the developments in the industrial sector due to financial liberalisation and development.

The Third Chapter dealt with data related issues and we did three things. First we discussed the data of Indian states. To measure financial liberalisation, total credit sanctioned by scheduled commercial banks statewise is taken from RBIs Basic Statistical Returns, (various years) from 1971 to 2013. Also the credit sanctioned to agriculture, service and industry by schedule commercial banks is used to capture sectorwise effect on output. As a measure of economic growth, a Log Real NSDP per capita, constant price 2004-05 is used. Data for 21 states for 42 years from 1971 to 2013 is used for regression analysis. We then examined data for non-financial firms in India from 1998 to 2014. The firms borrowing influence net change in physical investment, financial investment and inventories. To understand these relationships, CMIE's Prowess dataset is used across 8 different broad industries and 4 different categories of industries. Thirdly, we describe data for our cross country analysis taken from World Bank for the period 1970 to 2012 for 98 countries.

After discussing the data we proceeded in Chapter Four to describe the different regression methods used in our thesis. We relied largely on two methods: panel regression and quantile panel regression. The panel data also known as longitudinal data, consisting of time component and cross sectional units, makes regression results more robust. The large datasets are more informative and estimates are more reliable and needs less restrictive assumptions, which permits to test more sophisticated models. An added advantage of panel dataset is the

ability to control for individual heterogeneity. In particular, these models help in estimating dynamic models.

We also use quantile regression method. The linear OLS regression is a method to find the relationship between a group of predictor variables and a dependent or response variable. The regression model provides the mean value of the response variable for the given predictor variables based on the conditional mean function E(y|x). If we wanted to consider the relationship between a group of predictor variables and a dependent or response variable at different quantiles with a function Q(y|x), where the quantile Q can take values such as 5^{th}, 10^{th}, 25^{th}, 50^{th}, 75^{th} and 95^{th} , in the distribution. This technique helps us answer the question: "does credit influence output of the state differently for states with low or high credit availability than those with average credit? A broader picture of the relationship between the predictors on the response variable can be efficiently obtained by using quantile regression. To the best of our knowledge, this is the first attempt at using quantile panel regressions in testing for growth and financial relations. This is a contribution of this study.

We examine the effect of financial liberalisation on the growth across the countries in Chapter Five. In most of the countries in the world, equity market is not well developed, so they depend on the debt market for financing investment. The role of financial liberalisation is to free interest rate and attract large savings and

provide credit at market rate, which is a supply side outcome. To find the relationship between the economic growth and credit as a proxy for financial liberalisation we examine for causality between per capita growth (demand) and credit to private sector (supply) using panel Granger causality test

Unit root test for the Log of per capita income growth and log of credit to the private sector are found to be stationary which is primary requirement for the running of the Granger causality test. The panel Granger causality test results suggest that credit is not causing per capita income growth, but per capita income growth may be driving changes in credit to the private sector across countries.

We then focus on financial development in India (Chapter Six). Banking development is used as indicator of financial liberalisation. A number of factors can be examined to capture the degree to which banks improve market frictions and thereby advance competition, diversification, and ease the mobilization and pooling of savings. However, such empirical proxy variables do not exist for a large set of states over the last few decades in India. We therefore relied on a standard measure of the size and activity of banks for the period 1971 to 2013. We also studied the credit sanctioned to agriculture, service and industry by schedule commercial banks to examine sectorwise effects.

The OLS results show that financial liberalisation had a positive impact on overall economic growth of the country. Furthermore when bank credit is divided sector-wise (Agriculture, Services and Industry) we find a significant relationship for each sector, positive for services and industry but negative for Agriculture. Since OLS results for time series data suffer from estimation problems we used panel quantile technique and the results were different. All three sectors were insignificant at higher quantiles, implying that bank credit was not influencing economic growth at higher levels of growth. But bank credit was significantly influencing economic growth for states at lower quantiles (below 50%). This implies that a threshold effect may exist, as economic growth surpasses particular levels it is influenced by other factors than bank credit. This also is a new result for the Indian literature on impact of credit on growth.

We next look at the debate on financialization and its impact on growth in India (Chapter Seven). The past two decades in India has seen an increased role and use of the finance and a shift in investment from physical assets to financial assets. The critiques of financialisation, are that it adversely affects physical capital formation and reduces employment.

Some argue that there are thresholds below which financial development is necessary for growth and on crossing this limit there are adverse consequences. The current state of global economic slowdown is attributed by some to the

financialisation of the global economy. The issue of financialsation therefore raises the core issues in economics – equity and efficiency, agency, role of state and markets in promoting human wellbeing.

The critique of financialisation may seem contrary to what emerging countries anticipate from the increased role of finance in their economies. After all finance has played an important role in industrial development and growth of economies. Availability of credit makes the wheels of industry move forward as they are able to undertake investment which would otherwise be unfeasible.

One way to test this claim would be to look at India's industrial sector and see if there are any clues to this financial debate. We use the CMIE's Prowess dataset of about 7007 non-financial industries categorized into eight broad sectors: transportation, food and agriculture, construction, machinery, metal, chemicals, textiles and consumer goods. We also use data on firm size and classify them as per Ministry of Industries Government of India size specifications for micro, small, medium and big units. According to CMIE database classification Net fixed assets is the sum of intangible assets, net land and buildings, net plant and machinery, computers and electrical assets, net transport and communication equipment and infrastructure, net furniture, social amenities and other fixed assets and net lease adjustment reserves. Change in net fixed assets therefore is an

indicator of investment and we compliment this with financial information from the firms – borrowings, profits, inventories and financial investment.

Borrowings are created when a company takes loans. Financial Investment is defined as the expenditure by firms on buying shares, debentures, bonds and mutual funds, etc. Inventories are materials held to be consumed in the production process or for sale. These include all goods that are purchased and held for processing or for resale or in the form of materials or supplies to be consumed in the production process or in the rendering of services.

We setup a model with investment as the dependent variable (a quasi investment function) and financial variables as the explanatory. The impact of borrowings on change in Net Fixed Assets (NFA) is estimated using borrowings, profit, financial investment and inventories. We also allow for a lagged impact of profit on investment, as firms decide how much to invest depending on what was their profit in the previous period.

Our findings suggest that borrowings among Indian firms are financing inventories and accumulating financial assets. This shows that while credit access does ease the formation of capital the onus of growth still depends on demand stimuli in the

real goods and services domain. This is an important finding in the context of the Indian Economy.

We next move away from a national level analysis to examine how the highest per capita income state Goa has been impacted by financial development (Chapter Eight). Goa is one of the small states of Indian sub continent and ranked as number one for its socio economic status in India. In Goa the contribution of Banking and Insurance has shown exponential growth since 1992 (after liberalisation in India). Banks normally provide two kinds of primary services – receive money from depositors and then provide credit to borrowers. The role of banking in national development is to be adjudged on the basis of these two services. The fact that it has encouraged high levels of deposit is indicative that it has fulfilled its goal of providing safe financial assets to the Goan population. However, when one looks at the credit figures, it seems rather low especially when one compares with the national average. Goa's per capita bank deposit (Rs 2, 98,135) is about four times the national average in 2013 but the per capita bank credit is about one and a half times (Rs 78,178) the national average.

Credit is an engine of growth in countries which are bank financed economies. In case of Goa banking system is important source of finance and contributes significantly to meet credit requirements of the state. Credit plays essential role in creating additional purchasing power in the economy. In an economy the

penetration of credit could be measured in terms of credit deployed against the deposit received, labeled as the Credit Deposit Ratio. However we find that over the years the credit off take has slowed down as compared to the rest of the country.

We conclude this study in Chapter Nine. The policy reforms in India in 1991 transformed the financial sector in India. Our study examines how these reforms have helped in the country's growth. The literature on financial liberalisation and development has shown diversity in outcomes. Financial development is possible without going for financial liberalisation as it is an exogenous process and many developed countries showed it works well (Japan and Germany are classic examples). If we look at developing countries, the financial liberalisation has not shown much impact on direct growth, unless others factors are also in place.

The first objective of this study was to compare the effect of financial liberalisation in the post liberalisation and pre-period in India. We have tested this for India using a panel data study for a cross section of 21 Indian states over 42 years. A simple dummy to distinguish the two time periods was used in panel regression using per capita NSDP growth rate and Total credit sectioned to the private sector by the financial institutions. We find that the coefficient for the two time periods differs and it is positive and significant. But the estimate coefficients do not explain much of the change in the per capita NSDP growth rates of the

states. This leaves us with the conclusion that though reforms have changed the financial system in India, its impact is not large enough for explaining the growth in Indian economy.

The second objective was to understand the use of finance and its impact on the growth potential of the Indian Economy. In India more than 60 percent of the organised finance comes from banking sector borrowings. The industrial sector is the biggest borrower in the Indian economy. To understand the role of borrowings in capital accumulation by the Industrial sector, we used a unit level data for 7007 distinct industries from 1998 to 2014. Our study shows that borrowings by the industrial units are used for buying financial assets and holding of inventories, rather than financing new investment.

The third objective was to analyse the impact of sectoral finance (Industrial, Agriculture and services) on per capita NSDP growth. Credit to industry and service sectors are positively and significantly impacting a per capita income while agriculture shows negative and significant relationship. The regression results are similar for random effect model, and fixed effect models indicates that results are consistent.

The fourth objective was to understand the level of financial development and regional differences among Indian states. We find using quantile regression

technique, the growth of states at lower percentile of income is influenced by credit more significantly than the states with higher percentile of income.

9.1 Contribution of the Study:

We summarize briefly what we believe are the main contributions of this study:

1. We provide first evidence of differentiated impact of credit on growth across income quantiles and the possible presence of threshold effects of credit on economic growth.

2. Financialisation in India seems to affect investment behavior at the firm level as borrowings by non financial companies are being used to finance accumulation of inventories and investment in financial asset, rather than physical assets.

3. We provide evidence of unidirectional relationship where economic growth is leading to financial development, in India.

4. On the methodological front this is one of the first studies dealing with finance and growth in India that has used a panel quantile regression analysis.

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Appendix:

Install RQPD package from http://r-forge.r-project.org/R/?group_id=1082 both for windows and Linux is available.

ydata<-read.csv("f:/data.csv")---------- reads csv file in R

attach (mydata)---------attach csv file to the R

panel(method="pfe", taus=1:3/4, tauw=c(.25,.5,.25), lambda=1, ztol=1e-5)-------fixed effect method for quantile regression

method (FE, CRE): Method specificaition. "pfe" for a fixed effects estimation, "cre" for correlated random-effects estimation. Default is "pfe".

taus (FE, CRE): A vector of quantile indices in (0,1). Default is 1:3/4.

tauw (FE): A vector of weights (summing to 1) for the K weighted components in the FE criterion function. Default is c(.25, .5, .25).

lambda (FE): The penalty parameter controlling the shrinkage of the fixed effects toward zero. Default is 1.

cre (CRE): When method="cre", this is used to specify the nature of the CRE component. For time- means use "m" or "crem", for a specification like that in Abrevaya and Dahl (2008) use ad". Default is "m", which allows for an unbalanced panel. "ad" does not.

ztol (FE): A small number used to determine when numerically small numbers should be considered to be zero. Default is 1e-5.

```
p <- panel(taus=1:4/4, tauw=rep(1/4, 4))

fit <- rqpd(dp~ ag + se + id |s, p, data=mydata)

cre.form <- dp~ ag + se |s| id

crem.fit <- rqpd(cre.form, panel(method="cre"), data=mydata)
```